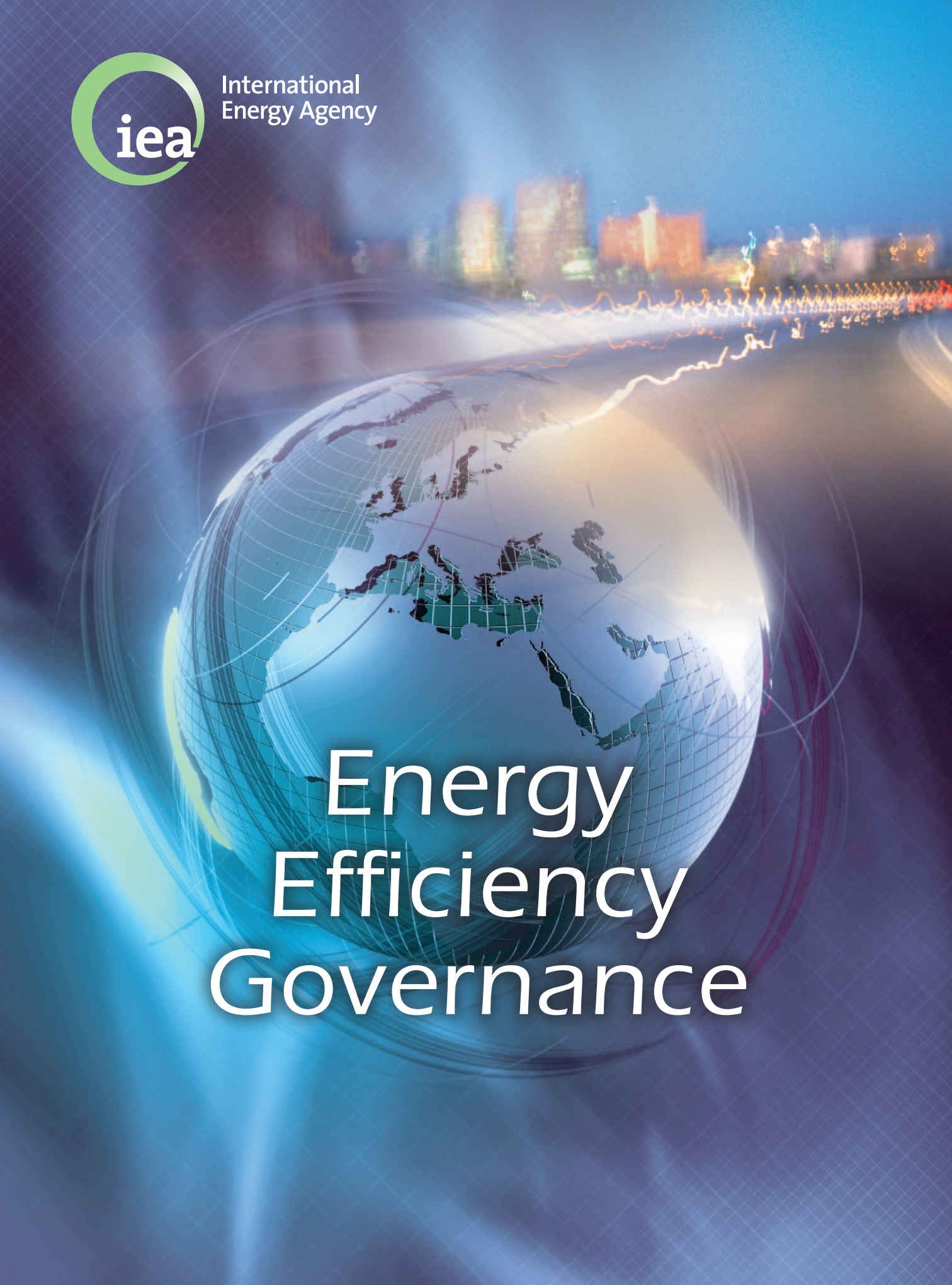
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The International Energy Agency (IEA), an autonomous agency, was established in November 1974. Its mandate is two-fold: to promote energy security amongst its member countries through collective response to physical disruptions in oil supply and to advise member countries on sound energy policy.

The IEA carries out a comprehensive programme of energy co-operation among 28 advanced economies, each of which is obliged to hold oil stocks equivalent to 90 days of its net imports. The Agency aims to:

- Secure member countries' access to reliable and ample supplies of all forms of energy; in particular, through maintaining effective emergency response capabilities in case of oil supply disruptions.
- Promote sustainable energy policies that spur economic growth and environmental protection in a global context – particularly in terms of reducing greenhouse-gas emissions that contribute to climate change.
- Improve transparency of international markets through collection and analysis of energy data.
- Support global collaboration on energy technology to secure future energy supplies and mitigate their environmental impact, including through improved energy efficiency and development and deployment of low-carbon technologies.
- Find solutions to global energy challenges through engagement and dialogue with non-member countries, industry, international organisations and other stakeholders.

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List of Acronyms

AAU	assigned amount units
ACEEE	American Council for an Energy Efficiency Economy (United States)
ACHEE	Agencia Chilena de Eficiencia Energética
ADEME	French Environment and Energy Management Agency
ANEEL	Brazilian Electricity Regulatory Agency
ANME	National Agency for Energy Conservation (Tunisia)
APEC	Asia-Pacific Economic Cooperation
APERC	Asia-Pacific Energy Research Centre
ARRA	American Recovery and Reconstruction Act (United States)
BAT	best available technology
BAU	business as usual
BEE	Bureau of Energy Efficiency (India)
CDM	Clean Development Mechanism
CDQ	coked dry quenching
CEE	Consortium for Energy Efficiency (North America)
CEE	Committee for Energy Efficiency (Japan)
CEEEP	California Energy Efficiency Evaluation Protocols
CEMC	Committee for Creating Eco-Model Cities and a Low-Carbon Society
CER	certified emission reductions
CERT	carbon emissions reduction target
CFL	compact fluorescent lamp
COAG	Council of Australian Government
CONUEE	National Commission for Energy Efficiency (Mexico)
COP	Conference of the Parties (United Nations Framework Convention on Climate Change)
DAEDE	Department of Alternative Energy Development & Efficiency (Thailand)
DANIDA	Danish International Development Agency
DECC	Department of Environment and Climate Change (United Kingdom)
DER	Department of Energy and Resources (Massachusetts, United States)
DSM	demand-side management
DSMO	Demand Side Management Office (Thailand)
E2PO	Energy Efficiency Programme Office (Singapore)
E2WG	Energy Efficiency Working Group
EAP	Energy Assistance Programme

EBRD	European Bank for Reconstruction and Development
EC	European Commission
ECA	enhanced capital allowance
ECBC	Energy Conservation Building Code
ECCJ	Energy Conservation Centre Japan
ECCT	Energy Conservation Centre of Thailand
ECF	Energy Conservation Fund (Thailand)
ECL	Energy Conservation Law (Singapore, China)
ECPA	Energy Conservation and Promotion Act (Thailand)
ECS	Energy Charter Secretariat
EE	energy efficiency
EEAC	Energy Efficiency Advisory Council (Massachusetts, United States)
EECA	Energy Efficiency and Conservation Authority (New Zealand)
EECB	Energy Efficiency Coordination Board
EECBGP	Energy Efficiency Community Block Grant Program (United States)
EECU	Energy Efficient Cities of Ukraine
EEG	Energy Efficiency Governance
EEWP	Energy Efficiency Working Party
EGAT	Electricity Generating Authority of Thailand
EMS	Energy Management System
EMC	Eco-Model Cities (Japan)
ENCON	Energy Conservation Fund (Thailand)
ENSI	Norwegian Energy Saving International
EPC	Energy Performance Contract
ERAM	electricity revenue adjustment mechanism
ERU	emission reductions units
ESCO	energy service company
ESD	Energy Service Directive
Eskom	Electricity Supply Commission (South Africa)
ESMAP	Energy Sector Management Assistance Programme
ESP	Energy Saving Partnership (Korea)
ETO	Energy Trust of Oregon
ETS	Emissions Trading Scheme (EU)
EU	European Union
FDC	Federal Trade Commission

FEMP	Federal Energy Management Program (United States)
FNME	National Energy Conservation Fund (Tunisia)
GCA	Green Communities Act (Massachusetts, United States)
GEA	Green Energy Act (Canada)
GEF	Global Environment Facility
GHG	greenhouse gas
GIS	green investment scheme
GoI	Government of Indonesia
GTZ	German Technical Cooperation Agency
GWSA	Global Warming Solutions Act
IDA	international development assistance
IDB	Inter-American Development Bank
IDeA	Improvement and Development Agency for local government
IEA	International Energy Agency
IFC	International Finance Corporation
IPMVP	International Performance Measurement and Verification Protocol
ISO	International Standards Organization
ITP	Industrial Technologies Program (United States)
JI	joint implementation
JICA	Japan International Cooperation Agency
KEEI	Korea Energy Economics Institute
KEMCO	Korea Energy Management Company
LAC	Latin America and the Caribbean
LCEC	Lebanese Centre for Energy Conservation
LCGG	Low Carbon and Green Growth (Korea)
LDC	local distribution company
LFMN	Federal Law on Metrology and Standards (Mexico)
M&V	monitoring and verification
MCE	Ministerial Council on Energy (Singapore)
MDB	Multilateral Development Bank
MED	Ministry of Economic Development (New Zealand)
MEEN	Municipal Energy Efficiency Network
MEMR	Ministry of Energy and Mineral Resources (Jordan, Indonesia)
MENA	Middle-East and North Africa
MEPS	minimum energy performance standards

METI	Ministry of the Economy, Trade and Industry (Japan)
MEW	Ministry of Energy and Water (Lebanon)
MKE	Ministry of Knowledge and the Economy (Korea)
MLG	multi-level governance
MOIT	Ministry of Industry and Trade (Vietnam)
NAER	National Agency for Energy Resources (Ukraine)
NAFTA	North American Free Trade Act
NBI	National Business Initiative (South Africa)
NDRC	National Development and Reform Commission (China)
NECAP	National Energy Conservation Action Plans
NECPA	National Energy Conservation Policy Act of 1978
NEEAP	National Energy Efficiency Action Plans
NEECS	National Energy Efficiency and Conservation Strategy (New Zealand)
NEPO	National Energy Policy Office (Thailand)
NERC	National Energy Research Centre (Jordan)
NERSA	National Electricity Regulator of South Africa
NFEE	National Framework for Energy Efficiency
NGO	non-governmental organization
NIEE	National Inquiry on Energy Efficiency (Sweden)
NIST	National Institute of Standards and Technology
NOVEM	Agency for Energy and the Environment (The Netherlands)
NYSERDA	New York State Energy Research and Development Authority (United States)
NZEECS	New Zealand Energy Efficiency and Conservation Strategy
OC	Other Countries
OEB	Ontario Energy Board (Canada)
OECD	Organisation for Economic Co-operation and Development
Ofgem	Office of Gas and Electricity Markets (United Kingdom)
OME	Other Major Economies
OPA	Ontario Power Authority (Canada)
OPUC	Oregon Public Utilities Commission (United States)
PCLCC	Promotion Council of Low-Carbon Cities
PEEEP	Promotion of Electrical Energy Efficiency Project (Thailand)
PEEREA	Protocol on Energy Efficiency and Related Environmental Aspects
PPEE	National Programme for Energy Efficiency (Chile)
ppm	parts per million

PPP	public-private partnership
PROCEL	National Electrical Energy Conservation Programme (Brazil)
RD&D	Research, development and demonstration
REEEL	Renewable Energy and Energy Efficiency Law (Jordan)
RET	Regulatory Energy Tax
SAVE	Specific Actions for Vigorous Energy Efficiency (European Union)
SCO	Standing Committee of Officials
SEU	Sustainable Energy Utility (Delaware, United States)
SOP	Standard Offer Programme (South Africa)
SME	small and medium enterprises
SPBC	system public benefits charges
UCEI	University of California Energy Institute (United States)
UKEEP	Ukraine Energy Efficiency Programme
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNESCAP	United Nations Economic and Social Commission for Asia and Pacific
UNFCCC	United Nations Framework Convention on Climate Change
UNIDO	United Nations Industrial Development Organization
USAID	United States Agency for International Development
US DOE	United States Department of Energy
US EPA	United States Environmental Protection Agency
US GAO	United States Government Accountability Office
VA	voluntary agreement
VAT	value-added tax
VNEEP	Vietnamese National Energy Efficiency Programme
WAP	Weatherization Assistance Program (United States)
WEC	World Energy Council
WHR	waste heat recovery

Executive summary

Improved energy efficiency (EE) is a critical response to the pressing climate change, economic development and energy security challenges facing many countries today. However, achieving EE improvements can be difficult. It requires a combination of technology development, market mechanisms and government policies that can influence the actions of millions of energy consumers, from large factories to individual households. Governments, EE stakeholders and the private sector must work together in order to achieve the scale and timing of energy efficiency improvements needed for sustainable and secure economic development. Much has been written about the role of market forces in delivering energy efficiency and market-based instruments play a central role in most national energy efficiency policies. However, much less is known about the legal, institutional, and co-ordination arrangements needed to scale-up energy efficiency. Compiling and presenting what is known about these important issues – referred to collectively as energy efficiency governance – is the purpose of this Report.

Experience shows that an EE policy is more likely to be successful if an effective system of EE governance is established (Box i). From the legal frameworks and institutions that develop and implement policy, to the stakeholders who participate in implementation in the market place, EE governance is a complex and yet critical part of the energy efficiency delivery system.

Box i **Definition of energy efficiency governance**

Energy efficiency governance is the combination of legislative frameworks and funding mechanisms, institutional arrangements, and co-ordination mechanisms, which work together to support the implementation of energy efficiency strategies, policies and programmes.

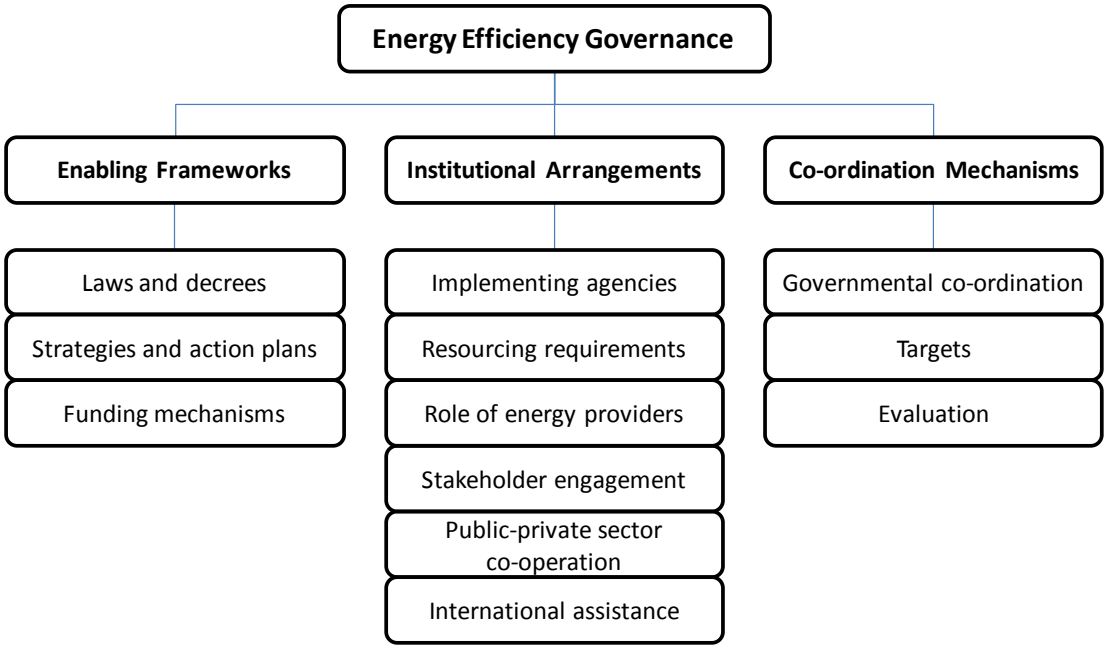
The purpose of this report is to help EE practitioners, government officials and stakeholders to establish the most effective EE governance structures, given their specific country context. It also aims to provide readers with relevant and accessible information to support the development of comprehensive and effective governance mechanisms.

The International Energy Agency (IEA) conducted a global review of many elements of EE governance, including legal frameworks, institutional frameworks, funding mechanisms, co-ordination mechanisms and accountability arrangements, such as evaluation and oversight. The research tools included a survey of over 500 EE experts in 110 countries, follow-up interviews of over 120 experts in 27 countries and extensive desk study and literature searches on good EE governance.

What is energy efficiency governance?

This study has identified three main aspects of energy efficiency governance: **enabling frameworks**, **institutional arrangements** and **co-ordination mechanisms**. Each aspect includes specific activities that contribute to an overall system of good EE governance.

Figure i **Key aspects of energy efficiency governance**



Enabling frameworks confer authority, build consensus, attract attention to and provide resources for EE policy implementation. Important enabling frameworks include laws and decrees, strategies and action plans and funding mechanisms. In many countries, laws and decrees (or directives and proclamations) provide for other governance mechanisms, such as implementing agencies and funding and co-ordination mechanisms. Strategies and action plans comprise the second enabling framework. Some countries use national strategy formulation or an action planning process to engage stakeholders, build consensus and enable energy efficiency measures to be taken. Sometimes the strategy formulation process serves other functions, such as identifying the need for new laws and new institutions. Funding mechanisms are the last – and perhaps most important – enabling framework. Experience from around the world shows that access to adequate, stable and dedicated funding sources is critical for the development of EE organisations and for the professionals that carry out policy implementation.

Institutional arrangements constitute the second pillar of energy efficiency governance. This review describes six main types of institutional arrangements: implementing agencies, resourcing requirements, energy providers, public-private sector co-operation, stakeholder engagement and international development assistance. Collectively, these arrangements reflect the broad range of actors that play leading roles in EE policy implementation. Resourcing requirements are an important consideration in making sure that implementing agencies have the financial and human resources needed to assume their policy implementation responsibilities. Many types of organisations can be implementing agencies: government energy ministries, specialist clean-energy agencies, energy providers, private and state-owned enterprises and non-profit organisations. There are both advantages and drawbacks for each of these organisational types and the choice of implementing agency should reflect historical development, country context, alignment with sector and EE objectives and the existing institutional map. Public-private sector co-operation ensures that government policies take full advantage of the resources and commercial acumen of the private sector and allows public funding to be leveraged through private investment. Such co-operation also supports market transformation strategies, as new demand for higher efficiency products needs to be satisfied by new products, developed and manufactured by the private sector. Stakeholder

engagement is important for building political consensus on policy and implementation strategy and for ensuring that policy deliberations consider a diverse range of perspectives and practical experiences. International development assistance has proven important in establishing EE implementing agencies and in creating other EE governance mechanisms in developing countries.

Co-ordination mechanisms include governmental co-ordination mechanisms, targets and evaluation. Creating co-ordination mechanisms both within and across levels of government directly influences the quality and effectiveness of EE policy outcomes. Intra-governmental co-ordination helps avoid overlap and duplication, and allows informed discussions about how best to implement policies. Co-ordination across levels of government (*i.e.* inter-governmental) enables national governments to devolve implementation responsibility to local authorities, while retaining overall programmatic control. Targets are useful co-ordination mechanisms because they help to motivate policy implementers, track implementation progress and identify the need to make mid-term policy adjustments. Targets can provide a concrete basis for developing multi-year programmes, mobilising funding and identifying agency staffing needs. Evaluation is critical to good EE governance, as it serves to test planning assumptions, monitor overall results, compare programme performance, fine-tune implementation processes and incorporate the lessons learned into future policies and programmes. Evaluation also provides the foundation for oversight and accountability arrangements.

These three governance frameworks and 12 governance mechanisms are by no means exhaustive, but they do encompass many of the observed best practices. Some governance mechanisms serve multiple purposes: for example, EE strategies and action plans and EE targets can be a co-ordination mechanism as well as an enabling mechanism. The balance of this Executive Summary briefly describes each governance mechanism, including summary findings and guidelines for EE practitioners.

Part I: Enabling frameworks

Enabling frameworks are the basic building block of EE governance. They literally enable EE policies and programs to be implemented by providing a basis in law, an overarching strategy linked to national development objectives, and the resources needed for government action.

Energy efficiency laws and decrees

Review of dozens of energy efficiency laws suggests that an effective legislative framework should:

- articulate the government's purpose and intent for energy efficiency;
- include specific, quantitative, time-bound goals or targets;
- justify the need for government intervention;
- assign responsibility for planning and implementation;
- provide funding and resources; and
- include oversight arrangements, such as results monitoring and reporting.

Decision makers need to address several other challenges when developing an effective EE legislative programme. Trade-offs between comprehensive and incremental-type legislation can be dealt with by focusing on the fastest-growing, energy-consuming sectors. Building rule-making and administrative capacity in advance of a law's passage avoids implementation delays. Legislation should include the means for periodic review and amendments, as well as complementary combinations of market mechanisms and

regulatory frameworks. Governments also need to be prepared for the inevitable conflicts of interest that arise between stakeholders – including within government itself.

Energy efficiency strategies and action plans

Several guidelines for ensuring effective strategies and action plans emerged from the study, specifically that an energy efficiency strategy should:

- be linked to an EE law or legislative framework;
- reflect country context and sectoral issues;
- be linked to broader national development policies;
- be reinforced through action and economic planning;
- allow for a learning approach;
- establish accountability; and
- be both comprehensive and sector-specific.

Funding energy efficiency programmes

A steady and reliable source of funding is essential for EE institutions and programmes. Establishing mechanisms to fund EE implementation is a critical aspect of good energy efficiency governance. A wide choice of EE funding mechanisms (Box **ii**) is available for policy makers, each of which has specific advantages and disadvantages, depending on the country context and EE objectives.

Box ii **EE Funding mechanisms for energy efficiency**

- General appropriations from government budgets
- Grants from other government agencies
- Energy or environment taxes
- System public benefit charges
- Stimulus funding
- Carbon financing
- Licensing and permitting fees
- Donor funding and international co-operation
- Fee-for-service arrangements

Key issues in selecting an EE funding mechanism include:

- **Adequacy:** Funding should be sufficient to finance policy implementation costs.
- **Stability:** Funding should be steady and predictable from year to year.
- **Regulation:** The funding source should be regulated by the implementing agency or an independent regulatory body not subject to political pressures.

- **Source:** The origin of the funding needs to be credible and regarded as suitable for supporting EE policy implementation.
- **Distortive effects:** Funding mechanisms which result in significant market or price distortions should be avoided.

Government budget allocations are the most common EE funding mechanism. However, funding through the annual government budgeting process puts energy efficiency budgets at risk of short-term fluctuations in response to economic conditions. This is the stop-go or boom-bust programme-funding problem. Some funding mechanisms, notably earmarked energy and environmental taxes and SPBCs, are attractive from a political economy viewpoint and because they may pay a double-dividend - generating revenue and discouraging energy consumption or environmental emissions. However, earmarking is anathema to strict economists and to treasury and public finance professionals, and may create market distortions if there are over-allocations to energy efficiency. The distributional impacts of taxes are a separate consideration, which can be mitigated through offsets or social safety nets.

Part II Institutional arrangements

Institutional arrangements provide the practical instruments by which EE policy is formulated and implemented. Institutional arrangements include both the political economy of EE governance – building consensus and mobilizing society – as well as the creation of practical instruments, *e.g,* implementing agencies for EE implementation and mobilisation of assistance from the private sector and international development agencies.

Implementing agencies

Implementing EE policies requires an administrative structure capable of conducting multiple specialised tasks: economic and policy analysis, planning, administration and management, engineering and logistics, and programme evaluation. Previous studies of EE implementing agencies have identified considerable variety in organisational type, from departments within energy ministries to state-owned companies and even non-governmental organisations. The study results highlight several principles for configuring EE implementing agencies:

- The design and structure of the energy efficiency organisation should reflect the desired energy efficiency outcomes, policy implementation requirements and the targeted sectors.
- A statutory basis is desirable, as it confers status and permanency to an energy efficiency organisation.
- Many different organisational models exist, and no single model is universally applicable.
- New organisational designs are emerging, such as energy efficiency utilities and public benefit corporations.
- Critical factors for success include: strong technical skills in core competencies, effective external co-operation, developing consensus in major strategies and plans, and financial independence.

Resourcing requirements

Governments need to allocate sufficient financial and human resources in order to achieve the desired level of energy efficiency improvement. Implementing agencies need to understand the resources required for different EE policies in order to organise, staff and budget their activities. Benchmarking or comparing the

resources needed for EE policy implementation in different countries is difficult, but vital. The study recommends establishing a consistent reporting framework at the sector and policy level in order to facilitate comparisons.

Role of energy providers in implementing energy efficiency

Energy providers have some distinct advantages as EE implementers, if the right institutional and regulatory framework and enabling conditions can be established. In particular energy providers often have ready access to capital, an existing relationship with end users, including billing systems and market data, a familiar brand name and a widespread service and delivery network within their jurisdiction. The study develops guidelines for mobilising energy providers to implement energy efficiency, including:

- Use clear criteria for considering whether energy providers should act as energy efficiency implementers.
- Apply a resource value approach when delivering energy efficiency, to ensure that utilities can implement effective programmes.
- Establish the conditions that enable utilities to implement energy efficiency.
- Carefully consider the specific advantages of engaging downstream utilities as energy efficiency implementers.
- Avoid complexity and simplify procedures whenever possible.
- Capitalise on the commercial acumen of utilities (where it exists), within a portfolio framework.
- Maintain oversight arrangements to guarantee the cost-effectiveness of results.
- Apportion institutional responsibilities to appropriate governmental and regulatory actors.
- Consider system public benefit charges (SPBCs), as these are an effective EE funding mechanism, regardless of who actually implements the programmes.

Stakeholder engagement

Stakeholder engagement is a crucial component of an overall energy efficiency governance system. It helps build political consensus and ensures broad buy-in to policy implementation. This review of effective stakeholder engagement suggests the following:

- Stakeholder diversity should be a goal of engagement, as stakeholders have different interests and concerns.
- The legislative framework should make stakeholder engagement a mandatory requirement.
- Mechanisms that provide for ongoing stakeholder engagement are particularly useful.
- There is no single, best method for engaging stakeholders.

Public-private sector co-operation

Co-operation between government and the private sector during EE policy development and implementation ensures that policies take full advantage of the resources and commercial acumen of the private sector. The study reviews several case studies of public-private sector co-operation, including: (i) voluntary EE agreements with large energy users; (ii) public-private partnerships (PPPs) to develop new EE

technologies and approaches; (iii) using public sector EE projects to foster energy service companies (ESCOs); and (iv) responsibility sharing on appliance efficiency regulation. Based on these case studies, the study develops several guidelines for further developing public-private sector co-operation:

- Governments should identify win-win situations in which public and private sector benefits overlap.
- Governments should generally take the lead, using an industry-wide approach.
- Governments must provide oversight to ensure policy objectives are met.
- The private sector must have an incentive to co-operate.

International development assistance for energy efficiency

International development assistance (IDA) is of growing importance to overall energy efficiency governance systems. The following key guidelines are aimed at donors seeking to support development of good EE governance in developing countries:

- Design donor-assisted projects that create sustainable outcomes.
- Identify and engage stakeholders to create a community of interest around energy efficiency policy.
- Focus on the creation of early markets for energy efficiency that will be sustainable.
- Identify opportunities for co-operation through regional networking.

Part III Co-ordination mechanisms

The final aspect of EE governance addresses the need to co-ordinate policy and programme implementation and to monitor results. This study identified three frequently-encountered mechanisms that served to co-ordinate implementation and track progress, although it is likely that many other mechanisms exist and also serve this purpose.

Government co-ordination mechanisms

Effective co-ordination within and across levels of government directly impacts the quality and effectiveness of energy efficiency policy outcomes. Two distinct governmental co-ordination tasks are identified: (i) intra-governmental (or horizontal) co-ordination among national government ministries and agencies; and (ii) inter-governmental (or vertical) co-ordination across various levels of government (e.g. national, regional and local governments). This study suggests several guidelines to be considered when establishing inter- and intra-governmental co-ordination:

- Plan co-ordination early.
- Build energy efficiency capacity as a pre-requisite for good co-ordination.
- Co-ordinate energy efficiency and climate change policies.
- Identify the strengths of each government level.
- Clearly define objectives and areas of responsibility.
- Create clear accountability.

Targets

Quantitative targets are an increasingly common tool for measuring and managing policy implementation. Governments find targets useful because they help to motivate policy implementers, track implementation progress and facilitate mid-term policy adjustments. Targets also provide a concrete basis for organising multi-year programmes, justifying funding and obtaining resources. However, targets can mislead or give a false impression of government action if not carefully constructed and accompanied by strong analytic capacity and transparency in how progress is measured. Targets can also prove counterproductive if they stretch credibility or are impossible to achieve. This study offers several guidelines on how policy makers can avoid specific pitfalls:

- Ensure targets are supported by resources and enabling frameworks.
- Ensure targets have medium-term relevance and balance stringency with achievability.
- Targets should be underpinned by analysis and consultation with sectoral energy efficiency experts and outside stakeholders.
- Targets should be straightforward to monitor.
- Avoid overlapping and competing targets.
- Targets should be clearly communicated and documented, as they constitute a tangible expression of EE policy.

Evaluation

Evaluation is defined as the assessment of the outcomes of a policy or measure and of the inputs required to generate such outcomes. Evaluation of EE policies and programmes is critical to good EE governance. It is used to test planning assumptions, monitor overall results, compare programme performance, fine-tune implementation processes and incorporate lessons learned into future policies and programmes. Despite the importance of evaluation, this study found evaluation practices to be lacking in all but a few countries. Drawing on the experience of countries with a history of strong evaluation, the following suggestions are offered to support improvement of evaluation practices:

- Build an EE agency culture, where evaluation is woven into the fabric of energy efficiency implementation and oversight;
- Match the evaluation approach to the policy objectives and programme design;
- Make sure accurate statistics are collected by incorporating evaluation planning into the design phase of any EE policy or programme;
- Allocate adequate funding by designating a percentage of funding specifically for evaluation;
- Build the capacity needed for evaluation, including specialist skill sets such as econometrics and market research; and
- Establish common methodologies or protocols for evaluating energy efficiency to be used by all evaluators.

Conclusions

Defining good EE governance is difficult, not least because there is so much diversity in country context and government structure. The most straightforward way to gauge the effectiveness of an EE governance scheme is to examine outcomes or results rather than the scheme itself. Considering the results of this study, several outcomes stand out as being characteristic of an effective EE governance scheme. An effective EE governance scheme will:

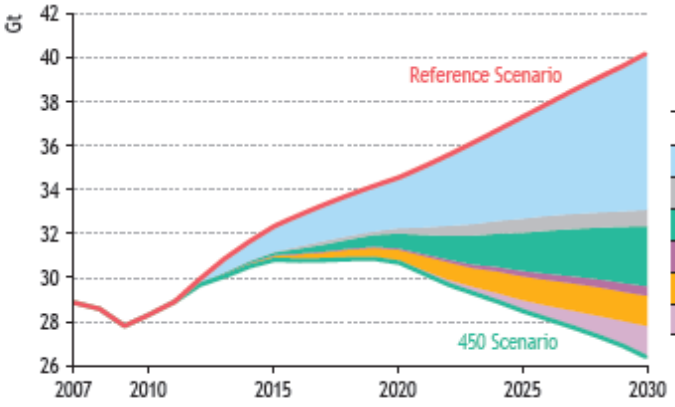
- Confer sufficient authority to implement EE policies and programmes;
- Build political consensus on EE goals and strategy;
- Create effective partnerships for policy development and implementation;
- Assign responsibility and create accountability;
- Mobilise resources needed for EE policy implementation; and
- Establish a means to oversee results.

The IEA produced this document so that governments and stakeholders working on energy efficiency around the globe can learn from one another's experience – thereby being able to improve their governance of energy efficiency policies and programmes. Ultimately, the IEA aims to facilitate the adoption of good EE governance on the global scale. As IEA analysis shows, reducing energy consumption through efficiency measures is the most cost-effective way to jump-start the much-needed energy revolution.

Introduction

The International Energy Agency (IEA) is strongly committed to supporting the role of energy efficiency (EE) in improving energy security, contributing to economic development and mitigating climate change. The IEA 450 Scenario (IEA, 2009a), which aims to limit greenhouse-gas (GHG) emissions to 450 parts per million (ppm) in the atmosphere, identifies energy efficiency as the single most important component of a low-carbon future. In fact, the Scenario shows energy efficiency accounting for two-thirds of reductions in energy-related carbon dioxide (CO_2) emissions in 2020 and over half in 2030 (Figure ii).

Figure ii **Role of energy efficiency in the 450 Scenario vs. the Reference Scenario**



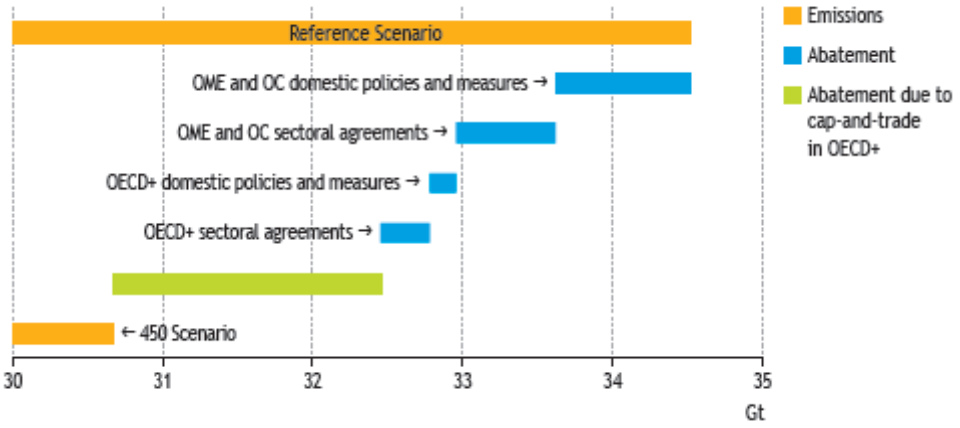
Abatement (Mt CO_2)	2020	2030
Efficiency	2 517	7 880
End-use	2 284	7 145
Power plants	233	735
Renewables	680	2 741
Biofuels	57	429
Nuclear	493	1 380
CCS	102	1 410

Source: IEA, 2009a.

These energy efficiency contributions will come from three main sources: market mechanisms (*e.g.* emissions trading), sectoral agreements[1] and national energy efficiency policies (Figure **iii**). National policies and measures are projected to deliver almost half of the emissions reductions, about 1.2 gigatonnes (Gt). These efficiency improvements will come from all consuming sectors, including buildings, appliances and equipment, lighting, transport and industry.

1 A sectoral agreement is "an international agreement that commits participating countries to adopting common processes or objectives in order to reduce greenhouse-gas emissions from a specific sector" (IEA 2009a). Examples include energy-intensive industries producing globally traded products (e.g. steel and cement).

Figure iii **Abatement by policy type in the 450 Scenario in 2020**



Source: IEA, 2009a.

Note: The IMF World Economic Outlook (WEO) divides the world into three groups: OECD, Other Major Economies (OME) and Other Countries (OC).

Member countries of the Organisation for Economic Co-operation and Development (OECD) have made substantial progress in developing and implementing national energy efficiency policies. The IEA supported this process by developing a set of 25 EE policy recommendations for their consideration (IEA, 2007). A recent evaluation of the progress achieved by member countries in implementing these recommendations, however, shows a worrisome trend: even countries with the most well-developed EE policies remain on trajectories that limit them to achieving less than half of the efficiency savings needed by 2020 (IEA, 2009a).

Development and implementation of national energy efficiency policy is of even greater importance in non-OECD countries, if the trajectory called for in the 450 Scenario is to be met. The Other Major Economies (OME), particularly Brazil, China, the Middle East, Russia and South Africa, and Other Countries (OC) need to reduce their projected consumption by 1 Gt – *i.e.* five times the OECD target – in order to meet the 450 Scenario. Some of these countries (*e.g.* China) have made great strides in increasing implementation of EE policies (Levine and Price, 2010). Others have barely begun.

The urgent need for improved EE policy implementation is the impetus for this study. Throughout the process of developing this report, the IEA has sought a better understanding of the precise requirements for successful EE policy implementation. Through research and literature review, it was possible to identify a number of enabling frameworks, institutional arrangements and co-ordination mechanisms that contribute to successful EE policy outcomes. The term used for this array of frameworks, arrangements and mechanisms is **energy efficiency governance,** which the authors define as *the combination of legislative frameworks and funding mechanisms, institutional arrangements and co-ordination mechanisms, which work together to support implementation of energy efficiency strategies, policies and programmes*. Energy efficiency governance is the political economy and organisational science of energy efficiency and an area that will need greater attention if the 450 Scenario is to be achieved.

Importance and objectives

Energy security, international competition and climate change are increasingly driving the development and implementation of government policies on energy efficiency. However, experience shows that policies do not always deliver their intended outcomes. Policy failure or shortfall stems from many factors, including: flaws in the policy itself, lack of political consensus, market or institutional barriers and implementation gaps. In many cases, the lack of a results monitoring or evaluation framework leads to an inability to identify the policy design flaw, implementation barrier or structural factor that led to failure.

Good energy efficiency governance is important for several reasons. Government action is essential to overcoming barriers to energy efficiency; good EE governance helps to ensure that the right policies are adopted and that the correct actions are taken to implement these policies. Against a backdrop of multiple consuming sectors, plus numerous and sometimes competing policies, good EE governance helps to ensure that policies and actions are co-ordinated and effective, and do not result in new problems. Good EE governance also helps to ensure that EE agencies are accountable for their results and level of effectiveness.

This study has assembled a body of knowledge and practical experience on existing EE governance structures around the world. The findings are structured to help policy makers and practitioners establish the best way to organise and co-ordinate their EE policy implementation efforts.

Previous research into EE governance has focused predominantly on identifying which institutional models and practices can effectively deliver energy efficiency under different sector and market conditions (Limaye, Heffner and Sarkar, 2008). The considerable variety in institutional arrangements and the diversity of country contexts means that no single model can be said to be the most effective. This study starts from the premise that institutional models and practices are only one aspect of EE governance, and undertakes to explore in more detail the full range of elements, including how the interplay of structure and process ultimately affects EE policy outcomes.

Approach

The study team took a phased approach to preparing this study. The first step was a global survey of energy efficiency practitioners, intended to characterise the EE governance landscape and identify countries for more detailed information collection and case studies. The authors subsequently conducted interviews with over 100 EE experts in 27 countries and states and then supplemented primary data with information from the EE governance literature. The IEA also established a Reference Group of high-level experts from government, academia and the private sector to provide comments and suggestions on the research approach and analysis results.

Literature review

As is reflected in the following chapters, the study effort included extensive review of the literature on each element of EE governance.

Literature on EE governance in the broad sense is somewhat limited. *Energy Efficiency for a Sustainable World* (Laponche, Jamet and Attali, 1997) includes a chapter on EE governance, which identifies key elements of effective EE governance, including strategy formation, stakeholder engagement and the creation of a national EE agency. Its authors identify key factors for an effective EE agency: political support, legitimacy conferred by a political authority, independence and autonomy, and adequate human and financial resources. They also state that an EE agency must be able to effectively mobilise and co-ordinate a

large number of delivery agents, since energy efficiency must ultimately be delivered at end-user level. This means that an EE agency should be skilled at developing partnerships and empowering others to make relevant decisions.

An Analytical Compendium of Institutional Frameworks for Energy Efficiency Implementation (Limaye, Heffner and Sarkar, 2008) uses real-world examples to examine how the structure, role and function of EE institutions interact. The authors describe, categorise and analyse the main elements of institutions that have proven effective in promoting energy efficiency. In many ways, this 2008 World Bank study set the stage for the current work, particularly in its description of how enabling frameworks and institutional arrangements contribute to successful policy implementation.

Although both studies offer useful insights, their focus is somewhat narrow compared to the broad concept of energy efficiency governance outlined in this study. For example, Laponche (1997) focused on assessing whether public policy objectives can be best met by placing obligations on utilities or establishing new non-utility institutions. The World Bank study (2008) describes the structural elements of EE institutions, but stops short of identifying the many other factors that contribute to the success or failure of EE policy implementation.

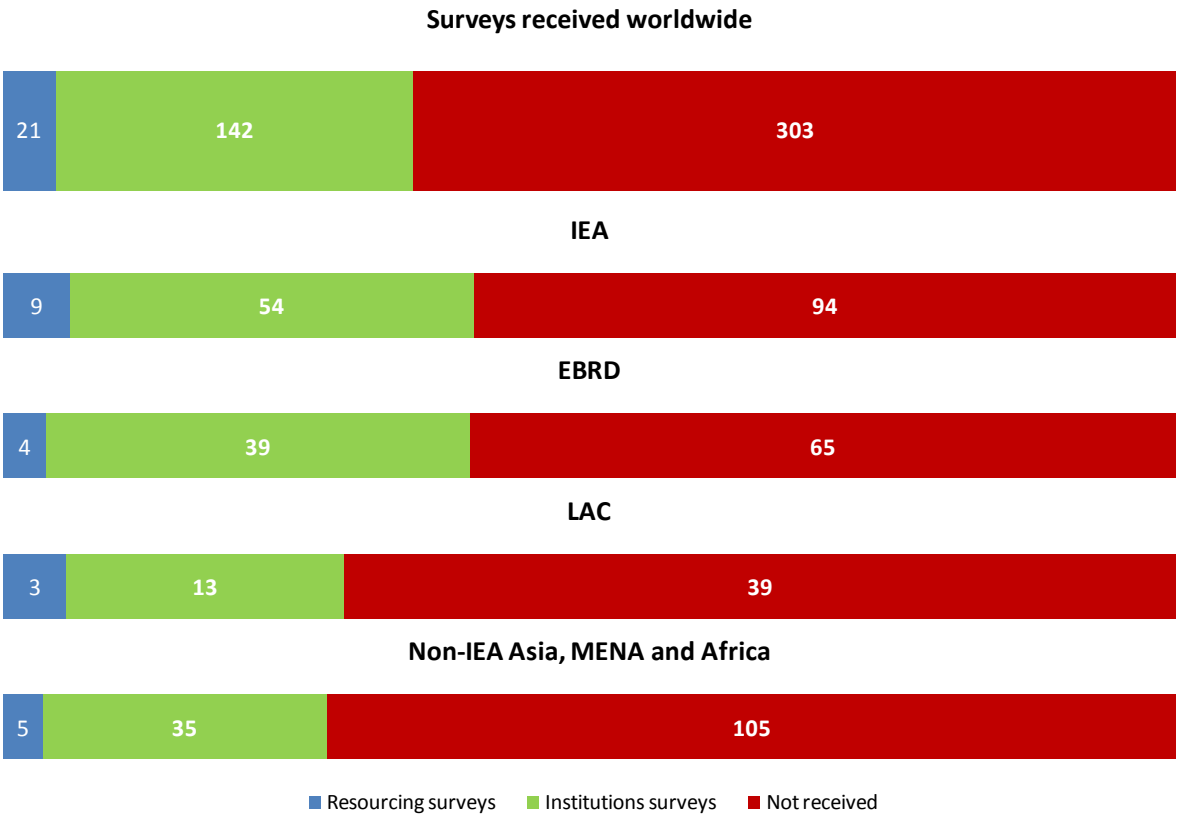
Despite their limitations, these previous studies provide an excellent foundation upon which to build. They provide the basis for developing a broader EE governance framework and help to illuminate areas that need more investigation.

Institutional survey

The study team identified 502 mid- to high-level energy efficiency practitioners in 110 countries (Annex 5) who were to receive the institutional survey. Survey respondents were selected based on recommendations from IEA regional consultants, multi-lateral development bank working partners (the European Bank for Reconstruction and Development and the Inter-American Development Bank), members of the IEA Energy Efficiency Working Party and other sources. Diversity in the survey sample was achieved through the inclusion of EE stakeholders from utilities, universities, non-governmental organisations (NGOs), inter-governmental agencies, research institutes and government. An average of four respondents per country were identified, but never more than one respondent per institution. The Reference Group reviewed the survey and conducted pilot tests to allow fine-tuning of the survey format, content and instructions.

The institutional survey was designed to take no more than 30 minutes to complete. It included questions on the function and structure of EE institutions and respondent views on establishing, structuring and operating EE institutions. The survey also asked respondents about drivers of EE policy, legal frameworks, use of strategies and targets, co-ordination issues, areas for improvement and evaluation practices. IEA sent the surveys via e-mail in Spanish, English and Russian, and used reminder e-mails and phone calls to increase the response rate. The study team received completed surveys from 175 EE experts in 77 countries. Response rates varied by region (Figure **iv**) and the global average was 35%.

Figure iv **Global institutional survey response rate and regional variation**



Resourcing survey

A separate resourcing survey was also sent to the 77 countries surveyed. Unlike the institutional survey, the resourcing survey targeted a single "official" respondent per country. Detailed instructions were provided, requesting the single central government respondent to gather requested information about EE spending from other organisations. The resourcing survey asked respondents to estimate the financial and staffing resources devoted by governments to designing, developing, implementing and evaluating EE policies and programmes in their countries. It was divided into two parts. The first part sought to collect general information on the respondent and the country, obtain estimates of overall EE spending at the national level and establish the origin of EE resources. The second part sought a list of all relevant EE government agencies, institutions and programmes and their related budgets. It also sought estimates of the respondent agency's policy and programme-related resources and resulting energy savings, broken down by sector.

The resourcing survey proved much more difficult to implement than the institutional survey, as reflected in a much lower response rate: 20 responses received from 112 countries (18% response rate).

Interviews

The study team conducted follow-up interviews with over 100 experts in 27 countries. These interviews allowed the team to delve more deeply into energy efficiency governance issues in specific countries with

extensive EE implementation experience or interesting implementation approaches. Interviews also helped identify good practices in energy efficiency governance from around the world. Selection of interviewees was based on their knowledge of energy efficiency and reflected the viewpoints of diverse EE stakeholders (*e.g.* government, donors, NGOs, private companies, universities and regulators). Although interviewers were encouraged to pursue interesting issues, some questions were compulsory and asked during each of the hour-long interviews. The interviews provided a rich source of detail regarding how countries approach EE governance issues. A complete list of countries contacted in the course of this study through surveys or interviews is given below (Table i).

Table i **List of countries contacted**

Albania	Ethiopia	Latvia	Singapore
Argentina	Finland	Lebanon	Slovakia
Armenia	France	Lithuania	Slovenia
Australia	Gambia	Macedonia	South Africa
Austria	Georgia	Mexico	Spain
Bangladesh	Germany	Morocco	Sri Lanka
Belarus	Greece	Namibia	Sweden
Belgium	Guatemala	Netherlands	Switzerland
Bosnia	Hungary	New Zealand	Thailand
Brazil	India	Nigeria	Tunisia
Bulgaria	Iraq	Norway	Turkey
Canada	Ireland	Pakistan	Ukraine
Chile	Israel	Peru	United Kingdom
China	Italy	Poland	United States
Colombia	Japan	Portugal	Uruguay
Costa Rica	Jordan	Romania	Uzbekistan
Croatia	Kazakhstan	Russian Federation	Vietnam
Czech Republic	Korea	Saudi Arabia	
Denmark	Kosovo	Senegal	
Egypt	Laos	Serbia	

Limitations

Energy efficiency is a very broad topic about which many volumes have been written. No single volume can hope to comprehensively span the many aspects of energy efficiency, and this report makes no such claims. Instead this report focuses on the enabling frameworks, institutional arrangements, and coordination issues associated with implementing EE policies and programmes. The report does not attempt to describe the many different EE policies and programmes, or how to select which policies or programmes might work in a given country context. As a result the report has many limitations which the reader should keep in mind. In particular this report:

- Does not describe or analyse the many energy efficiency policy mechanisms that have been developed around the world, although the next chapter lists many of the most-common policies found.
- Does not recommend how to overcome specific EE barriers or solve specific EE issues.
- Does not critique the pros and cons of different policies or financing mechanisms. Such EE policy analysis is well-trodden, by the IEA and others (see for example Taylor et al. (2008), IEA (2003 and 2008) and IEA

(2010d)). Rather, this report focuses on how governments build consensus on the need for energy efficiency policies and how they organize for and implement the EE strategies, policies, regulations and programmes decided upon.

- Does not offer definitive solutions to how governments should organize to implement their EE policies, regulations and programmes. Variations in country context, EE drivers, sector structure, institutional arrangements and EE barriers make this impossible.

However, the report does highlight the critical questions that require policy makers' attention when dealing with EE governance issues, and offers successful examples and guidelines for addressing these questions based on experience in many countries around the world. The authors hope that this admittedly narrow but arguably important contribution to the energy efficiency literature will be sufficient to keep the reader's interest.

Report structure

This report is divided into three main sections, according to the three aspects of EE governance, and subdivided into 12 chapters. An initial chapter introduces the EE policy landscape, describing drivers of EE policy, barriers to scaling-up energy efficiency, and the major types of EE policies implemented by governments.

The first part of the report, **Enabling Frameworks,** includes chapters on Energy Efficiency Laws and Decrees, Energy Efficiency Strategies and Action Plans, and Funding Energy Efficiency Programmes. Part II on **Institutional Arrangements** includes chapters on Energy Efficiency Organisations, Resourcing Requirements, the Role of Energy Providers, Stakeholder Engagement, Public-Private Sector Co-operation and International Development Assistance for Energy Efficiency. Finally, Part III covers **Co-ordination Mechanisms,** including chapters on Governmental Co-ordination Mechanisms, Targets and Evaluation.

Each chapter briefly describes the importance of a particular element of energy efficiency governance, identifies key research questions, explores relevant literature, and presents the results of the survey, interviews and desk research. Each chapter also includes a discussion of the issues and considerations associated with ways in which that governance element fits into the overall governance framework and interacts with other elements. Finally, each chapter includes conclusions and guidelines on how governments and policy makers can effectively utilise this aspect of governance to contribute to successful EE policy implementation. The overall structure of the report with research questions is given on page 30.

Several annexes provide more detail from the research and desk study. Annex 1 lists the EE laws identified, including a capsule description of each plus references. Annex 2 provides an EE institutional map for each of the countries studied. This incorporates the IEA's current understanding of the key EE institutions in these countries, including the apex energy ministry, the EE agency and other relevant institutions. Annex 3 and Annex 4 provide listings of the targets, strategies and action plans identified through the research, again organised by country. Annex 5 provides the survey templates used.

List of research questions by chapter

1. Drivers of and barriers to energy efficiency

What are the major drivers of energy efficiency policies?
What are the major barriers to energy efficiency implementation?
How can policies overcome these barriers?

Enabling frameworks

2. Energy efficiency laws and decrees

What can legal frameworks contribute to successful energy efficiency policy outcomes?
What elements should a legal framework include to enable successful EE policy outcomes?
What key issues should be addressed in developing energy efficiency laws?
Are there historical trends or patterns in the formulation of energy efficiency laws?
What guidelines or suggestions can be provided for developing an energy efficiency law?
Where can one find information on existing and proposed energy efficiency laws?

3. Energy efficiency strategies and action plans

How do national strategies and action plans contribute to energy efficiency governance?
What are the key elements of an EE strategy?
What issues need to be addressed in developing an EE strategy?
What guidelines can be suggested for an EE strategy development process?
What is the difference between a strategy and an action plan, and how should they be linked?

4. Funding energy efficiency programmes

How are energy efficiency implementation agencies and programmes funded?
What are the advantages and disadvantages of different energy efficiency funding mechanisms?
What criteria should governments consider when selecting an energy efficiency funding mechanism?
Are some funding mechanisms inherently preferable to others?

Institutional arrangements

5. Energy efficiency agencies

What skill sets and capabilities are required for an EE agency to be effective?
Should EE agencies have a statutory basis?
How should EE agencies and programmes be funded?
What role should EE agencies play in policy formation and programme implementation?
What factors should be considered in deciding where to house an EE agency?
What factors are critical to agency effectiveness?
Who should provide oversight and accountability for EE agency operations?

6. Resourcing requirements

What resources (financial, human, operating, information delivery) are needed for energy efficiency institutions?
How do energy efficiency policies and programmes vary in their resourcing needs?
Is it possible to benchmark energy efficiency resourcing requirements across policies, sectors and countries?

7. Role of energy providers in implementing energy efficiency

What role can energy providers play in implementing energy efficiency policies?
What enabling conditions allow energy providers to become effective implementers of EE programmes/projects?
What has been the experience with energy providers as EE implementers?
What criteria should policy makers use to determine whether energy providers are a viable EE implementing agency in their country?

8. Stakeholder engagement

Why is stakeholder engagement important?
Does stakeholder engagement contribute to successful energy efficiency policy outcomes?
What can be learned from experiences with stakeholder engagement?
How does stakeholder engagement fit into the overall EE governance framework?

9. Public-private sector co-operation

Why is public-private sector co-operation important in EE governance?
What are some good examples of public-private sector co-operation?
How can the private sector be mobilised in implementing energy efficiency policies?

10. International development assistance for energy efficiency

What role does international development assistance play in promoting energy efficiency in developing countries?
How can international donors and development agencies engage with developing and transition-economy countries to help establish EE governance frameworks and mechanisms?

Co-ordination mechanisms

11. Governmental co-ordination mechanisms

What is the role of governmental co-ordination within EE governance?
What co-ordination mechanisms have proven effective?
How do intra-governmental (horizontal) co-ordination and inter-governmental (vertical) co-ordination issues and mechanisms differ?
What guidelines can be offered for establishing effective co-ordination mechanisms?

12. Energy Efficiency Targets

What role do targets play in an overall system of energy efficiency governance?
What kinds of targets exist?
How should targets be formulated and expressed?
What other considerations enter into setting targets?

13. Evaluation

Is evaluation of EE policies and programmes common practice?
How can evaluation contribute to good energy efficiency governance?
Who should perform evaluations?
Is there a universal standard of effective evaluation or good evaluation practice?
How can an evaluation culture for energy efficiency be created?

PART I. ENABLING FRAMEWORKS

1. Drivers of and barriers to energy efficiency

The energy efficiency (EE) policy landscape varies from country to country, even though many governments have similar motivations for pursuing energy efficiency and face similar barriers to implementing policy. This section briefly explores the drivers and barriers to energy efficiency, and the policies that governments use to achieve their EE objectives.

Key issues and research questions

- What are the major drivers of energy efficiency policies?
- What are the major barriers to energy efficiency implementation?
- How can policies overcome these barriers?

What drives governments to implement energy efficiency policies?

Understanding the objectives of EE policy makers is critical to developing relevant governance frameworks. The following list of drivers for government energy efficiency policies is drawn from previous work undertaken by the IEA, the World Energy Council and others (Table **1.1**).

Table 1.1 **Drivers of government energy efficiency policies**

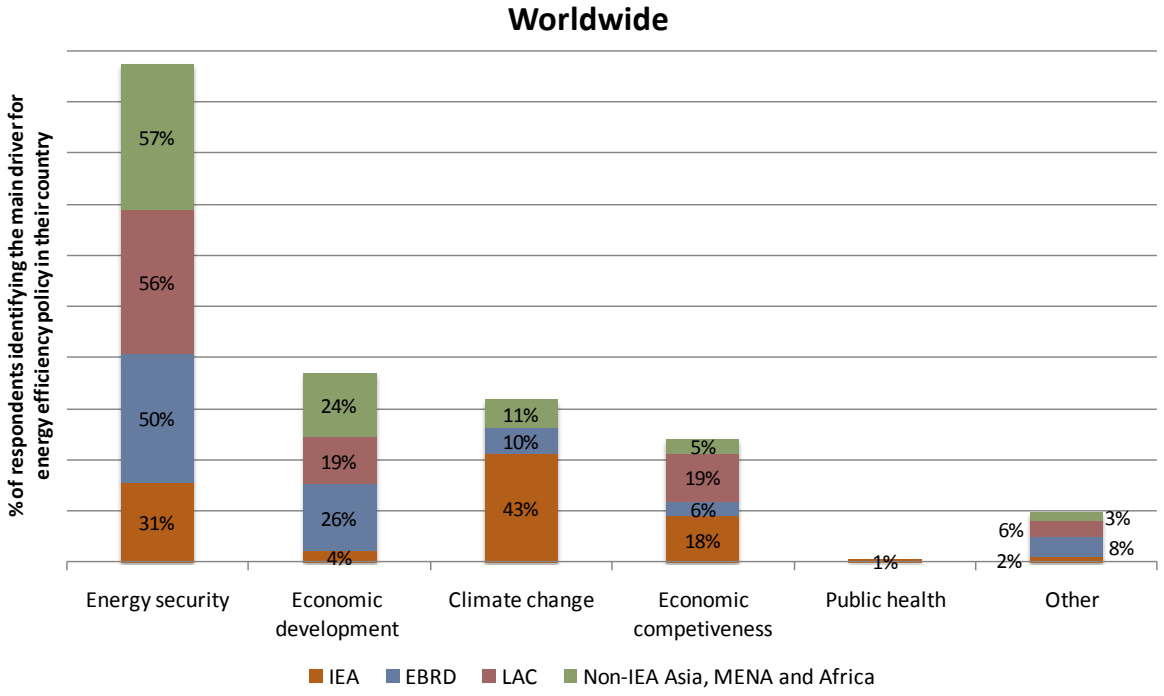
Driver	Typical objectives
Energy security	• Reduce imported energy • Reduce domestic demand to maximise exports • Increase reliability • Control growth in energy demand
Economic development and competitiveness	• Reduce energy intensity • Improve industrial competitiveness • Reduce production costs • More affordable energy customer costs
Climate change	• Contribute to global mitigation and adaptation efforts • Meet international obligations under the United Nations Framework Convention on Climate Change (UNFCCC) • Meet supra-national (*e.g.* European Union) accession requirements or directives
Public health	• Reduce indoor and local pollution

Source: WEC, 2008.

The institutional survey (Annex 5) asked respondents to rank the most important driving forces for EE policy, using the choices above plus the option to specify other drivers. Significant regional variations can be seen, even when considering only the top driver from each respondent (Figure **1.1**). Climate change is the

overwhelming driver of energy efficiency in IEA member countries, followed by energy security and then economic competitiveness. In all the non-OECD groupings, the main driver is energy security followed by economic development, with climate change a distant third. This underscores the difference in the EE policy landscape for developed and developing countries.

Figure 1.1 **Principal drivers of energy efficiency polices***



*Note: Percentages amount to 100 for each region.

Interviews also revealed that experts within a country did not always agree on the most important driver of energy efficiency. Several experts noted that viewpoints might depend on the institutional affiliation of the interviewee. Respondents from the Ministry of Environment, for example, might select climate change, while respondents from an energy utility might select energy security or economic competitiveness.

Understanding what drives EE policy was clear and unanimous in some countries. Climate change is listed as the top driver of EE policy in Germany, Poland, Republic of Korea and Switzerland. Energy security ranks first in Greece, Hungary, Japan and the Slovak Republic. Economic development and competitiveness are of most importance in the Czech Republic, Italy and Spain.

Energy efficiency barriers

Scaling up energy efficiency requires energy consumers to modify their behaviour in relation to both energy consumption and equipment investment. Several factors influence these behaviours, including: country-specific incentive structures, consumer preferences, rules and regulations, decision-making practices and even cultural considerations. Experts have also identified a number of factors that hamper behavioural change, such as market, financial, information, institutional and technical barriers that exist in all economies

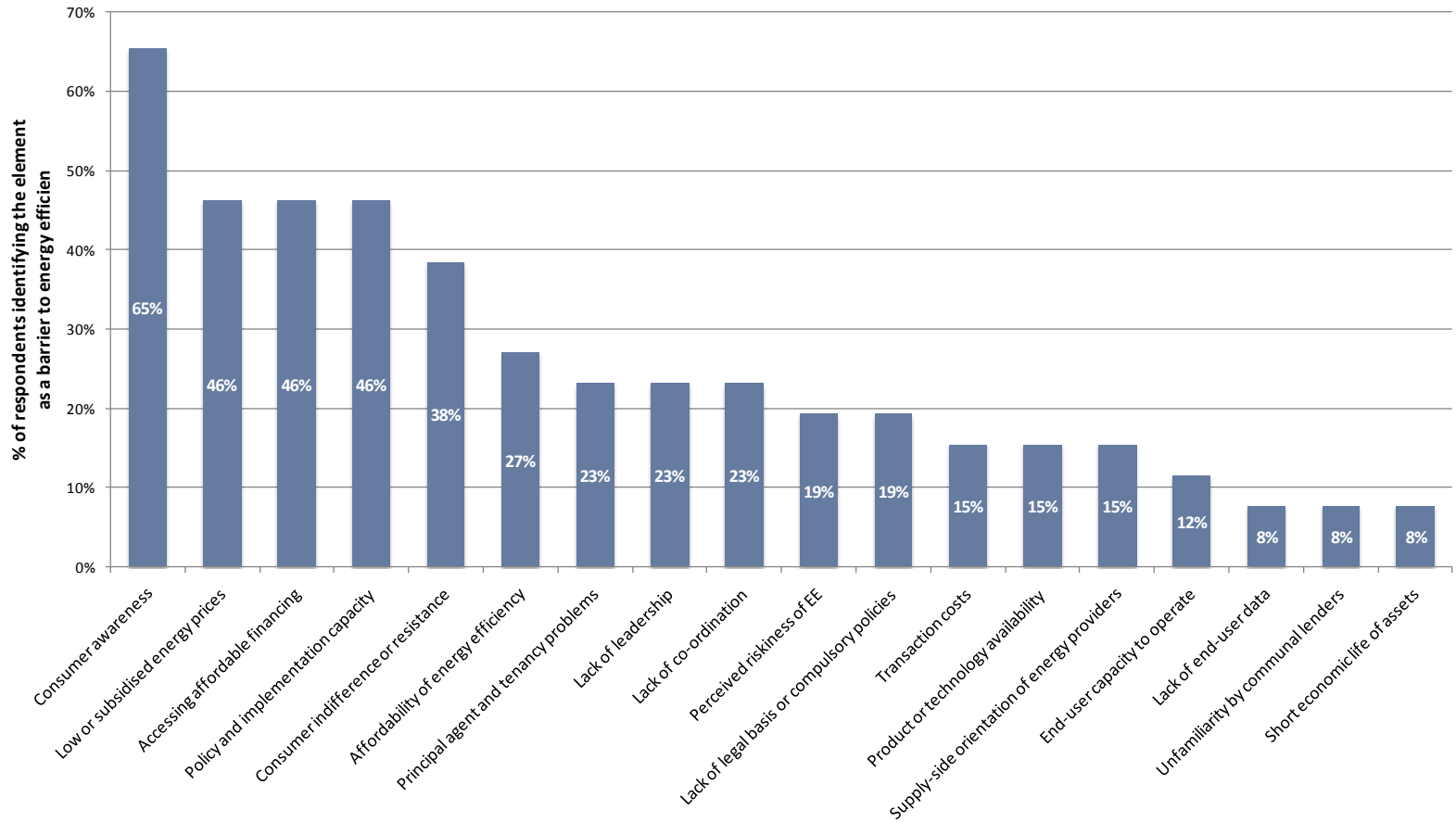
(Golove and Eto, 1996; IEA, 2007a; Limaye, Heffner and Sarkar, 2008) (Table **1.2**). Overcoming such barriers is the key challenge for EE policies.

Table 1.2 **Barriers to energy efficiency**

Barrier	Examples
Market	• Market organisation and price distortions that prevent customers from appraising the true value of energy efficiency. • The principal agent problem, in which the investor does not reap the rewards of improved efficiency (the classic case being the landlord-tenant situation) (IEA, 2007a). • Transaction costs (project development costs are high relative to potential energy savings).
Financial	• Lack of understanding of EE investments, or aversion to perceived risk on the part of financial institutions.
Information and awareness	• Lack of sufficient information and understanding on the part of consumers to make rational consumption and investment decisions.
Regulatory and institutional	• Energy tariffs that discourage EE investment (such as declining block prices). • Incentive structures that encourage energy providers to sell energy rather than invest in cost-effective energy efficiency. • Institutional bias towards supply-side investments.
Technical	• Lack of affordable EE technologies suitable to local conditions. • Insufficient local capacities for identifying, developing, implementing and maintaining EE investments.

When questioned about barriers to energy efficiency, the responses of most EE experts reflected the practical difficulties they face in scaling-up energy efficiency in their respective countries. Subsequent analysis tracked their replies regarding barriers and aggregated the results across all interviews. The most frequently cited barrier (mentioned in two-thirds of countries) was lack of information and low awareness. Other frequently cited barriers included low energy prices, difficulty in accessing affordable financing and lack of EE implementation capacity. Barriers cited less frequently included consumer indifference, higher initial cost of EE products, the principal agent problem, and lack of political leadership and inter-governmental co-ordination (Figure **1.2**).

Figure 1.2 **Frequency of energy efficiency barriers cited by respondents**



Overcoming barriers through energy efficiency policies

Governments at all levels have developed policies to surmount specific barriers to more rational use of energy, usually by implementing targeted energy efficiency policies. Once barriers are removed, market forces should work to ensure economical levels of energy efficiency. Thus, most policies aim to create markets for energy-efficient equipment or infrastructure, or to build capacity to deliver EE goods and services (Table **1.3**).

Table 1.3 **Energy efficiency policies**

Policy	Example
Pricing mechanisms	• Variable tariffs where higher consumption levels invoke higher unit prices.
Regulatory and control mechanisms	• Compulsory activities, such as energy audits and energy management. • Minimum energy performance standards (MEPS). • Energy consumption reduction targets. • EE investment obligations on private companies.
Fiscal measures and tax incentives	• Grants, subsidies and tax incentives for energy efficiency investments. • Direct procurement of EE goods and services.
Promotional and market transformation mechanisms	• Public information campaigns and promotions. • Inclusion of energy efficiency in school curricula. • Appliance labelling and building certification.
Technology development	• Development and demonstration of EE technologies.
Commercial development and capacity building	• Creation of energy service companies (ESCOs). • Training programmes. • Development of EE industry.
Financial remediation	• Revolving funds for EE investments. • Project preparation facilities. • Contingent financing facilities.

2. Energy efficiency laws and decrees

Importance

Energy efficiency (EE) laws and decrees can serve several purposes. They state a government's overall objectives for energy efficiency, as well as policies and strategies for achieving these objectives. Many EE laws specify targets or activities to be undertaken, often at the level of consuming sectors or specific industries. Laws and decrees can provide the statutory basis for the promulgation of rules and regulations including building codes, appliance efficiency labelling or minimum efficiency performance standards (MEPS) and obligatory activities (*e.g.* audits or investment) for consumers. Energy efficiency laws also assign responsibility for developing rules or implementing programmes, which in some cases involves establishing new agencies or institutions. Finally, a few EE laws specify funding requirements and may even establish the funding mechanism for EE activities (*e.g.* EE funds or system public benefit charges [SPBCs]).

In many countries, an EE law or decree is an essential enabling framework for EE policy and programme implementation. Recent years have seen rapid growth in the number of countries enacting EE legislation. Today, most well-known and successful EE programmes around the world have a firm statutory basis (Limaye, Heffner and Sarkar, 2008). However, EE laws are not a panacea. They can be time-consuming to develop and politically difficult to enact. In order to form an effective enabling framework, they need to be carefully drafted and must reflect the country context, especially with regards to barriers to scaling-up energy efficiency.

Key issues and research questions

- What can legal frameworks contribute to successful energy efficiency policy outcomes?
- What elements should a legal framework include to enable successful EE policy outcomes?
- What key issues should be addressed in developing energy efficiency laws?
- Are there historical trends or patterns in the formulation of energy efficiency laws?
- What guidelines or suggestions can be provided for developing an energy efficiency law?
- Where can one find information on existing and proposed energy efficiency laws?

Literature review

An earlier review of EE institutional frameworks identified a comprehensive legal basis for EE policies and programmes (Limaye, Heffner and Sarkar, 2008):

- articulate the government's energy efficiency purpose and intent ;
- include specific, quantitative, time-bound goals or targets;
- justify the need for government intervention;
- assign responsibility for planning and implementation;
- provide funding and resources; and
- include oversight arrangements, such as monitoring and reporting of results.

Other studies of EE legislation distinguish between different types of laws: **soft laws** that lay out principles and intentions, and **hard laws** that provide the statutory basis and specify the procedures needed for actual implementation. Soft laws need to be followed by secondary legislation in order to be effective. In many cases, however, this process is delayed and a gap emerges between the statement of broad intent and practical application. Even hard laws require additional administrative work, such as rules and regulations, before policy implementation can commence (ECS, 2009).

A recent handbook published by the United Nations Environment Programme (UNEP, 2007) includes indicative legislation for a number of EE policies. The example laws cover regulatory policies (*e.g.* building codes and appliance efficiency standards) and market mechanisms (*e.g.* financial incentives and tax credits). Given the diversity of policy mechanisms and types of government intervention, the report concludes that there is no single "right" way to legislate EE improvements. Instead, it suggests that legislators consider legal precedents from energy and other sectors, including from other countries, as a guide to establishing suitable policies and legislative frameworks.

Several organisations have tracked recent proliferation of EE legislation. The Energy Charter Secretariat (ECS) has developed a timeline of major EE laws enacted over the past 30 years (ECS, 2009). The Asia-Pacific Energy Research Centre (APERC, 2010), the United Nations Economic Commission for Europe (UNECE, 2010) and this study have prepared similar compilations of EE laws. These recent surveys have identified laws in place or awaiting enactment in dozens of countries. Annex 1 of this report contains a listing of the EE laws identified in the course of this study.

Historical development of energy efficiency and conservation laws

Energy importing countries introduced the first EE laws after the oil price shocks of the 1970s and 1980s. These energy conservation laws in Japan, Korea, the United States and elsewhere established institutions, authorised funding and provided mandates for market interventions (UNESCAP, 1999). Most of these early laws remain in force, but have been amended over the years to broaden the scope and coverage of EE policies. Many other countries have followed suit, and today an estimated 50 countries have some form of national EE law or decree.

Some early laws have proven seminal, with their main elements being widely replicated in later legislation. This is frequently a regional phenomenon. For example, the Japanese Rational Use of Energy Law (1979) was replicated regionally with similar elements found in subsequent laws in China, India, Korea, Thailand and, most recently, Vietnam (Table **2.1**). These elements comprise a template of sorts for EE laws in the Asian region, and possibly beyond. They include:

- clearly defined responsibility for developing and implementing policies and programmes;
- creation of a specialist unit focused on policy and programme implementation;
- regulatory policies focused on the largest energy users (*e.g.* designated enterprises) regardless of sector (*e.g.* factories, buildings, government, transport);
- minimum standards plus labelling schemes for equipment and appliances;
- financial support for technology development and pilot projects plus other incentives (subsidies, low-interest loans, tax incentives) for investment in energy efficiency; and
- some form of funding mechanism supporting policy and programme implementation.

IEA research suggests that replication of energy efficiency laws is continuing. For example, the Government of Indonesia (GoI) issued Regulation 70 in November 2009, which contains detailed provisions for energy

efficiency in each sector. Regulation 70 requires large consumers (over 6 000 toe/yr) to retain an energy manager and undertake specific EE activities (audits, multi-year plans). The same regulation also creates the legal basis for an appliance labelling requirement.

Recent development of clean energy laws

Considerable legislative activity on climate change and energy efficiency took place in the run-up to the United Nations Framework Convention on Climate Change (UNFCCC) 2009 Conference of the Parties (COP 15) in Copenhagen. The characteristics of this legislation differed from earlier energy efficiency and energy conservation laws. Key elements of these new clean energy laws include: (i) long-term targets; (ii) mobilisation of multiple organisations to implement energy efficiency; (iii) creation of more flexible funding arrangements; and (iv) design of efficiency programmes to meet specific targets. The following section presents four examples of recent clean energy laws enacted in Korea, Singapore, Massachusetts (United States) and the Province of Ontario (Canada).

Low Carbon and Green Growth Law, Korea

In 2009 Korea enacted the Basic Law of Low Carbon and Green Growth (LCGG). This Basic Law empowers the government to introduce legally binding (compulsory) regulations on greenhouse-gas (GHG) emissions, including cap-and-trade. The LCGG was passed in 2009 and took effect in May 2010. Additional Secondary Laws to implement the provisions of the Basic Law are currently under preparation. The Basic Law contains the main elements recommended by the World Bank and others for a comprehensive EE law: a statement of overall policy; numerical specification of goals and targets; provision of a firm legal basis; establishment and empowerment of implementing agencies; provision of sustainable funding; and specificities of accountability, co-ordination, oversight and reporting mechanisms. The LCGG provides the legal basis for Korea's ambitious Low Carbon Green Growth National Strategy.

Specific provisions of the Basic Law enable the Ministry of Knowledge Economy (MKE) and the Korea Energy Management Company (KEMCO) to place compulsory requirements on industry and buildings for the first time. The Law also creates a Green Growth Committee to co-ordinate EE activities and establishes a green certificates programme. The volumetric threshold of coverage will be considerably lower than the existing threshold and will include buildings. The Law also incorporates targets contained in the companion Low Carbon Green Growth Strategy for new and retrofit buildings, including a requirement that all new housing construction reach a zero-net-energy threshold by 2020. For commercial buildings the zero-net-energy target is set for 2025, and for existing buildings the target is to reduce current consumption by 30% to 40% by 2020.

Table 2.1 **Replication of energy efficiency laws in Asia**

Provision	Japan (1979, amended in 1993)	Korea (1979, amended in 1999)	Thailand (1992, amended in 2003)	China (1997, amended in 2007)	India (2001)	Vietnam (2010)
Title	Rational Use of Energy Law	Rational Energy Utilisation Act	Energy Conservation and Promotion Act	Energy Conservation Law	Energy Conservation Act	Energy Efficiency and Conservation Law
Coverage	All but households	Industry, buildings, equipment	Industry, buildings, equipment	All but households	Industry, buildings, equipment	All but households
Plans and targets		Basic Plan for Rational Use of Energy (every five years)	None	Covered by five-year plans	None	5-10 year national targets
Lead agency	Ministry of Economy, Trade and Industry (METI) and Energy Conservation Centre Japan (ECCJ)	Ministry of Knowledge Economy (MKE) and its subsidiary unit, Korea Energy Management Company (KEMCO)	Ministry of Energy and Department of Alternative Energy Development and Efficiency (DAEDE)	Overall responsibility lies with the State Council. Implementation delegated to national and provincial agencies	Bureau of Energy Efficiency (BEE)	Ministry of Industry and Trade (MOIT)
Role of lead agency	Develop and enforce EE policies and regulations; deliver technical assistance; co-ordinate implementation	Develop and enforce EE policies, regulation and programmes; deliver technical assistance and energy services; co-ordinate implementation	Develop EE policies and regulations; manage the Energy Conservation Fund (ECF); support energy suppliers and consumers	Develop and enforce EE policies, co-ordinate implementation, approve periodic plans, promote awareness	Develop and enforce EE policies, programmes, training, pilots and certification programmes; co-ordinate implementation	Develop policies, regulations, national targets, five-year plans, performance measures; co-ordinate implementation
Market-based policies	Provided for small and medium enterprises	The Fund for Rational Use of Energy provides long-term and low-interest loans on request to install or retrofit energy efficiency on buildings or facilities.	Working capital, grants and subsidies for EE investment for public, state-owned, and private consumers.	Establishes preferential taxes for EE; provides financial subsidies for EE lighting and other products	Financial assistance to institutions to promote EE	Reduction in import, revenue, VAT and other taxes on EE/RE equipment; preferential financing for EE/RE companies

Funding mechanism		Electricity Infrastructure Charge of 3.7%	Tax on gasoline (USD 0.1 cents/litre) funds the Energy Conservation Fund	Establishes energy conservation funds and subsidies for energy conserving products	Requires each state to establish a State Energy Conservation Fund	
Regulatory policies	Law designates large-scale energy consumers and requires energy-management measures, (appointing energy managers, reporting annual consumption and energy audits). Law establishes efficiency standards for buildings, appliances, and motor vehicles, and requires appliance efficiency labels.	Large users must report their production, energy facilities, equipment and energy use, along with a corporate energy conservation plan. Act created a voluntary co-operation plan for the 200 largest energy users and provides for KEMCO to assist them in meeting energy intensity goals. Act establishes a standards and labelling programme, and a rating programme for electrical equipment.	Larger users must appoint energy managers, set targets and plans for EE, report on energy production, maintain records of energy use and equipment changes that affect energy use, and retain a registered auditor to conduct audits.* *Requirement removed in 2003 revision.	Very large users must appoint energy managers, submit annual energy consumption reports, and implement economical EE measures. New buildings must comply with building efficiency codes. Local governments must optimise transportation systems. Appliances must adhere to equipment standards and carry labels. Energy management contracts and voluntary energy conservation agreements are encouraged.	Act provides legal frameworks, institutional arrangements and regulatory mechanisms at the national and state levels to support EE. Various measures target different sectors. Act creates a Bureau of Energy Efficiency charged with introducing stringent energy conservation norms. Large energy users must appoint energy managers, carry out energy audits, submit reports on annual energy use and comply with industrial energy norms. New buildings must comply with building thermal code. Establishes efficiency standards and labelling requirements for appliances.	Large users must submit annual energy consumption reports, carry out energy audits, and educate staff on EE practices. Very large users must submit five-year plans, carry out audits, appoint energy managers and report annually. Local government must incorporate EE into traffic planning. Appliances must carry EE labels. All consumers should phase-out old, inefficient equipment.

Energy Conservation Law, Singapore

Singapore's first-ever Energy Conservation Law (ECL) is currently under development. Preparation of the ECL includes a two-year planning and consultation process now underway that will establish the details of the legislation. The law is expected to target industrial users and buildings, which account for almost all of the energy consumption in the city-state. The ECL is expected to include typical regulatory mechanisms found in other Asian EE laws: EE managers, reporting, target setting and audits. The ECL is also expected to streamline and consolidate other statutes that address energy efficiency, including the statutory basis for implementing appliance standards, and energy consumption reporting requirements for large buildings. All of these new requirements will be tied to targets contained in the Sustainable Development Blueprint, *e.g.* a 35% improvement in energy efficiency over 2005 levels by 2030.

Green Communities Act and Global Warming Solutions Act, Massachusetts (United States)

The Green Communities Act (GCA) and the Global Warming Solutions Act (GWSA) were passed during the same legislative session and are companion bills. These two acts require the Commonwealth of Massachusetts to reduce its GHG emissions by at least 80% below 1990 levels by 2050. The GWSA calls for the Secretary of Energy and Environmental Affairs to set an interim target of between 10% and 25% below 1990 levels by 2020, as well as targets for 2030 and 2040. The GCA will help achieve these goals by integrating gas and electric EE programmes, requiring utilities to implement "all cost-effective EE", and creating a more comprehensive, longer term approach for utility-managed EE implementation.

Green Energy Act, Ontario (Canada)

In 2009, the Ontario Provincial Parliament (Canada) passed the Green Energy Act (GEA). The act aims to make Ontario a world leader in clean energy and to create a green culture in the province. The GEA has established lucrative feed-in tariffs for renewable energy, guaranteed for 20 years at fixed prices of up to CAD 0.90/kWh. The Act also streamlines applications for environmental permits for renewable energy, making it compulsory for electricity distributors to cater promptly to connection requests and even pay for connection costs. The Act provides a right to access for renewable power and curtails a community's power to block required permits or licenses. With regard to energy efficiency, the GEA subsumed the earlier Energy Efficiency Act, which extended federal appliance standards to provinces but at more stringent levels, and continued to enforce the Supply Mix Directive. It also specified that local distribution companies (LDCs) should meet conservation targets or risk losing their business license. The provincial electricity authority, the Ontario Power Authority (OPA), is developing a suite of programmes to ensure that all customer classes stand to benefit from energy efficiency, thereby satisfying a portfolio requirement established by the government and enforced by the regulator. Other elements of the GEA provide for secure multi-year funding, standardised and compulsory measurement and verification (M&V) protocols, and the elevation of EE considerations to equal importance with safety and health within the Ontario Building Code.

Findings and discussion

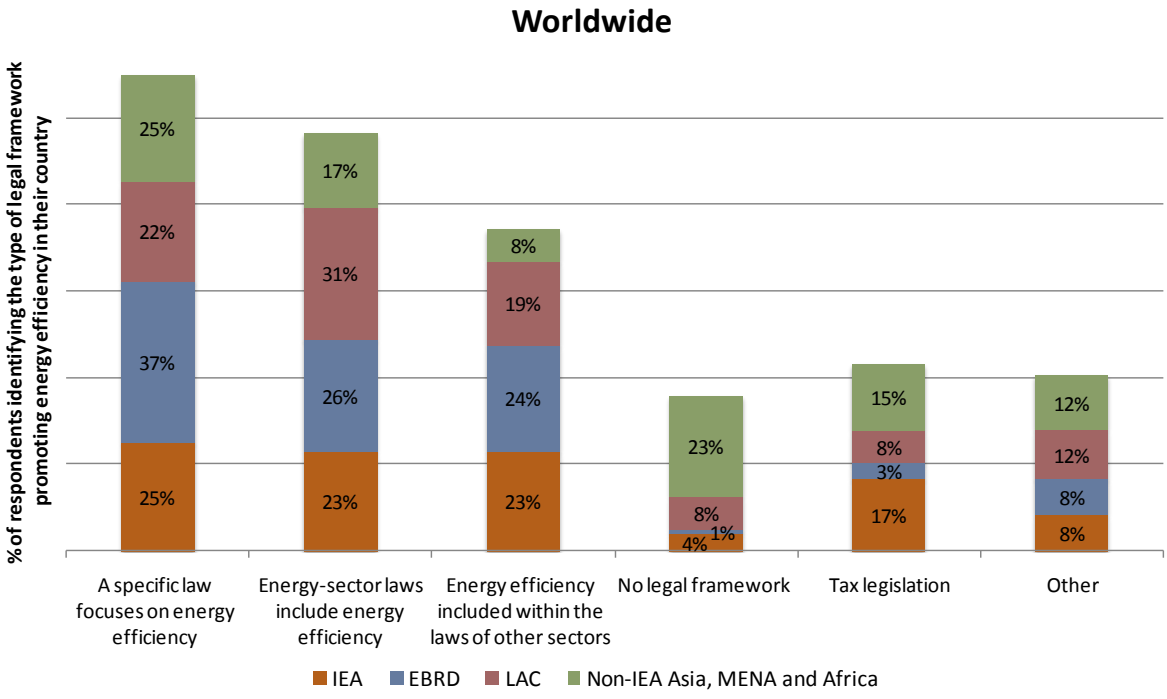
The IEA undertook a literature review as well as surveys and interviews of EE experts in order to better understand the importance of EE laws within an overall system of energy efficiency governance. The IEA

received institutional surveys from 176 EE experts in 77 countries, and also interviewed over 100 EE experts in 27 countries. These research methods provided considerable information on the scope and nature of EE legal frameworks worldwide.

Two-thirds of survey respondents indicated that their country had some form of legal basis in support of energy efficiency, either in terms of a specific EE law or clauses in other laws covering energy efficiency (Figure **2.1**). Over one-quarter of respondents indicated that their country had a specific law focused on energy efficiency. Only a few respondents (less than 10%) indicated that their country had no legal framework for energy efficiency. Respondents also noted other legal frameworks promoting energy efficiency, such as tax legislation, EE building codes, environmental legislation, public utility codes and administrative rules.

Interviewees were asked several questions about EE laws as an enabling framework for energy efficiency: what specific laws or decrees existed, what was the process for enacting the law or decree, and what were the most important constituent elements of an EE law. These responses helped the IEA to compile the extensive list of EE laws contained in Annex 1. The next section discusses some of the main issues that the survey and interview respondents associated with the development of EE laws and decrees.

Figure 2.1 **Legal frameworks promoting energy efficiency**



Note: Percentages amount to 100 for each region.

Comprehensive vs. incremental approach

Many energy efficiency laws are narrow in focus, targeting one or two policies, industries or mechanisms. In the Czech Republic, for example, the state's Energy Efficiency Law requires audits of certain large end-users (*e.g.* boilers), but does not cover all large end-users, nor does it provide for the additional policy mechanisms (*e.g.* financing and implementation capacity) needed to move from an energy audit to project investment.

Although a comprehensive law (*e.g.* covering all consumers and including reinforcing mechanisms) is desirable from a governance viewpoint, it often proves difficult to enact. In Vietnam, for example, a draft comprehensive EE law was developed as early as 2006, but was only recently enacted by the National Assembly. The law is quite comprehensive and ambitious, with multiple ministries (construction, transport, commerce and industry) given responsibilities according to the consuming sector (Table **2.1**). Its comprehensiveness, however, necessitated lengthy inter-ministerial co-ordination, stakeholder engagement and revision processes (APEC, 2009b).

There is clearly a trade-off between a comprehensive law that takes years to develop and enact versus a narrowly focused law that can be quickly enacted but may have a smaller impact. The suitability of either approach varies from country to country depending on both technical and political considerations. A compromise approach might be to narrowly focus on a high-impact consuming sector, but with a law that provides a full suite of reinforcing policies (*e.g.* compulsory audits, access to financing and implementation assistance).

Analytical foundation

It is important that energy efficiency laws have a strong analytical foundation. They should be based on in-depth study of potential, markets, technology, and available technical and institutional capacity. Such analysis is essential to ensuring that the law contains the best policies targeting the most-promising markets and customers. Strong analytical underpinnings are also important in building a political consensus to enact the legislation.

Delays in implementation

Delays often occur when basic laws are passed but additional by-laws or rulemaking is delayed. Russia's landmark Federal Law on Energy Conservation and Increase of Energy Efficiency (Law No. 261-F3) was passed in 2009, but the implementation details have not yet been determined in full. The obligatory character of the measures, deadlines for implementation, and penalties for non-compliance are quite innovative. However, the price of such innovation is the additional time needed to work out the details. Compulsory elements of Law No. 261-F3 include rehabilitation or capital repairs of large buildings to upgrade thermal efficiency, installation of energy use meters on all grid-connected demand, a ban on the production and trade of incandescent electric bulbs with power exceeding 100 W, and development of the indicators needed to gauge compliance of buildings and facilities. Interview respondents praised this new law, but noted that it cannot work without extensive by-laws and administrative action at sub-national levels.

Federal systems of government and supra-national systems (such as the European Union [EU]), can contribute to gaps in implementation. EU directives must be implemented by the national legislatures of EU member states. This takes time and may create disparities in the pace of implementation. In Australia, federal legislation also requires the enactment of companion legislation at the state level. As a result, it can take some time to move from the federal legislative framework to local implementation. The Indian Energy

Conservation Law, enacted in 2001, requires each state to establish a State Energy Conservation Fund. The first such fund was established in the State of Kerala in 2010, nine years after the national law was enacted (Kerala Gazette, 2010).

Building rulemaking capacity in advance of a law's passage avoids such implementation delays. A two-track process, whereby rule making and legislative development take place in parallel, is an effective approach. Alternatively, the inclusion of sufficient detail in the basic legislation will allow for immediate implementation. Another solution is to devote greater attention to stakeholder engagement; gaining acceptance for both broad legislative objectives and the details of rules can help smooth implementation. In Singapore, extensive preparation is built into the run-up to any plans for major new legislation. Preparation of the ECL is already underway, even though the law will not be considered until the 2012 legislative session. The ECL will include a number of regulatory mechanisms, and the different agencies charged with developing the new rules are collaborating with affected parties in the private sector to work out the details. Development of auditor and energy manager capacity is also being undertaken well ahead of the expected 2012 enactment.

Need for revisions and amendments

Many energy efficiency laws (Table **2.1**) require amendments to add new mechanisms or correct aspects of the law that did not function as intended. Thailand's Energy Conservation and Promotion Act (ECPA) was revised twice, in 2003 and 2007. The 2003 revision removed the mandatory energy audit requirement, as the audits were becoming a cumbersome bureaucratic burden and were not delivering the expected EE improvements. The 2007 revision was comprehensive, representing a basic shift in regulatory philosophy, away from specific technologies or one-time investments and towards management methods that encourage continuous attention to energy consumption. The role of the Department of Alternative Energy Development and Efficiency (DAEDE) also changed, from that of an enforcer of regulations to a facilitator of improved management practices. Under this new approach, DAEDE will audit the enterprise management systems installed by the designated facilities, a function previously undertaken by the facilities themselves. DAEDE will also provide support and assistance with improving energy management practices. This new approach is consistent with emerging best practice for facilities management such as that contained in the draft International Standards Organization (ISO) Standard 50001 (ISO, 2010).

The 1997 Chinese Energy Conservation Law (ECL) marked the first time that a long-term strategy for energy conservation was placed within a legal framework. The Chinese ECL is credited with creating mechanisms for rational utilisation of energy in industry, including: systems for collecting and reporting energy statistics; metrics to track improvements in energy-intensive industries; a mandate to eliminate obsolete and inefficient equipment and processes; and the promotion of energy efficiency through research and development (R&D) and awareness-raising. The 1997 Law had shortcomings, however, including a strict focus on industry and a lack of enforcement mechanisms. An extensive process of reformulation, redrafting and stakeholder consultation began in 2005. The revised ECL (2007) drastically expanded the scope of energy conservation, broadened policy mechanisms, and clearly specified the roles of central and local governments relating to implementation. The revised law introduced substantial improvements in that it:

- established resource conservation as a basic National Policy of China, obligating all entities and individuals to pursue energy conservation;
- clearly assigned responsibility for achieving energy conservation targets to leaders of local and provincial governments;
- provided mandatory EE standards for equipment, devices and energy-intensive industrial processes;

- extended the provisions of the former ECL to all large energy users;
- provided market mechanisms, including financing, tax incentives and government procurement measures, to help enterprises comply with regulations; and.
- clearly specified the penalties for compliance failures.

The 2007 ECL was a clear improvement over China's earlier law, and has been credited with helping to deliver impressive reductions in energy consumption under the so-called "Green Leap Forward" or 11th Five-Year Plan (Levine and Price, 2010).

An EE law should anticipate the need for revisions and amendments, and if possible include a means to regularly evaluate effectiveness in order to identify areas for improvement. Including provisions for amendment or refinement also reduces concerns about unanticipated results, and may make it easier to establish initial political consensus on passing an energy efficiency law.

Balancing carrots (market mechanisms) and sticks (regulation)

An array of policy measures and intervention mechanisms is available to address the barriers to scaling-up energy efficiency described in Chapter 1. Setting aside advisory and promotional policies, most other policies and interventions can be divided into two types: incentives/market mechanisms and regulatory/compulsory activities. Analysts have emphasised the need to balance these two mechanisms by ensuring that an EE law enables both types of policies – in other words, offers both carrots and sticks (ECS, 2009). Most successful national EE programmes have this dual policy combination. In Denmark, the 1995 omnibus legislation referred to as the Energy Package included sticks in the form of taxes on energy consumption and associated emissions (carbon dioxide [CO_2] and sulfur dioxide [SO_2]) and compulsory targets for energy-intensive companies. The carrots took the form of subsidies and access to financing for EE investment.

Compulsory mechanisms can pave the way for participation in voluntary mechanisms. Thailand's ECPA requires large consumers to prepare a database for their factory/building energy efficiency plans. Companies must also designate energy managers and set energy efficiency targets. This is the minimum under the law; however, additional assistance (such as grants and capacity building) is available for conducting audits and developing projects. Even if initial efforts are mostly no-cost operational improvements, successful early results can lead to equipment investments that take advantage of other voluntary mechanisms (*e.g.* soft loans or revolving funds).

The balance between compulsory and market mechanisms can vary according to the public and political appetite in a given country context. It can also differ across consuming sectors (*e.g.* appliances vs. industry). Some countries (*e.g.* Australia, New Zealand and Singapore) emphasise market mechanisms, in keeping with a general free market philosophy. Countries with a more significant tradition of government intervention in markets (such as China, Japan and Vietnam) place greater emphasis on regulation.

However, there is evidence of a trend towards greater regulation, particularly in the light of emerging climate change policies and mitigation targets. In Singapore, slow EE progress based solely on market mechanisms overrode reluctance to adopt compulsory measures, despite concerns about cost-incurrence and reduced competitiveness. The new ECL is therefore expected to include compulsory activities for large buildings and all industry. The same trend can be seen in Korea, where the newly enacted Low Carbon and Green Growth law will phase out the long-standing use of voluntary agreements (in which industry voluntarily adopts targets for EE improvement) and enable government to impose compulsory requirements

on industry and buildings.[2] The European Union is phasing out voluntary vehicle fuel economy standards in favour of mandatory directives.

Importance of a funding mechanism

This study found that a reliable and continuous source of funding may be the single most critical factor in scaling-up energy efficiency investment. Thus, it is important to integrate a funding mechanism as part of any EE law. In Thailand, a tax on gasoline raises revenues which are earmarked for EE policies and programmes. This funding mechanism, enabled through the ECPA, provides a powerful enabling framework for energy efficiency.[3] The Energy Conservation and Promotion Fund, or EnCon Fund, disburses USD 150 million annually on a wide variety of EE-related activities, from the budgets of government EE agencies to capitalising EE revolving funds for ESCOs and banks (APERC, 2010). A typical use of the fund is to subsidise feasibility studies for EE projects, which can stimulate commercial lending by reducing the risk perceived by bankers. Less than one-third of the fund's annual outlay is used for actual investments; the rest is allocated to advisory services, demonstrations, R&D and administrative costs (Heffner, 2008). Interviews with managers at the Thai Bureau of Energy Regulation and Conservation underlined the singular importance of funding: "The ENCON fund is a cornerstone of all EE activity in Thailand. The stability of the fund makes it possible to make and carry out long-term plans and develop organisations. The fund provides for technical assistance, R&D, grants for audits and project preparation, soft loans – all of the things necessary to scale-up an energy efficiency industry in Thailand."

Other EE funding mechanisms, described in detail in Chapter 4, include system public benefit charges (SPBCs), permit and registration fees, and others. Brazil's Law 9.991 (2000) established an SPBC collected by utilities, and specified that 0.5% of revenues be earmarked for EE activities and clean energy R&D (UNECE, 2010). This funding mechanism resulted in Brazil's utilities directing up to USD 200 million annually toward EE investments on behalf of their customers. In Denmark, carbon taxes on business and industry included within the 1995 Energy Package legislation have been reinvested in EE improvements. The result has been the so-called Danish miracle: economic growth without growth in energy consumption or CO_2 emissions.

Energy conservation in the transport and public sectors

Results from many countries highlight the special difficulties encountered in implementing EE policies for the transport and public sectors. These two sectors face unique barriers that require special approaches. For transport, the challenges range from creating convenient mass transit alternatives to get passengers out of their cars, to addressing the basic linkage between urban planning and transport efficiency.

Challenges for the public sector relate to rigid procurement and budgeting policies, and limited incentives for public employees or managers to save energy or try new approaches. In most countries, these complexities have led to separate laws and polices for these sectors. However, several countries (Table **2.1**) have enacted laws subjecting all large energy-using enterprises (such as factories, buildings, road freight

[2] Korea's voluntary agreement programme with industry, the Energy Saving Partnerships (ESP), has been in place since 1998. Although voluntary, the government provides support through tax incentives and soft loans. The ESP has no legal basis. For each of nine industrial subsectors, the Korea Energy Management Corporation (KEMCO) created ESP Councils and convened and moderated meetings in the spirit of information exchange on energy efficiency. Subsectors include fibre and chemicals, food, petrochemicals, etc. The ESP Councils work despite the involvement of competitors because energy is not generally a proprietary part of their operations.

[3] In public finance jargon earmarking of tax revenues means the monies raised are set-aside for a specific purpose rather than flowing to the general treasury. See Chapter 4 for more detail.

companies and airlines) to similar compulsory measures designed to stimulate efficiency improvements. In China, for example, the ECL (2007) stipulates that public institutions are subject to the same procedures as factories and other large buildings.

Interpreting, administering and building implementation capacity

When drafting a law it is important to consider the implementation process required once the law has passed. This includes rulemaking, administration, enforcement mechanisms, and results monitoring and reporting. Issues of practical importance to businesses and industry might include how large energy users are designated and how to protect the confidentiality of compulsory energy consumption reports.

China took several years to build the capacity needed to process energy and production statistics and analyse progress towards energy intensity targets. The National Statistical Bureau has steadily strengthened its procedures, which now include inspections to ensure that the data submitted are validated, as well as quarterly reporting on progress towards provincial efficiency improvement targets (Levine and Price, 2010).

Singapore is taking a co-ordinated approach to ensure that adequate certified energy auditors are in place to implement the requirements of the ECL (2013). As the law will require large businesses to undertake energy audits and hire energy managers, the government is working with the private sector to ramp-up a training programme for Certified Energy Managers. Anticipating and preparing for implementation capacity needs is a way of helping to avoid undue implementation delays following the enactment of EE laws.

Balancing conflicting interests of government agencies

The formulation of energy efficiency laws often involves bargaining and compromise between conflicting interests in the public and private sector – as well as between government agencies. In Romania, the Law Concerning the Effective Use of Energy took six years to enact before final approval was granted. Much of the process involved difficult inter-ministerial negotiations on specific legal elements, as well as concerns about the effect on economic growth and energy company profits. Certain aspects were eventually dropped (*e.g*. inclusion of the buildings sector) in order to achieve a consensus within government. Frequent conflicts of interest arose between the finance and energy ministries over elements of the law affecting government revenues.

In Vietnam, the large energy users in the buildings and transport sectors engaged in extensive consultation and discussion with the respective ministries. In Korea, the passage of the Low Carbon Green Growth law meant that compulsory targets for energy efficiency replaced voluntary goals for large industries. KEMCO and its parent agency, the Ministry of Knowledge Economy (MKE), conducted numerous workshops and held public hearings in order to seek industry input and build public consensus around this change.

Most market mechanisms (including taxes, tax credits, tax earmarks, preferential treatment of EE goods and services, government subsidies) have an impact on public finances, and are thus of special concern to the treasury or finance agency.

Creating consensus and balancing inter-agency and stakeholder interests depend on the relative roles of parliamentarians, government officials, interest groups and civil society – all of which reflect the country context. Formulas that have proven effective for building a consensus include the creation of inter-agency committees to co-ordinate development, and the proposal of policies, programmes and mechanisms for early engagement with stakeholders.

Conclusions and guidelines

Evidence from this review supports earlier observations that effective energy efficiency legislation contains certain common elements, including:

- articulation of purpose and intent;
- specific, quantitative, time-bound goals or targets;
- justification for government intervention;
- assignment of responsibility for planning and implementation;
- provision of funding and resources; and
- oversight arrangements, including results monitoring and reporting.

These elements apply equally to comprehensive EE laws and narrowly focused (sectoral or end-use) legislation. In addition to including the elements listed above, decision makers should consider the following guidelines when developing the provisions of an EE law:

Address the trade-off between comprehensiveness and incremental-type legislation by focusing on the fastest growing energy consuming sectors.

Make provision for implementation delays, bearing in mind that an EE law is usually only the first step. Many details necessary for implementation will need development (*e.g.* sector regulations, technology-specific standards, administrative policies, reporting protocols, details of incentive mechanisms). Implementation delays can be avoided by building capacity into rulemaking and programme administration ahead of a law's passage, and devoting attention to stakeholder engagement.

Build mechanisms for periodic review and amendments to ensure that the legislation can be adjusted as necessary.

Include complementary mixtures of market mechanisms and regulatory frameworks. The evidence from many countries shows that compliance with compulsory activities is more likely if financial support is available.

Anticipate and resolve conflicts of interest within government. Dealing with inevitable conflicts of interest among government stakeholders is part of the legislative development process. Formulae that have proven effective in building consensus include the creation of inter-agency committees to co-ordinate development, and analysis of proposed policies and programmes as well as mechanisms for early engagement with stakeholders.

Following these suggestions will help governments to develop a legal framework for energy efficiency and provide a foundation for the achievement of EE objectives.

3. Energy efficiency strategies and action plans

Importance

Many countries are developing strategies and action plans as a means to engage stakeholders, build consensus and galvanise action on energy efficiency (EE). These strategies and action plans can help guide and encourage energy efficiency policy development and implementation by:

- placing energy efficiency policy within the broader policy context;
- prioritising resource allocation across the range of possible energy efficiency policies;
- capturing synergies between policies;
- engaging stakeholders and building political consensus; and
- assigning responsibility for policy development, implementation and oversight (IEA, 2009b).

Key issues and research questions

- How do national strategies and action plans contribute to energy efficiency governance?
- What are the key elements of an EE strategy?
- What issues need to be addressed in developing an EE strategy?
- What guidelines can be suggested for an EE strategy development process?
- What is the difference between a strategy and an action plan, and how should they be linked?

What makes a strategy or an action plan?

An EE strategy should provide a comprehensive description of the rationale and approach to designing and implementing EE policies and programmes. In many cases, an EE strategy is used to provide a high-level view of how a country can meet specific targets or goals. Korea's Low Carbon, Green Growth Strategy, described below, is a good example of a strategy which connects high-level goals with sector-specific activities and targets.

The literature on strategies finds general agreement on what comprises a strategy. However, many countries have EE action plans as opposed to strategies. An action plan is usually a programmatic document, focused more on implementation activities than broad strategy. A complete action plan should, however, contain much of the same content found in a strategy.

Strategies

- **Focus:** Long-term and high-level.
- **Opportunity:** The size and scope of potential EE improvements and their benefits should be clearly described.
- **Policy integration:** The relationship between EE policy and other social, developmental and environmental policies should be clear.
- **Rigour:** The strategy should have a firm analytic foundation.

- **Articulation of purpose, goals and objectives:** Strategies should articulate the government's overall goal for energy efficiency, and the reason for government action.

Action plans

- **Demarcate scope and expected results**: Action plans should indicate where government policies are to be focused and what outcomes are intended.
- **Assign responsibility for action:** Action plans should clearly assign responsibility for implementation, and identify how and to whom implementers will be accountable.
- **Relate barriers, policies and outcomes in a logical framework:** Action plans should describe the main barriers to scaling-up energy efficiency and justify government intervention policies in terms of overcoming these barriers.
- **Identify resources needed for action:** Action plans should identify the resourcing needs for developing and implementing government policies as well as other resources (private investment, donor support) needed to achieve results.
- **Mechanisms for monitoring results:** An action plan should specify how policies will be evaluated and results monitored, and who will provide oversight.
- **Enable updates and revisions:** The action plan should specify regular review procedures and mechanisms for revisions (IEA, 2009b).

The process of formulating strategies and action plans is also important, as it facilitates stakeholder engagement, political consensus building, stock-taking of managerial and technical capacity, and identification of EE governance needs.

Findings and discussion

The findings described below are based on desk studies, including a 2009 IEA workshop on energy efficiency strategies and action plans, institutional survey results and interviews. This section describes several examples of energy efficiency strategies and action plans and discusses challenges faced in developing a comprehensive energy efficiency strategy.

Examples of EE strategies

Many of the countries reviewed in this study have developed some form of EE strategy or action plan. A list of several EE strategies and action plans considered in this study is provided below (Table **3**.**1**). A complete list of all the EE strategies and action plans identified in the course of this study is provided in Annex 3.

The scope and use of EE strategies and action plans varies widely. Some countries have designed a comprehensive strategy or action plan, but not implemented it. Other countries have developed much more narrowly focused EE strategies or action plans covering just a few consuming sectors or end-uses. Relatively few countries have strategies and action plans that are current, comprehensive, action-oriented and fully implemented.

Table 3.1 **Sample of national strategies and action plans**

Country	Strategy	Year
European Union	National Energy Efficiency Action Plans (NEEAPS)	2007
Indonesia	Master Plan on National Energy Conservation	2008
Japan	New National Energy Strategy	2006
Korea	Low Carbon Green Growth Strategy	2009
New Zealand	Energy Efficiency and Conservation Strategy (version 3)	2010
Singapore	Sustainable Development Blueprint	2009
South Africa	Energy Efficiency Strategy	2006
Ukraine	Energy Strategy to 2030	2007
United States	National Action Plan for Energy Efficiency	2005

In the European Union, National Energy Efficiency Action Plans (NEEAPs) contribute to sharing of best practices among countries and EE practitioners, and help develop synergies between strategies and measures (European Commission, 2009). A NEEAP is compulsory for EU member countries in order to comply with the EU's Energy Services Directive (ESD), which requires certain actions on end-use energy efficiency and energy management. The ESD requires each EU member country to describe its plans for achieving overall national targets, with particular attention to improving public sector energy efficiency and providing information and advice to end-users.[4]

In 2009, the European Commission conducted a review of all 27 NEEAPs, which found considerable variation in sufficiency, detail and comprehensiveness across sectors and member states. Many of the NEEAPs presented "coherent and comprehensive strategies, backed by institutional and financial provisions". However, many more "showed a piecemeal approach characterised by fragmented and stand-alone energy efficiency measures targeting a sector or an end-use". The review described the objectives that a comprehensive and thorough action plan could aspire to: "A successful Action Plan would place energy efficiency policy firmly within the broader policy context, it would prioritise resource allocation across the entire energy efficiency portfolio, it would ensure that synergies between policies are captured and duplication avoided, and that clear responsibility for implementation is allocated" (EC, 2009).

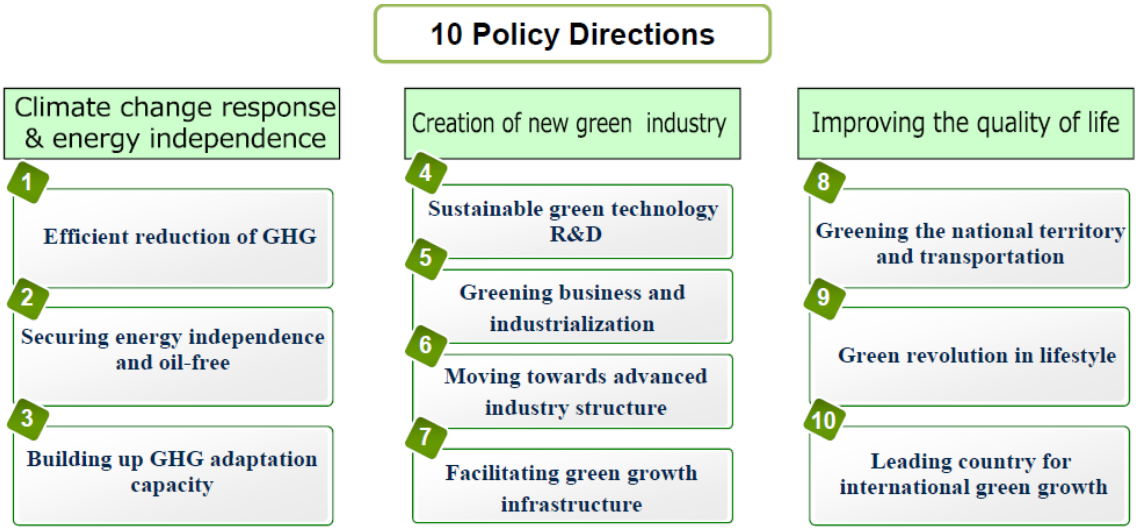
Most strategies and action plans fall short of these goals. One reason for this is that some strategies and action plans are formulated in isolation and do not include the engagement with stakeholders and practitioners needed to build political consensus. In other cases, strategies and action plans do not find their way into actual practice in guiding EE implementation, nor do they necessarily align with broader development needs. This is particularly the case for strategies and action plans developed as a requirement for receiving grants from development banks, aid organisations and non-governmental organisations (NGOs).

Outside of the European Union, development of EE and climate change strategies and action plans increased with the build-up to the United Nations Framework Convention on Climate Change (UNFCCC) 2009 Conference of the Parties (COP 15). Several countries prepared comprehensive strategies and action plans for attaining long-term greenhouse-gas (GHG) emissions reduction targets, including Korea and Singapore.

[4] The national target required by the ESD is a 9% reduction in energy use by 2016 (against a 2008 baseline) for most EU members.

Korea's Low Carbon Green Growth National Strategy, developed by the Ministry of Knowledge Economy (MKE), has three broad goals: (i) creating a green society that embraces sustainable culture; (ii) transitioning to a green economy by promoting green technology and industry; and (iii) establishing a Green Korea brand and thus situating Korea as a global leader in promoting green growth. The strategy sets a "30 by 30" goal: 30% reduction in carbon intensity against a business-as-usual projection by 2030. Ten comprehensive policy directions are specified in order to attain this goal (Figure **3.1**).

Figure 3.1 **Korea's low-carbon, green growth strategy**



Singapore's Sustainable Development Blueprint includes a target to improve the energy efficiency of the economy by 35% by 2030 (compared to 2005 levels). The blueprint provides targets for each sector and activity, emphasizing market mechanisms. It also allows for the introduction of regulatory requirements on consumers, a first for Singapore. The blueprint complements the previous Energy Efficiency Master Plan by adding new initiatives to improve overall resource efficiency (energy, water, land) and environmental quality, and to promote awareness of the benefits of environmentally friendly and sustainable development. An Energy Conservation Law that will provide the legal basis for several elements of the blueprint is currently under development (Government of Singapore, 2009).

Other climate change strategies and action plans are proliferating at national and even sub-national levels. The Province of Ontario in Canada unveiled a five-point Go Green Action Plan in 2007, which included:

- Short-, medium- and long-term targets for reducing GHG emissions, tied to specific regulatory and market mechanisms;
- Massive investment in new green infrastructure for transit and renewable power production;
- A Next Generation Green Jobs Fund supporting private investment in clean and green technologies and businesses in Ontario;
- Streamlined and preferential regulatory treatment for renewable energy; and
- Support and incentives to city and regional planning for creation of more sustainable, energy-efficient, transit-friendly communities (MEI, 2007).

Strategy development and action planning issues

Although EE experts agree on the importance of energy efficiency strategies and action plans, many have reported gaps, notably in identifying needed resources, assigning responsibility for action, and monitoring results. This section describes some of the issues faced in developing energy efficiency strategies and action plans.

Securing adequate funding and resources

Interview respondents provided numerous examples where the critical issues of funding and resource requirements were not addressed during the strategic planning process. Such unfunded and under-resourced strategies face difficulties in gaining acceptance and achieving implementation.

Energy efficiency experts in Armenia and Hungary reported that their countries have drafted strategies/action plans, but it remains unclear whether the funding to implement them will be available. Hungary's NEEAP lists programmes designed to achieve goals contained in the EU directive, but the funding has not been identified. An expert in Thailand also stated that strategies do not always translate into new resources or political support. For example, although energy efficiency has been described as a top priority of recent Five-Year Economic Plans, this has not resulted in increased budget allocations.

Establishing a solid analytic and quantitative foundation

Several respondents pointed out that strategy development can outpace the understanding of EE market potential or the capacity to project expected benefits. This can result from a lack of basic data or a lack of analytic capability. In Armenia, one respondent noted that the NEEAP has commitments for several sectoral state agencies; however, these ministries do not have the capacity to analyse and select the best EE policies and programmes.

Some experts stated that the actions described in their strategies are based on unreliable data. The problem of data reliability and estimation methods is generally greater for longer-term strategies and more ambitious targets. For example, in Russia the recently enacted Law on Energy Conservation and Increase of Energy Efficiency includes indicators for evaluating progress on energy efficiency improvements, such as the heating performance of buildings. However, baseline data on heating performance is unavailable at present, and a system of statistical reporting on energy efficiency has yet to be established. As a result, it may prove difficult to monitor the results of the EE improvements.

Accountability

Assigning responsibility for strategy implementation and action plan execution is necessary if results are to be achieved. The study found two basic approaches to accountability – centralised and decentralised - which generally mirrored overall institutional arrangements for energy efficiency.

Examples of strategies with relatively centralised accountability include Singapore, Ireland and Australia. In Singapore, the Energy Efficiency Programme Office (E2PO) is responsible for co-ordinating the implementation of the Energy Efficiency Master Plan. Ireland's NEEAP names the Department of Communications, Energy and Natural Resources as the lead department for implementation of EE strategy. Australia's National Framework for Energy Efficiency (NFEE) also has a clearly defined governance structure, comprising the Ministerial Council on Energy (MCE). This Council takes high-level responsibility for national

energy policy, and identifies policies and programmes that will deliver significant improvements. The Australian structure also includes the Standing Committee of Officials, which advises MCE Ministers and the Energy Efficiency Working Group (E2WG), which provides strategic advice on energy efficiency policy and programme delivery (2009).

By contrast, New Zealand's NZEECS (2007) employed distributed accountability, assigning specific tasks and roles to several government agencies. For example, the Ministry of Economic Development (MED) is in charge of reporting on implementation progress to the Minister of Energy, to enable emerging problems and opportunities to be identified. The Energy Efficiency and Conservation Authority (EECA) is responsible for delivering programmes and actions, and also for monitoring sector-level achievements. The Ministry of Transport heads transport EE initiatives in that sector. The NZEECS staff is responsible for identifying which agencies are accountable for delivering individual programmes and ensuring targets are met. Agencies report the impact of programmes to the MED and demonstrate how each one contributes towards the overall objectives.

Conclusion and guidelines

Based on the literature on strategies and action plans plus findings from surveys and interviews, the IEA suggests several guidelines for strategies and action plans (Box 3.2).

Box 3.1 **Guidelines for strategies and action plans**

- Provide a statutory basis for strategy development and updates
- Ensure strategies reflect country context and sectoral issues
- Link energy efficiency strategies to the broader policy context
- Reinforce strategies through action and economic planning
- Adopt a learning approach
- Establish accountability
- Balance comprehensive and sectoral strategies
- Create an energy efficiency strategy development checklist

Link strategy development and energy efficiency laws. Embedding strategy mandates within legal statutes increases the chances of long-term political support. For example, the New Zealand Energy Efficiency and Conservation Strategy (NZEECS) was written in accordance with section 10(2) of the Energy Efficiency and Conservation Act 2000 (Government of New Zealand, 2007). Although the Act is periodically updated, the EE strategy imperative is firmly rooted in statute.

Other examples demonstrate this important linkage between EE strategy and EE law. In Korea, the Low Carbon Green Growth Strategy is underpinned by the Low Carbon Green Growth Basic Law, which gives the government important new regulatory powers. In Singapore, the Energy Conservation Law, currently under development, will give the government a mandate to shift away from purely market mechanisms, and towards the more compulsory measures required under the Energy Efficiency Master Plan and the Sustainable Development Blueprint.

Ensure strategies reflect country context and sectoral issues. Many experts have noted that there is no "one-size-fits-all" EE strategy template for countries to follow. However, in spite of their differences, EU member states have worked to create NEEAPs in compliance with the ESD. The goals of these countries are broadly similar: increase economic development, improve energy security and mitigate climate change. However, their EE strategies necessarily differ to reflect country context.

Strategies should also address key sector issues, such as:

- the effect of energy efficiency on energy prices and growth in demand;
- the impact of energy efficiency on trade and energy security; and
- the mobilisation of investment needed to scale-up energy efficiency.

Link energy efficiency strategies to the broader policy context. Experts in several countries, including the United Kingdom and Sweden, stated that energy efficiency strategies and action plans should be linked to policies on climate change and the promotion of renewable energy. In fact, there is a strong trend towards subsuming energy efficiency strategies within the broader climate change policy umbrella (as already seen in the examples of Korea and Singapore). Ontario's Green Energy Act vastly increases investment in energy efficiency and renewable energy as part of an overall effort to make Ontario a world leader in clean energy and instil a conservation and green culture in the province. India recently announced the National Mission on Enhanced Energy Efficiency (BEE, 2010a), a key element of the National Action Plan for Climate Change (Government of India, 2010).

Many strategies incorporate a range of measures that cross sector lines and link up to a broad range of government objectives, including economic development, security, environment and education. France's NEEAP, for example, links energy efficiency to four broader energy-sector foci established by law, and demonstrates how energy efficiency measures are crucial to attaining national energy objectives (French Authorities, 2008). Another example is Ukraine's Energy Strategy to 2030, which calls for energy efficiency improvements in order to decrease dependence on Russian gas.

Balance economy-wide and sectoral strategies. Experts questioned whether national strategies are necessary or whether it is sufficient for a country to create a series of sectoral strategies. In the United States, for example, multiple national energy efficiency strategies were developed covering sectors over which the federal government has relatively little (the states hold significant regulatory power). Each US programme (for example, appliance and equipment efficiency standards, the ENERGY STAR product-labelling programme, industrial energy efficiency and the state/utility-focused National Action Plan for Energy Efficiency, or NAPEE) includes a strategy, an outline of key objectives, and a legislative and regulatory plan. In countries such as Chile, programmes have specific goals, but there are no sectoral or economy-wide strategies.

Most experts reported that although sectoral approaches are useful in federal systems and programme-specific goals are essential in general, it is important to have national strategies because these increase the profile of energy efficiency and act as drivers for strategic policy change. Experts warned, however, that while a national strategy is necessary, it is not sufficient by itself. For example, New Zealand's 2001 strategy increased the profile of energy efficiency and renewable energy, and acted as a driver for strategic policy change; its impact on improving energy efficiency across the entire economy was however less clear.

Reinforce strategies through action and economic planning. Any strategy must be complemented by a series of actions to achieve stated goals. While strategies take a high-level view, action and economic plans complement strategies by providing greater detail on specific actions and responsibilities. In countries with federal or supra-national governments, action plans are particularly effective when developed in conjunction with sub-national jurisdictions. In this way, the action and economic plans become the practical instrument

guiding implementation of national or supra-national strategy. This is the case in Australia, the European Union, India and Russia.

In many countries, economic plans are an important means of moving EE strategy forward. This is particularly true in China, where Five-Year Plans are the main vehicle for translating national policy into specific responsibilities and targets for provincial and local government. China's 11th Five-Year Plan (2006-2010) set a goal of reducing energy consumption per unit of GDP by 20% between 2006 and 2010, and promulgated binding targets for provinces, plus comprehensive EE policies and programmes covering all sectors (Levine and Price, 2010).

Adopt a learning approach. The effectiveness of a strategy over the long term can be further improved by adopting a continuous learning approach, in which monitoring and evaluation of energy efficiency results allows for expansion of successful measures and redesign of measures with below-par results.

New Zealand adopted a learning approach with its energy efficiency strategy; its 2007 Energy Efficiency and Conservation Strategy builds on the experience and achievements of its 2001 predecessor, and includes a section on lessons learned from the first strategy. High-performing programmes from the 2001 strategy were continued, and underperforming programmes were examined and modified (Government of New Zealand, 2007).

To ensure the accuracy of evaluations, monitoring methods must measure progress against quantifiable goals. Experts interviewed for this study stated that periodic review of strategies and action plans is essential. However, monitoring and review requires evaluation capacity that may not be well developed in some countries (See Chapter 13 on Evaluation). The development of credible evaluation and resulting monitoring methods is fundamental to a continuous learning and improvement approach. European Commission delegates noted that they are currently working on a harmonized calculation framework to monitor progress against achieving quantifiable goals.

Establish accountability. Experts generally agree that accountability is important, but differ on how to achieve it. Centralised accountability (*i.e.* with a single energy efficiency agency) ensures easier management, co-ordination and evaluation. More widely distributed accountability (across many agencies) promotes policy support and commitment from a larger number of agencies and decision makers, and expands ownership of energy efficiency strategy goals.

Most experts agreed that one high-level official should be accountable for the strategy. Ideally, this person should have political authority (for example, the Minister or Secretary of Energy). In the decentralised model, this person should be responsible for authoritative cross-government energy efficiency co-ordination functions.

The model used to establish accountability should be appropriate to the context and should consider governance culture and capacity levels in participating agencies.

Follow an energy efficiency strategy development checklist. Using the survey and interview results, as well as past IEA work on EE strategies and action plans, the IEA has developed the following checklist for developing strategies (Box **3.2**).

Box 3.2 **Energy efficiency strategy development checklist**

- Take a long-term, high-level view, but be supplemented with shorter-term and more programmatic action plans.
- Have a strong analytic foundation.
- Articulate its purpose, goals and objectives. Incorporate quantitative time-bound targets, both long-term and short-term.
- Identify internal and external factors affecting success.
- Be comprehensive and cross-sectoral.
- Ensure integration with other policy areas.
- Identify the resources needed to turn strategy into action.
- Prioritise consuming sectors and policy measures.
- Identify actions and responsibilities.
- Provide for results monitoring, updating and revisions.
- Facilitate stakeholder engagement and build political consensus as a fundamental strategy development process.

4. Funding energy efficiency programmes

Introduction

A steady and reliable source of funding is essential for EE institutions and programmes. Establishing mechanisms to fund EE implementation is a critical aspect of good energy efficiency governance – and should be addressed in the earliest stages of EE policy development. The role of funding mechanisms in good energy efficiency governance is closely related to several other elements of EE governance, including EE Laws and Decrees (Chapter 2), EE Implementing Agencies (Chapter 5), and EE Resourcing Requirements (Chapter 6). This chapter examines the variety of different EE funding mechanisms available and some of the practical issues associated with funding EE programmes and implementing agencies.

Key issues and research questions

- How are energy efficiency implementation agencies and programmes funded?
- What are the advantages and disadvantages of different energy efficiency funding mechanisms?
- What criteria should governments consider when selecting an energy efficiency funding mechanism?
- Are some funding mechanisms inherently preferable to others?

Importance

Interview and desk study results consistently cite reliable and adequate sources of funding as perhaps the most important enabling framework for successful long-term EE implementation. Countries with well-developed energy efficiency industries and a history of continuous efficiency improvements have usually paid particular attention to EE funding mechanisms.

In contrast, “stop-go” funding is a perennial problem for energy efficiency managers. If EE funding depends on annual government budgets, implementation is susceptible to budget availability. A common occurrence is for EE budgets to be reduced when economic conditions result in overall government cutbacks. This makes it difficult to maintain the continuity of effort needed to build new EE industries and accomplish market transformation objectives.

Findings and discussion

The information assembled on funding mechanisms came from an extensive literature search plus a series of interviews conducted with EE experts around the world. During these interviews, respondents were asked how government EE activities were funded. The study identified nine distinct EE funding mechanisms (Box **4.1**), each of which is described below.

Box 4.1 **EE funding mechanisms**

- General appropriations from government budgets;
- Grants from other government agencies;
- Energy or environment taxes;
- System public benefit charges;
- Stimulus funding;
- Carbon financing;
- Licensing and permitting fees;
- Donor funding and international co operation; and
- Fee-for-service arrangements.

General appropriations from government budgets

Most energy efficiency agencies and programmes are financed directly through government appropriations. This is especially true for programmes administered by national government agencies. Most of the 29 national EE agencies reviewed by the World Bank (2008) and the 20 national EE programmes reviewed by Asia-Pacific Energy Research Centre (APERC, 2010) were funded through government budgets.

Funding through general appropriations can be advantageous to large EE agencies that report to a powerful and influential parent organisation. For example, the Korea Energy Management Company (KEMCO) reports to the Ministry of Knowledge Economy (MKE) in Korea, and the Energy Conservation Centre Japan (ECCJ) reports to the Ministry of Economy, Trade and Industry (METI) in Japan. However, competing with other agencies for government funding can be difficult for smaller or less well-connected institutions, including non-governmental organisations (NGOs) and statutory authorities. General appropriations are also subject to the vagaries of annual budgetary processes: priorities may change and there is no guarantee of stable and continuous funding.

Grants from other levels of government

Grants that are disbursed from the budgets of another level of government are a common funding mechanism in federal systems (*e.g.* Australia, Canada and the United States) and supra-national organisations (*e.g* the European Union). These grants have the same liability as direct government appropriations, but without recourse to political influence.

In Australia, the federal government provides half of EE funding, with each state providing the balance. In the United States, block grant programmes to states and communities constituted one of the earliest EE funding mechanisms. The US DOE's Weatherization Assistance Program (WAP) disbursed over USD 7 billion in funding for weatherisation and other programmes from 1977 through 2007. Funding was sharply reduced during the 1980s, forcing many states to cut back on EE programmes. The cycle has begun again, with new community block grant programmes having been mobilised to disburse stimulus funding under the American Reconstruction and Recovery Act (ARRA).

The European Union is an example of a supra-national authority in which each member votes on policy and measures that will affect all countries. EU Structural Funds and the Cohesion Fund are the EU's major

financial instruments designed to reduce development inequalities among regions and member states, through the support of development projects including EE initiatives. Experts have cited considerable funding opportunities within the framework of Operational Programmes for Structural Funds. For example, in the Czech Republic and Hungary, the Operational Programme is the main financing source for energy efficiency measures for the public and private sectors. For the period 2007-13, the Structural Funds will total EUR 348 billion, representing the largest item of the EU budget (over 35%). These funds require co-financing with public expenditure (EUROPA, 2010).

Energy and/or environmental taxes

Energy and/or environmental taxes are a powerful fiscal instrument for governments. Such taxes and fees serve two purposes: they provide an important price signal that encourages investment in energy efficiency; and they generate government revenue, which can either flow back to the general treasury or be earmarked for special purposes (*e.g*. reducing pollution or investing in clean energy). As compared against other taxes on labour or consumption, energy and/or environmental taxes may also pay a double-dividend in that they can contribute to improving both environmental and non-environmental welfare (OECDa, 2006).

Earmarking is the specification of some or all of the revenues from environmental and energy tax revenues for specific purposes, such as energy efficiency or pollution prevention. In many cases, it is introduced to reduce equity loss and political opposition. Earmarking is a controversial issue for economists. A very recent (2010) study by the OECD recommends against earmarking, arguing instead that especially during times of financial crisis governments should "use the proceeds (of environmental taxes) to augment general government spending in other areas, maintain spending levels, reduce debt or reduce other taxes" (OECD, 2010). From this strict economic efficiency viewpoint, the earmarking of environmental taxes may add to price and market distortions created by previous fiscal and tax policies. Other economists argue for a more nuanced approach, in which earmarking a portion (5% to 20%) of environmental or energy tax revenues for "eco-innovation" is justifiable (Andersen, 2010). Most analysts agree that any policy on the use of revenues from environmental and energy taxes should take into account political economy issues as well as strictly economic efficiency considerations.

Earmarking does have advantages from a political economy viewpoint. Since opposition to any new tax can be expected, earmarking improves the political feasibility of energy taxes by arguing that benefits from how the taxes are spent will flow to affected sectors. The distribution of the recycled revenue should be tied to energy efficiency improvements in those sectors, thus increasing the probability of energy efficiency investments and reinforcing the price signal of the energy tax. Earmarking can also be useful in overcoming political resistance and ensuring equity during the introduction of taxes. The creation of a special account, to which the new tax is dedicated, helps provide further credibility and institutional justification (Joel, 2008). In the United States, for example, a motorboat gas excise tax has been earmarked for conservation of aquatic resources, while a motor fuels excise tax is earmarked for highway construction and maintenance (Muller, 2008). Since the introduction of energy taxes is so important to sustainable energy use and investment in energy efficiency, in general governments should "focus on minimizing the political barriers associated with the redistribution of property rights" and concentrate on the environmental dividend (de Mooij, 2002).

Considering this political economy perspective, it can be noted that earmarking of energy and environmental taxes is already common practice in many countries. According to the OECD, one-third of all environmental and energy taxes in place in 2006 were to some degree earmarked (OECDa, 2006). Some examples of environmental and energy taxes and their degree of earmarking are shown in Table **4.1**. They include emission fees for sulphur dioxide (SO_2), nitrogen oxide (NOx) and carbon dioxide (CO_2) in Estonia; value-added tax and excise taxes in Poland; excise tax on non-highway recreational fuel use in the United

States; and excise tax on gasoline in Thailand. In the United Kingdom, the government created a climate change levy on the commercial use of energy, to encourage the private sector to reduce energy demand (Muller, 2008).

Energy and environmental taxes can have a large fiscal impact. The OECD has estimated total receipts from environmental and energy taxes revenues in OECD countries at 2% to 2.5% of GDP (OECDb, 2006; OECD, 2010). In Mexico, the Mexican national petroleum company, Pemex, pays an annual energy excise tax that goes directly to the Sectoral Fund for Energy Sustainability. In 2012, the duty rate will be 0.65% of annual crude oil and natural resource inventories. The Sectoral Fund contributes to scientific research and applied technological innovations for energy efficiency, renewable energy and diversification of primary energy sources (APERC, 2010).

Table 4.1 **Examples of energy and environmental taxes with earmarking noted**

Country	Energy/environmental taxes	
	Type of tax	**Earmarking**
China	Sales tax on engine displacement	None
Korea	Tax on high-consuming or large appliances	Subsidy for low-income EE
Mexico	Tax on oil production	Sustainable energy fund
Moldova	Fines for violation of provisions of the Law on Energy Conservation	Energy Conservation Fund
Morocco	Automobile registration	National Energy Savings Fund
Singapore	Road congestion pricing and vehicle downtown access	None
Thailand	Surcharge on gasoline and diesel consumption	Energy Conservation Fund
Tunisia	Duty levied on imported air conditioners	National Energy Savings Fund
United Kingdom	Climate change levy on GHG emissions	Energy supplier obligations
United States	Gasoline tax	State road repairs

In Thailand, the proceeds from a tax on transportation fuels go to the Energy Conservation Promotion Fund, from which they are disbursed among EE programmes, mostly in the electricity sector. In Sweden, the charge on industrial emissions is fully earmarked for energy efficiency investments in the industrial sector (Sterner and Höglund, 2000). In Switzerland, a solar initiative is funded through a tax on non-renewable energy consumption, equivalent to about 5% of end-user energy expenditures. The revenue is earmarked for investment in energy efficiency and solar energy (ECS, 2006a).

Denmark adopted an interesting earmarking scheme. The Green Tax Package was developed with two conflicting goals: the need for a high tax to meet emissions reduction goals and a lower tax that would not adversely impact the competitiveness of firms. The solution was found in redirecting the surplus tax revenue back to the sector. This approach raised taxes, but gave firms time to improve energy efficiency (ECS, 2004b). In Korea, the Special Energy Budget fund is supported by a tax on oil consumption. In Croatia, an Energy Efficiency Fund that supports preparation, implementation and development of energy efficiency and

renewable energy-related initiatives, receives part of its financing from charges on emissions (CO_2, SO_2 and NOx) and waste disposal (ECS, 2005).

New earmarked energy and environmental taxes continue to be created. In Korea, the new Low Carbon Green Growth law allows the MKE to place taxes on energy-consuming home appliances. Appliances liable for this extra 5% tax include televisions bigger than 40 inches, refrigerators consuming more than 40 kWh per month, big fans, drum washers using more than 720 kWh per month, and air conditioners using over 370 kWh per month. Revenues will flow to a fund that subsidises purchase of high-efficiency appliances by low-income households.

Any tax has distributional impacts, and energy and environmental taxes can have a regressive impact on low-income households. Targeted compensation mechanisms that offset these distributional impacts are a possible solution. This may take the form of tax incentives (allowances and credits) or earmarking of revenues for vulnerable populations. In the Netherlands, for example, a regulatory energy tax (RET) on the use of natural gas and electricity is applied based on progressive tax rates. The increase of RET was accompanied by a decrease in income tax for the first income bracket. In the United Kingdom, the climate change levy excludes domestic energy use to avoid increasing fuel poverty (OECD Observer, 2006).

System public benefit charges

System public benefit charges (SPBCs) differ from energy and environmental taxes in important ways.[5] Most importantly, SPBC revenues are collected by energy providers from their customers rather than by governments from taxpayers, and thus do not pass through the tax revenues or public finance system. Secondly, SPBC revenues are usually under the purview of regulators, who earmark the revenues for specific activities in advance. The spending from SPBC revenues is often reinvested in programmes benefiting the ratepayers from whom they were collected. Finally, there is often a portfolio or resource target associated with the level of the SPBC; thus, the revenues and spending is linked to a development plan. This development plan may include both resource targets and public benefit or social welfare targets, such as providing assistance with managing energy to low income-households.

The SPBC mechanism has many benefits. It provides a steady large-scale source of funding for long-term, comprehensive, transformational energy efficiency programmes. It is especially well suited for funding long-term trajectories towards low-carbon or lower energy intensity goals. These funding mechanisms benefit customers, create new businesses and promote co-operative activities between utilities, the private sector, customers and third-party energy services providers.

SPBC funding mechanisms are also flexible. The funds can be used for many different activities: rebates, loans, education and outreach, technology development, evaluation and measurement, or even agency-operating expenses. The SPBC funding source also works regardless of who (*e.g*. utilities, state agencies or third-party programme administrators) is implementing the programmes. In both Vermont and New York, the utilities act as collection agencies, including the SPBCs in rates, while the revenues flow into a special account administered by a statutory authority under regulatory oversight. The close connection between funding source and programme design can be used to fine-tune energy efficiency spending to suit the demand for programmes on a sectoral basis. The New York State Energy Research and Development Authority (NYSERDA) offers EE programmes for industrial customers funded in line with the SPBC collections from those customers. Such schemes make it difficult for any class of customers or consumers to argue that they are being disadvantaged by higher rates due to the SPBC.

[5] These funding mechanisms are variously called public benefits charges, public goods charges, system public benefits charges, line charges, and network or wires charges.

SPBCs are most frequently found in the United States, where they originated as part of the unbundling and deregulation of the US electricity supply industry. Utilities under competition were unwilling to increase electricity rates in order to fund energy efficiency or other public benefit programmes. However, ratepayer advocates argued that these programmes provided important social benefits, and that a scheme was needed to continue funding them (Eto, Goldman and Kito, 1996). SPBCs currently fund EE programmes in 25 states. In Oregon, the SPBC provides over USD 60 million annually for energy efficiency and renewable energy programmes. NYSERDA has used an SPBC to fund energy efficiency programmes since 1998: the charge currently generates revenues of USD 175 million per year. New Jersey's Clean Energy Program is funded by an SPBC, which will collect USD 1.2 billion or 3% of total electricity revenues over the four-year period 2009-12.

SPBCs have taken hold around the world. Table **4.2** provides examples including the level of the per-kWh charge and revenues, where available.

Table 4.2 **Comparison of SPBC funding mechanisms**

Jurisdiction	Public benefit spending as a % of utility revenue	USD/kWh	Annual revenue (USD million)
Brazil	1%*		80.0
Jordan**			35.0
United States, California±	1.2	0.28	600.0
United States, Massachusetts±	2.4	0.33	246.0
United States, New Jersey±	3.0	0.34	300.0
United States, New York±	1.0	0.06	177.2
United States, Oregon±	1.7	0.19	60.0
United States, Vermont±	3.0	0.33	17.5

* NF/UNEP/World Bank, 2004. ** The Jordan Institute, 2010. ± Energy Programs Consortium, 1999.

In Brazil, two separate energy efficiency schemes supported by SPBCs are set to collect 1% of revenue. Revenues flow to two separate funds, one for utility EE spending and the other for energy efficiency R&D. The Brazilian regulator approves utility spending proposals while a board comprising government, academia and private sector representatives manages R&D spending (Poole and Guimarães, 2003).

In Jordan, the recently enacted Renewable Energy and Energy Efficiency Law (REEEL) will use SPBCs to generate USD 42 million in annual funding for the Jordan Renewable Energy and Energy Efficiency Fund and the Rural Electrification Fund.

Stimulus funding

Stimulus funding is a new funding mechanism reflective of the emerging role of EE programmes in stimulating investment and creating jobs. Under the 2009 American Relief and Recovery Act (ARRA), over USD 13 billion of stimulus funding covering Fiscal Years (FY) 2009-2011 will be provided for energy efficiency. These funds will be transferred to state and local governments through block grant programmes, with local agencies disbursing the funds according to guidelines and rules set by the federal government. Although appreciative of this funding, some EE practitioners in the United States are concerned with the co-ordination issues and administrative arrangements needed to absorb such a massive influx of funding in such a short period of time.

Other countries have implemented accelerated EE programmes with the dual objectives of jobs creation and economic stimulus. The French Environment and Energy Management Agency (ADEME) will receive a 50% increase in overall funding over the next five years, earmarked for residential and small commercial customers, clean vehicles and smart grids. The European Union also approved a USD 5 billion stimulus package in 2009 which includes EE projects (EurActiv, 2009).

Stimulus funding is not ideal from an EE governance viewpoint. Energy efficiency agencies and programmes are always quite keen to receive additional funding from stimulus programmes. However, energy efficiency administrators have no control over how much funding is provided, and how long it will be available. There are also administrative challenges and possibilities for abuse associated with accommodating large funding additions with short time-frames for disbursement. As a matter of good EE governance, it is better to scale-up programmes and administrative procedures gradually and to have a strategy for filling the funding gaps when the short-term stimulus money is depleted.

Licensing and permitting fees

Licenses and permitting fees constitute a source of public revenues distinct from taxes. They are often used to defray the operating expenses of an agency or institution, but are restrictive because the revenue generated is usually not very large. However, some licensing and permitting fees can generate sufficient revenue to cover programme or agency costs. In Tunisia, the registration fees for private cars as well as excise duty on the import of air conditioning equipment are earmarked for the National Energy Savings Fund, which in turn provides subsidies for energy efficiency initiatives. The Tunisian National Energy Conservation Fund (FNME) is financed with a special tax on car registration, which generates USD 14 million in annual funding. Licenses and permitting fees score well in terms of stability and autonomy, but not as regards adequacy, as they are usually insufficient to fully fund EE programmes.

Carbon financing

Despite turmoil in global financial markets, carbon markets have recorded steady growth. The most liquid markets include the European Union's Emission Trading Scheme (EU-ETS) and the Kyoto Protocol compliance market. In 2008, total carbon market volume was USD 126 billion, over one-third of which was transacted via energy efficiency projects (Capoor and Ambrose, 2009). Carbon finance is clearly an important additional revenue stream for funding energy efficiency.

Funds generated through project-based transactions, in particular the Joint Implementation (JI) and primary and secondary Clean Development Mechanisms (CDM), can promote EE measures.[6] In 2009, the Czech

[6] There are three main modalities of carbon financing: emissions trading, project transactions and, most recently, programmatic transactions. These modalities were created under the Kyoto Protocol. Two types of project-based transactions that feed the carbon market are: Joint Implementation (JI), which occurs in countries with Kyoto Protocol commitments and involves the conversion of existing Assigned Amount Units (AAUs) into Emission Reductions Units (ERUs), and the Clean Development Mechanism (CDM), which occurs in developing countries without any emission reduction obligations and creates Certified Emission Reductions (CERs). Under the CDM and JI, a programmatic approach has recently become available, allowing for emission reduction credits to be achieved through grouped "programme of activities", particularly important for facilitating small-scale residential energy efficiency projects for example. Credits under the CDM and JI are used for compliance purposes by countries with Kyoto obligations, or by firms within domestic emissions trading schemes (for example, the EU ETS). Emissions trading involves the sale and purchase of excess AAUs between Kyoto Protocol parties. Such transactions generally require the establishment of a Green Investment Scheme (GIS) by the selling country, under which revenue from AAU sales must be used for GHG mitigation purposes, including energy efficiency.

Republic signed its first contract with Japan and immediately launched the Green Saving Programme. This project finances EE measures and the use of renewable energy sources in the residential sector (Valentova, 2010). In Singapore, a CDM Documentation Grant was created under the administration of the National Environment Agency to co-fund the costs of preparing CDM projects. Recently in Bangladesh, the Power Development Board used programmatic CDM to co-fund a national roll-out, comprising some 10 million compact fluorescent lamps (World Bank, 2010d).

Emissions trading markets, such as the EU-ETS, retain the lion's share of the global carbon market; over USD 90 billion in emissions allowances and derivatives was transacted in 2008 alone (Capoor and Ambrose, 2009).

Donor funding and international development assistance

Many bi-lateral and multi-lateral donors develop and fund EE initiatives. The role of international development assistance in establishing EE governance mechanisms is described in more detail in Chapter 10. This section focuses specifically on international donor funding of EE activities.

Interview respondents referred to many well-known donor organisations as important sources of funding, including the European Bank for Reconstruction and Development (EBRD), the German Technical Cooperation Agency (GTZ), the Global Environmental Facility (GEF), the World Bank, the US Agency for International Development (USAID) and the United Nations Development Programme (UNDP). For example, the Lebanese Centre for Energy Conservation (LCEC) began as a fully funded UNDP/GEF project. It still receives donor funding but has been absorbed within the Ministry of Energy and Water. Eventually, the LCEC expects to achieve funding self-sufficiency through a combination of government funding and fee-for-service arrangements. Indonesia's Directorate General of Energy Efficiency receives bilateral donor assistance from the Danish International Development Agency (DANIDA), the Japanese International Cooperation Agency (JIPA), the Netherlands Agency for Energy and the Environment (NOVEM), the United Nations Industrial Development Organization (UNIDO) and UNDP/GEF, while the Government of Indonesia funds staff costs. This is a common arrangement for developing countries: donors fund programme costs, while agency overhead expenses are funded through government appropriations.

Donor funding often flows directly to programme implementation by capitalising or guaranteeing credit facilities and revolving funds. EBRD has funded the Ukraine Energy Efficiency Programme (UKEEP), a credit facility available to Ukrainian private companies seeking financing and technical assistance. UKEEP maintains a project preparation facility, which provides technical assistance for companies with project ideas. If a project idea is found to be feasible, UKEEP can also provide debt financing.

Donor support is particularly important in the early stages of a national energy efficiency programme. These donors support start-up activities such as building awareness of the importance of energy efficiency, supporting the development of legal frameworks, building technical capacity and encouraging private sector involvement. However, sometimes the donor-financed project ends before a sustainable threshold of EE activity is reached. This is a common problem, with the result that EE activity often ceases as soon as the project is completed.

Fee-for-service arrangements

Many energy efficiency institutions also deliver services, such as audits, project preparation, project management and training, for which they charge fees. Such fee-for-service arrangements can be a significant source of funding, particularly for NGOs, statutory authorities and parastatal companies. For example,

Motiva Oy of Finland operates like a consulting firm, selling services to government agencies. The work programme can include EE project design, technology development or research. In Thailand, the government provided the initial capital for the Energy Conservation Centre of Thailand (ECCT), with the agreement that it would achieve funding autonomy after five years. ECCT now gets two-thirds of its revenues from fees for energy audits, project management, training and consultancies, with the balance coming from donors such as the European Union and the Japan International Cooperation Agency (JICA).

Summary

The advantages and disadvantages of the funding mechanisms described above can be summarised according to five attributes: **adequacy**, **stability**, **regulation**, **source, and potential for distortive effects**.

- **Adequacy** refers to the sufficiency of the funding relative to the costs of operating an EE agency or implementing an EE programme. Funding adequacy means that the funding is commensurate with the scope of EE efforts. This can be crucial when ambitious targets or new objectives are set without increased funding.
- **Stability** refers to the continuity of funding over time. A stable level of funding for multiple years is critical for developing an EE industry (*e.g.* certified auditors, qualified energy services companies [ESCOs] and knowledgeable bankers) or for transforming markets. Stability creates confidence and expectations for continued growth in EE activities.
- **Regulation** of the funding source by the implementing agency or independent regulator is desirable, both as a practical matter of accessing the revenues and as a further guarantee of stability. A funding source with independent regulation is less vulnerable to changes in government or political commitment.
- **The source** of the funding can be a factor in the credibility of EE spending. Taxing environmental emissions or energy consumption as a way of funding EE programmes make it easier to gain public acceptance, especially if the energy tax and EE programme are part of a comprehensive approach to climate change mitigation.
- **Potential for distortive effects** is a counterpoint to the issue of funding origin. Economic theory says that earmarking of any tax revenue for specific spending risks creating economic inefficiencies in government budget allocations, which may cause price and/or market distortions. A possible solution is to earmark a portion of energy or environmental taxes for EE programmes, in accordance with funding needs.

It is possible to generate a scorecard of EE funding mechanisms using these five attributes (Table **4.3**). Each funding mechanism has advantages and disadvantages. None of the funding mechanisms meet all five criteria, although earmarked energy and environmental taxes, SPBCs, and fee-for-service arrangements have the highest "scores". In practical terms, many EE programmes and agencies rely on several funding mechanisms to support their operating and programme expenses. In other cases a single institution will have multiple funding sources reflective of multiple EE implementation responsibilities. For example, the Korea Energy Economics Institute (KEEI) is a research institute funded primarily from client ministries within the government (including the Office of the Prime Minister), but 20% of its funding comes from the private sector. KEEI's sister agency, KEMCO, is funded mostly from MKE's budget, but one-third comes from other multiple sources, including commissions from a soft-loan programme, revenues from CDM projects, fees from audits and inspection, and training fees from private companies.

Table 4.3 **Scorecard for grading EE funding mechanisms**

Funding mechanism	Funding governance attributes					Indicative examples
	Adequacy	Stability	Regulation	Source	Potential for distortive effects	
Government budgets	√				√	See APERC (2010) for list of appropriations for APEC economies.
Grants from other agencies	√				√	See, for example, weatherisation assistance programs in the US and EU Structural Funds.
Earmarked energy or environmental taxes	√	√	√	√		Emission fees for SO2, NOx and CO_2 in Estonia, VAT and excise taxes in Poland, excise tax on gasoline in Thailand.
System public benefit charges	√	√	√	√		Countries with SPBC include: Brazil, Jordan and the United States(for example, New York, California).
Stimulus funds	√				√	US Energy Efficiency and Conservation Block Grant Program under the ARRA EU Stimulus package.
Licensing and permitting fees		√	√			In Tunisia, for example, the registration fees for private cars as well as excise duty on import of air conditioning equipment are earmarked for the National Energy Savings Fund.
Carbon finance	√			√		Countries that have taken advantage of this source of funding include Czech Republic and Singapore.
Donor funding	√				√	Can come as grants or loans from bilateral donors such as USAID (United State's Agency for International Development) and German Technical Cooperation (GTZ), or development banks such as EBRD (European Bank for Reconstruction and Development), and World Bank, or other international organisations such as the GEF (Global Environment Facility), and UNDP (United Nations Development Programme).
Fee-for-service arrangements		√	√	√	√	Motiva Oy of Finland Energy Conservation Centre of Thailand (ECCT).

Conclusions and guidelines

The perfect EE funding mechanism would be adequate to meet implementation targets, stable from year-to-year, reliable even under changing political conditions, under the administrative control of EE implementing agencies, and free from distortive effects on markets. However no single funding mechanism can satisfy all these criteria. Since there is no ideal solution, it is up to EE policy makers to consider the specific advantages and disadvantages of each, according to country context and EE objectives.

Government budget allocations are the most common EE funding mechanism. However, funding through the annual government budgeting process makes energy efficiency budgets vulnerable to short-term fluctuations in response to economic conditions, the stop-go or boom-bust programme-funding problem. If the agency or programme is well-connected to the budget-making authority, this can be beneficial, as in cases where special one-time funding is available through stimulus bills or other factors. However, it does not meet the criterion of long-term stability.

Earmarked energy and environmental taxes are attractive from a political economy viewpoint and because they may pay a double-dividend - generating revenue and discouraging energy consumption or environmental emissions. However, earmarking is often anathema to strict economists and to treasury and public finance professionals, and may create market distortions if there are over-allocations to energy efficiency. The distributional impacts of taxes are another consideration which can be mitigated through offsets or social safety nets.

System public benefit charges are being increasingly adopted around the world and have proved workable under quite diverse electricity market and regulatory regimes. SPBCs have the advantage of flexibility and independence from the government treasury. They also provide an inherent linkage between financing needs for energy efficiency improvement and securing adequate energy resources.

Many other funding mechanisms can play a role in achieving the goals of adequate, stable, reliable and distortion-free funding. In fact, having a portfolio of different funding sources is in all probability the best solution.

PART II. INSTITUTIONAL ARRANGEMENTS

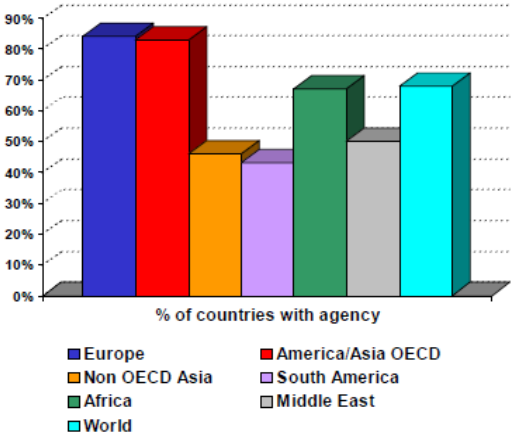
5. Energy efficiency agencies

Introduction

Previous reviews, as well as this study, show that many types of organisations are engaged in energy efficiency (EE) policy and programme implementation: government energy ministries, specialist clean energy or energy efficiency agencies, regulators, energy providers, research centres, private and state-owned enterprises, non-profit organisations, and more. Survey and interview results from this study, as well as the secondary literature, serve as the basis for considering these different organisational arrangements and provide some guidelines for establishing effective EE agencies.[7]

Government and quasi-government EE agencies have proliferated in recent years. A recent World Energy Council (WEC) survey found that two-thirds of countries had some form of permanent, government-sanctioned entity responsible for EE policies and implementation (WEC, 2008). The WEC survey also found significant regional differences: almost every OECD member country reported an EE agency, compared with less than half of the countries in non-OECD Asia, South America and the Middle East (Figure **5.1**).

Figure 5.1 **Results of WEC survey of energy efficiency agencies**



Source: WEC, 2008.

[7] An EE agency can be defined as "a body with strong technical skills, dedicated to implementing national energy efficiency policy" (WEC, 2008).

Key issues and research questions

- What skill sets and capabilities are required for an EE agency to be effective?
- Should EE agencies have a statutory basis?
- How should EE agencies and programmes be funded?
- What role should EE agencies play in policy formation and programme implementation?
- What factors should be considered in deciding where to house an EE agency?
- What factors are critical to agency effectiveness?
- Who should provide oversight and accountability for EE agency operations?

Importance

Implementing EE policies requires an administrative structure capable of conducting multiple specialised tasks: economic and policy analysis, planning, administration and management, engineering and logistics, and programme evaluation. Only a government or quasi-government body can implement certain types of EE policies (*e.g.* establishing and enforcing regulations), while other functions (*e.g.* delivery of EE goods and services) can be undertaken by any number of private or public sector entities. Establishing a new EE agency (or adding EE responsibilities to an existing agency) requires consideration of institutional arrangements within the energy sector, market conditions, country context including the political economy, and practical questions regarding technical and managerial capabilities within and outside government. An EE agency is at the heart of any system of energy efficiency governance, and its structure and design should be carefully considered. Some of the research questions regarding EE agencies that this study tried to address are shown below.

Literature review

Several researchers have reviewed the ways in which different energy efficiency agencies are chartered and structured (Blumstein, Goldman and Barbose, 2003; Limaye, Heffner and Sarkar, 2008). These analysts were not able to identify any single preferred organisation for EE policy and programme implementation; however, they did recommend key considerations when making a selection:

- the organisation's compatibility with public policy goals;
- alignment of the organisational incentive structure with energy efficiency objectives;
- ability to realise economies of scale and scope; and
- relationship to the rest of the energy-efficiency infrastructure.

Researchers have also identified the main tasks that EE agencies undertake (Table **5**.**1**). Agencies with regulatory responsibilities may take on additional tasks such as labelling, certification, accreditation, and inspection and enforcement, while agencies implementing market mechanisms may administer subsidy or financing schemes, manage funds or directly invest in projects. Activities undertaken by EE agencies are as diverse as the government policies and programmes being implemented.

Table 5.1 **Energy efficiency implementation functions and responsibilities**

Programme function	Specific responsibilities
General administration and co-ordination	• Manage overall budget for portfolio of programmes. • Manage contracts with all primary contractors. • Maintain centralised information system for reports to regulators, legislators, advisory groups, etc.
Programme development, planning and budgeting	• Prepare initial technical and/or market reports necessary for programme strategies and initial programme designs. • Facilitate development of public planning process. • Prepare general program descriptions and budgets for regulatory approval.
Programme administration and management	• Prepare detailed programme designs and propose changes based on experience-to-date. • Hire and manage staff and/or sub-contractors for programme implementation. • Develop and implement quality assurance standards and tracking protocols. • Review and approval of invoices.
Programme delivery and implementation	• Promote and market programmes. • Develop and implement programme services (*e.g.* energy audits, financial incentives, contractor certification, information and education, etc.). • Develop energy-efficiency projects at specific sites. • Develop measurement and verification (M&V) procedures and/or conduct M&V to determine performance-based administration fees or shareholder incentives.
Programme assessment and evaluation	• Assess programme impact and/or cost effectiveness. • Evaluate effectiveness of programme processes and administration.

Source: Blumstein, Goldman and Barbose, 2003.

A recent World Bank study (Limaye, Heffner and Sarkar, 2008) identified a growing diversity in EE organisations, ranging from purely governmental organisations to purely private companies. The study found that EE agencies established in the 1990s tended to be organised as specialist departments within larger ministries. More recent EE agencies, however, take a variety of organisational forms, including stand-alone clean energy agencies, independent statutory authorities (ISAs) and public-private partnerships (Table **5.2**). The study utilised input from a workshop of EE experts to identify the advantages and disadvantages of each organisational type. For example, EE departments within an energy ministry tend to have more access to policy-making and a better chance of mobilising public funding; however, government employees generally have lower compensation and face greater difficulties in taking decisions. In contrast, an independent statutory authority (ISA) or non-governmental organisation (NGO) focused on energy efficiency can more easily hire and retain high-quality staff and will have greater flexibility in taking decisions.

However, such non-governmental entities may have to compete for public funding and access to policy makers.

This analysis led the World Bank study team to suggest a roadmap for establishing new energy efficiency agencies, taking into account country context, energy efficiency drivers and objectives, key consuming sectors, probable policy interventions, and gaps in existing institutional and enabling frameworks. The study also identified core competencies associated with successful EE agencies: (i) ability to work collaboratively; (ii) ability to leverage private sector and energy provider participation; (iii) credibility with stakeholders; and (iv) adequate technical and administrative resources.

Table 5.2 **Observed organisational models for EE agencies**

Type	Brief description	Examples
Government agency	Agency with broad energy responsibilities	U.S. Department of Energy Danish Energy Authority
Government agency	Agency focusing primarily on clean energy	Australian Greenhouse Office Mexico: CONAE
Government agency	Agency focusing entirely on EE	Thailand: DEDE Brazil: PROCEL
Independent statutory authority (ISA)	An independent authority created by statute to promote EE or Clean energy	UK: Energy Saving Trust Sustainable Energy Ireland
Independent corporation	An independent corporation owned entirely by the government	South Africa: NEEA Korea Energy Management Corporation
Public-private partnership (PPP)	A corporation owned partly by the government and partly by the private sector	Polish National Conservation Agency Germany: DENA
Non-governmental organisation (NGO)	Non-profit or non-governmental organisation	Austrian Energy Agency Croatia Energy Institute

Source: Limaye, Heffner and Sarkar, 2008.

Findings

An institutional survey fielded as part of this study asked several questions about EE agencies and the people in them. Each respondent was asked about the type of organisation they worked in and the way in which it was established. One question asked respondents to draw an institutional map showing the most important EE organisations and consuming sectors. Other questions asked respondents to cite which factors determined whether EE institutions were effective, and which core competencies and skill sets were most important in implementing EE policies and programmes.

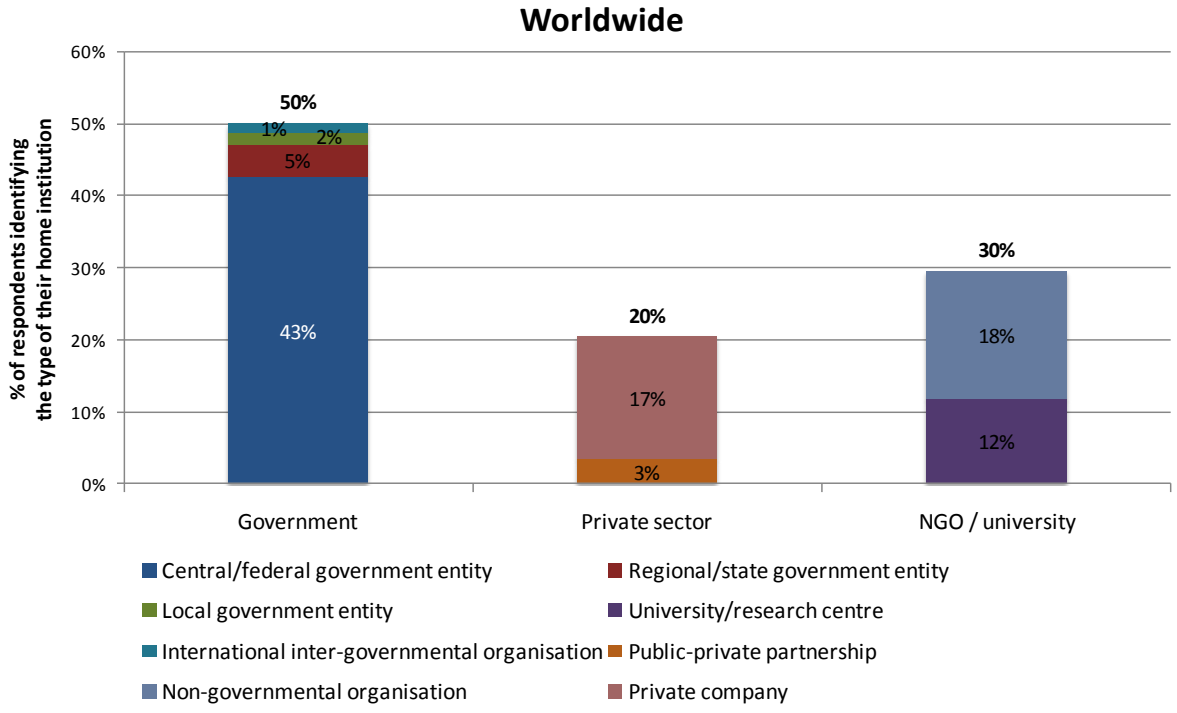
The institutional survey was followed up with interviews of EE experts. These interviews afforded an opportunity to probe more deeply into the factors that affect the operational results of energy efficiency institutions. The survey collected information on the legal underpinning, number of employees, funding sources and goals of each organisation. Respondents were asked what was working and what improvements were needed. Based on these sources of information, the IEA was able to develop insights into the factors

that contribute to creating effective EE agencies, as well as the ways in which country context affects their development and operation.

Where are the EE experts?

According to the survey response, exactly half of EE practitioners are based in government agencies, primarily at the national level (Figure **5.2**). Most of the other respondents worked for NGOs, universities and research centres. Only 20% were in the private sector.

Figure 5.2 **Type of energy efficiency institutions**



How are EE organisations established?

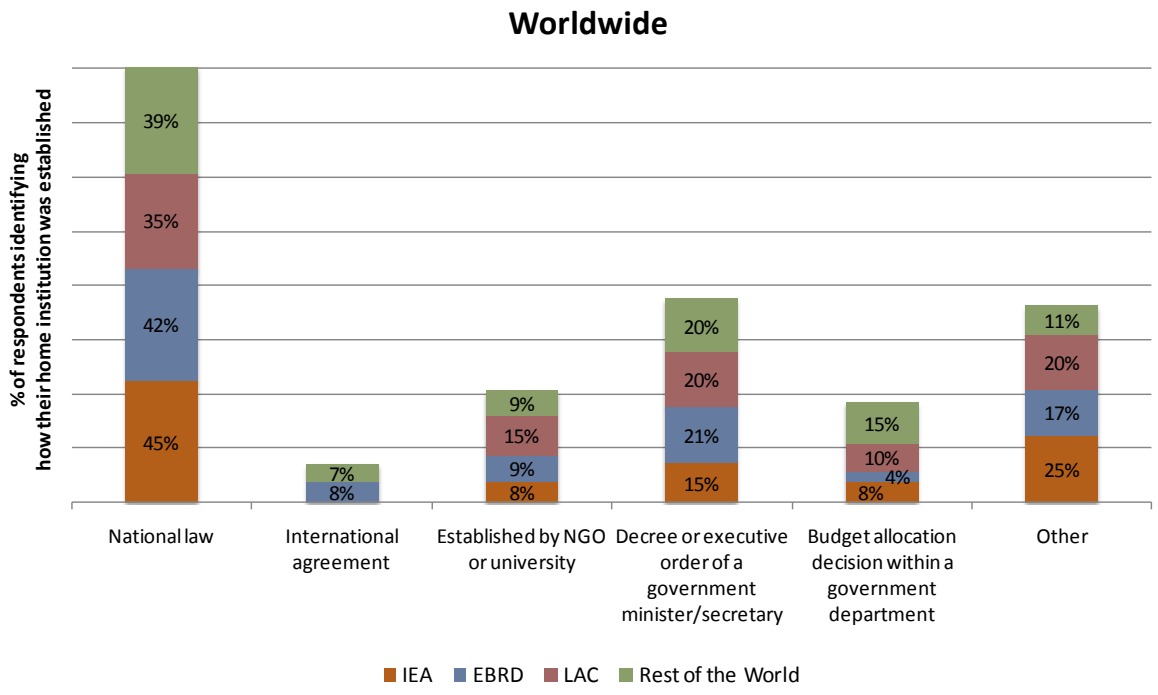
Interviews provided an opportunity to document how EE agencies were originally established. Many agencies were established in response to one of the EE drivers described in Chapter 1: energy security, the need to improve industrial competitiveness, or in response to climate change concerns. Other institutions emerged as a result of policy reviews or other public deliberations on national EE strategy. Several of the better-known and most successful energy agencies have existed for decades. The Korea Energy Management Company (KEMCO), the Energy Conservation Centre Japan (ECCJ) and the United States Department of Energy (US DOE) date back to the oil supply disruptions of the 1970s.

National laws were the most common means of establishing EE institutions, especially in the IEA member regional grouping (Figure **5.3**). Roughly equal shares of responding EE institutions were created either by administrative decree or through miscellaneous ("other") means. These other establishment procedures

applied mostly to non-governmental EE institutions and included international development assistance projects, research initiatives, and start-ups of new companies.

Several illustrative examples of how EE agencies were established are provided below.

Figure 5.3 **Establishment of energy efficiency institutions***



*Note: the percentages add up to 100 for each region.

In the mid-1990s the predecessor to Finland's current Ministry of Employment and Economy was concerned about energy security. To address the new topic of energy efficiency, the ministry hired a consultant who engaged stakeholders from various sectors to discuss the feasibility of energy efficiency in the Finnish context. Motiva, the Finnish parastatal energy institution, began as a project that delivered EE information and advisory services, including energy audits. After two years in operation, the government was impressed by the profitability of the project, and in November 2000 Motiva was incorporated as a company under the full ownership of the Finnish state. Motiva remains the government's main EE services provider.

The idea for the United Kingdom's Energy Saving Trust was present in the 1992 Conservative Manifesto. The Trust was founded in 1993 as a non-profit partnership between the government, British Gas, and 14 other grid-bound energy companies. It was initially hobbled by funding limitations: the regulator, Office of the Gas and Electricity Markets (Ofgem) at first refused to approve the supplier obligation envisioned in the manifesto, and first-year funding was only GBP 25 million. However, the Energy Saving Trust steadily grew over the succeeding decade, and today has a budget of well over GBP 100 million, financed by supplier obligations and other sources.

In the United States, several new sub-national EE agencies emerged from deregulation of the electricity supply industry during the 1990s. In Oregon, deregulation and excess generation resulted in reduced utility support for energy efficiency. However, Oregon's tradition of resource conservancy resulted in a regional

effort by government and EE stakeholders to advance energy efficiency in the absence of utility support. The Regional Review of the Pacific Northwest Power Sector (NPCC, 1996) culminated in the establishment of the Energy Trust of Oregon (ETO), an independent, non-profit organisation charged with implementing state-wide clean energy programmes. ETO was chartered as an ISA subject to the Oregon Public Utilities Commission (OPUC) and funded with a system public benefit charge (SPBC) set at 3% of electricity revenues. Similar statutory authorities have since been established in Connecticut, Maine, New York and elsewhere (Blumstein, Goldman and Barbose, 2003).

In developing and middle-income countries, international development assistance has been a key element in establishing EE agencies (see Chapter 10 for a more complete discussion of the role of international development assistance in EE governance). The Demand Side Management Office (DSMO) within the Electricity Generating Authority of Thailand (EGAT) was created via a donor-supported effort, the World Bank/GEF Thailand DSM project. This project provided grant financing to hire consultants and undertake studies that formed the basis of what the DSMO still does today.

In Jordan, the National Energy Research Centre (NERC) was established by Royal Decree in 1998. The NERC is now the unofficial clean energy agency in Jordan, with 20 energy efficiency and renewable energy experts. They form part of the Royal Scientific Society and are thus not part of the Jordanian government. However, the Ministry of Energy and Mineral Resources (MEMR) chairs the Board of Directors and much of NERC's funding comes from the Jordanian government and donors.

The Lebanese Centre for Energy Conservation (LCEC) is a national organisation affiliated to the Lebanese Ministry of Energy and Water (MEW). It was created in 2002 as a project financed by the GEF and MEW under the management of the United Nations Development Programme (UNDP). Over the years, the LCEC established itself as an independent technical centre supporting the government to develop and implement national strategies promoting energy efficiency and renewable energy at the consumer level. It is now financially and administratively independent, and operates under the direct supervision of MEW.

Organisational types observed

The earlier World Bank effort identified seven categories of energy efficiency organisation (Table **5**.**3**), and described the advantages and disadvantages of each. To supplement this earlier work, interviewees in this study were asked how organisational type influences agency effectiveness. A simplified organisational typology was used to characterise 22 national EE agencies around the world. This study, as with the previous World Bank study, found no single predominant organisational type. The most common organisational types included governmental agencies with broad energy and other responsibilities (8/22), specialised (*e.g.* focused on energy efficiency) governmental agencies (7/22) and parastatal corporations (4/22).

Table 5.3 **Examples of energy efficiency agency organisational types**

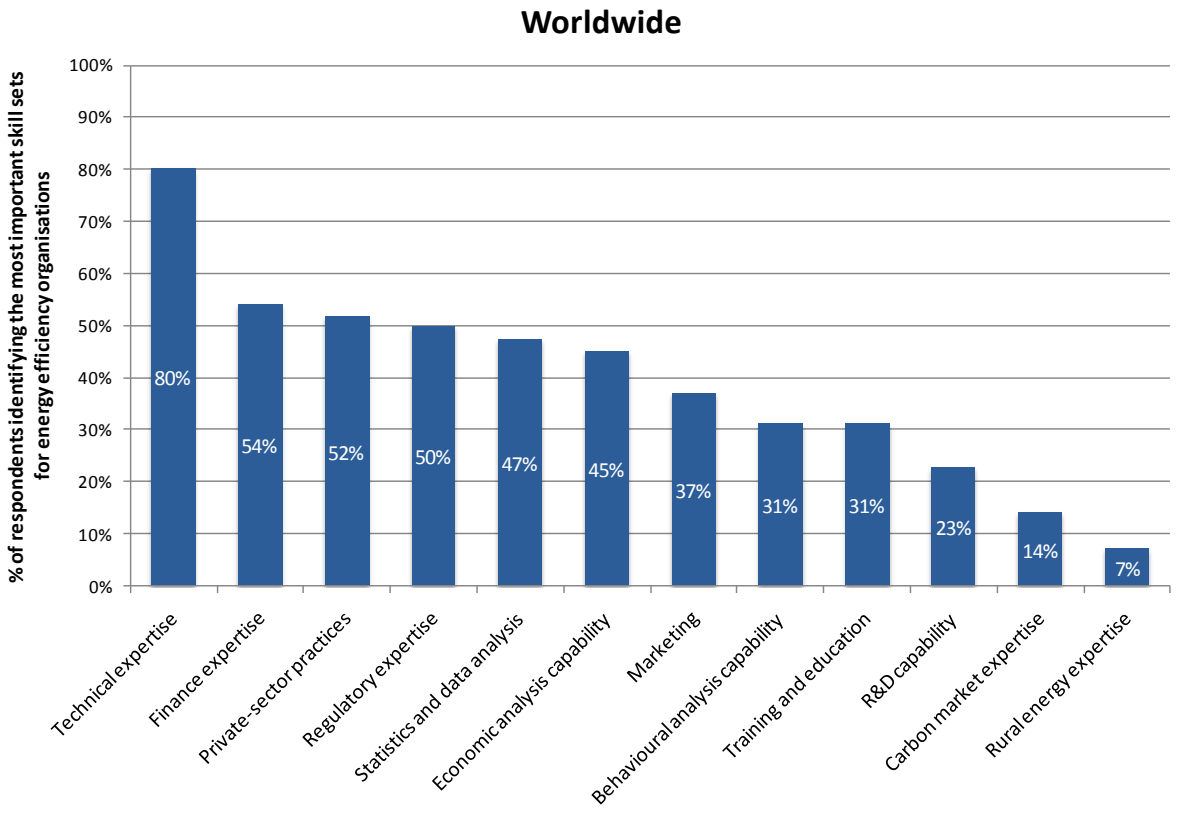
Organisational type	Examples	
	Country	**Organisation**
Department within a government energy agency	Canada China Indonesia Russia Singapore Sweden Thailand Turkey	Natural Resources Canada National Development and Reform Commission Ministry of Energy and Mineral Resources Russia Energy Agency Energy Efficiency Policy Office National Environment Agency Swedish Energy Agency Ministry of Energy Ministry of Energy and Natural Resources
Specialised governmental energy efficiency and clean energy agencies	Brazil Hungary India New Zealand Tunisia Ukraine	PROCEL The Energy Centre Bureau of Energy Efficiency Energy Efficiency and Conservation Authority National Agency for Energy Management National Agency for Efficient Use of Resources
Independent energy efficiency and clean energy statutory authority or corporation	Finland Korea Norway	Motiva Oy Korea Energy Management Corporation Enova SF
Energy efficiency and clean energy NGO or public benefit organisation	Jordan United Kingdom	National Energy Research Centre Energy Savings Trust and the Carbon Trust
Energy efficiency and clean energy public-private partnership	Chile	Chilean Energy Efficiency Agency

Note: Some organisational categories in Table **5.1** have been consolidated in Table **5.2**. ISAs and independent corporations have been combined into independent energy efficiency and clean energy statutory authorities or corporations while government agencies focused primarily on clean energy and government agencies focused entirely on energy efficiency have been collapsed into government EE and clean energy agencies.

Skill sets and critical factors for organisational effectiveness

The interviews afforded an opportunity to obtain respondents' thoughts on critical skill sets and other factors needed to ensure an effective energy efficiency organisation. Respondents were asked to indicate which of 12 distinct skill sets were essential to a well-functioning EE organisation. These responses were then mapped globally (Figure **5**.**4**). A mix of skill sets was deemed critical, beginning with technical expertise, but including financial expertise, private sector experience, regulatory expertise and specialized analytic skills (*e.g*. statistics and economic analysis).

Figure 5.4 **Essential skill sets for energy efficiency organisations**



Well-trained staff with the right skills mix contribute to organisational effectiveness. Enabling frameworks, support networks and resources are of equal importance. Respondents were provided with a list of factors and asked to select which were most critical to organisational success. The results (Table **5.4**) show some regional differences, but relative unanimity on organisational success factors: strong political support, legislative mandate, stakeholder engagement and a dedicated funding source.

For the IEA member countries, strong political support and ongoing engagement with stakeholders were by far the most critical success factors. This most likely reflects the high importance of democratic institutions and the need to maintain consensus on issues such as clean energy and climate change. Surprisingly, legislative mandate and authority to regulate were less critical.

Respondents from countries supported by the European Bank for Reconstruction and Development (EBRD) also placed highest importance on strong political support. However, the next-most important success factors were quite different: legislative mandate, dedicated funding source and authority to regulate. This may reflect start-up difficulties encountered by EE agencies in some EBRD countries.

In the Latin America and Caribbean (LAC) region the top two success factors were a credible results monitoring framework and ongoing engagement with EE stakeholders. This may reflect the diffuse implementation arrangements in some LAC countries, with policy and implementation responsibility spread across several EE institutions. LAC respondents agreed with the other regions on the importance of strong political support and were also keen on authority to regulate.

Table 5.4 **Critical success factors for EE agencies, by region**

Success factors	Response (by region)			
	IEA	EBRD	LAC	Non-IEA Asia, MENA, Africa
Legislative mandate	3	2		1
Strong political support	1	1	3	2
Authority to regulate				2
International support				
Stakeholder engagement	2		2	
Results monitoring framework			1	
Dedicated funding source	3	3		3
Other				

The final region is residual, grouping together everything other than IEA, EBRD and LAC, and thus comprising respondents from South Asia, East Asia Pacific and Middle East-North Africa. The most critical factor for successful EE institutions in these countries was a legislative mandate for the organisation, followed by strong political support and authority to regulate. This most likely reflects good results in enacting EE laws with strong regulatory mechanisms (China, India, Thailand, and Vietnam). Dedicated funding sources also received support, which is to be expected given the success of mechanisms such as the Energy Conservation fund in Thailand.

Interviews afforded an opportunity to more closely examine factors affecting organisational success. Most of the interviewees suggested organisational success factors very similar to those identified by survey respondents, including:

- strong leadership;
- professionalism and high calibre of staff;
- strong incentives for staff (*e.g.* compensation) and management;
- good external contacts and co-operation with stakeholders, especially the private sector;
- consensus documents such as strategies, plans and targets;
- private sector involvement in implementation;
- financial independence (long-term, stable funding source);
- more direct involvement in energy planning including power development planning;
- detailed data and knowledge of energy use and efficiency opportunities in key sectors, including customer energy use data;
- effective means for co-ordination across government;
- international co-operation; and
- control and inspection functions.

Areas for improvement and capacity-building needs

Most interview respondents quickly identified the improvements needed in or for their organisations. Some improvements would be common to any agency: better equipment, a bigger budget, larger staff, better pay and incentives, etc. Other improvement priorities reflected capacity differences in developed vs. developing countries. Illustrative examples of capacity building needs and areas for improved co-ordination are noted below.

- In Brazil there is a need to co-ordinate and seek synergies between electricity and gas EE programmes.
- In Chile and Ireland there is a need to build capacity on programme results indicators in terms of energy savings, GHG emissions reductions and jobs creation.
- In Armenia there are difficulties sourcing the basic energy efficiency audit tools needed; for example, selecting energy audit software from the many available was difficult, as they had no prior experience.
- In Ukraine, respondents noted the need for improved demonstration equipment and facilities to train energy auditors and managers.
- In Finland and Korea there is a need to address the small and medium enterprises (SME) sector, which has so far been overlooked.
- In Indonesia there is a need to create a special job classification for EE professionals in order to attract the right job candidates.
- In Mexico there is a need to broaden the scope of existing programmes and develop better co-ordination among the various EE agencies.
- In Tunisia there is a need to build staff capacity in order to open local EE offices throughout the country.
- In Turkey there is a need to build outsourcing capability to allow programme expansion and spur private sector capacity building.

Discussion

Advantages of different organisational types

The interviews provided an opportunity to collect new information about the advantages and disadvantages of different EE organisational types (Table **5**.**5**).

For the Finnish parastatal, Motiva Oy, being an independent company (as opposed to a unit within a ministry) is important for several reasons. First, Motiva is not limited to working only with government groups and agencies; it can take on projects with the private sector and NGOs. This provides a more robust project portfolio and contributes to Motiva's technical and commercial competence. As a result of these collaborations, private companies are likely to be more open about the challenges they face, and willing to use Motiva to communicate EE issues to the government. Despite this ability to act as a private company, Motiva benefits from a direct link with the government, including political and financial support.

Table 5.5 **Advantages and disadvantages of different EE organisational types**

Organisational type	Advantages	Disadvantages
Department within a government energy agency	Access to funding and decision makers Potential for international co-operation and donor funding Influence on policy and legislation Firm basis in law	Limitations on salary and staff Difficulty in taking decisions Must compete for attention of policy makers Turnover of officials
Specialised governmental energy efficiency and clean energy agencies	Credibility with other public agencies Ability to specialise and focus Potential for international co-operation and donor funding Often have a firm basis in law Cultural benefits of a purpose-driven organisation	Limitations on salary and staff Potential opposition from elsewhere within government
Independent energy efficiency and clean energy statutory authority or corporation	Linkages to and credibility with private sector Access to multiple public and private funding sources Independence and autonomy Firm basis in law Cultural benefits of a purpose-driven organisation	Cannot directly access donor funding
Energy efficiency and clean energy NGO or public benefit organisation	Independence and autonomy Access to private sector resources, support and funding Cultural benefits of a purpose-driven organisation	Only indirect access to public policy making Difficulty with policy co-ordination May not be permanent arrangement
Energy efficiency and clean energy public-private partnership	Independence and autonomy Credibility with stakeholders and consumers Cultural benefits of a purpose-driven organisation	Only indirect access to public policy making Must compete for resources, including staff and public funding Lack of authority Difficulty with policy co-ordination May not be a permanent arrangement

For the Energy Conservation Centre of Thailand (ECCT), quasi-governmental status creates challenges. To do the technical work of building and industrial audits it needs to attract engineering staff and then expose them to industrial operations and the latest technologies. However, as a state-sponsored centre, salaries are on a scale comparable to government employees. This creates retention problems, as young engineers come to ECCT mainly to gain technical experience, and then move on to private ESCOs where salaries are much higher.

In EU member states, EE agencies need to be located close to the central energy ministry for purposes of compliance with supra-national requirements, such as the Energy Service Directive. These directives must be implemented locally via national legislation and programmes. In some countries, including Hungary and the Czech Republic, EE agencies are able to mobilise European structural funds for EE programmes. This is facilitated by close proximity and frequent interaction between the EE agency, the energy ministry and the European Union.

In Jordan, the NERC benefits from its special status as an NGO created by Royal Decree. NERC forms part of the Royal Scientific Society and is an autonomous but government-supported organisation. A board of directors comprising energy professionals and academics, as well as government officials, allows NERC to act as an advisor to government, helping to draft energy legislation and provide inputs to national energy strategy. NERC also maintains its own programmatic efforts, including the delivery of energy services (audit and project development) and working with donors.

In Korea, the Rational Use of Energy Act of 1979 established KEMCO as a state-owned enterprise reporting to the Ministry of Knowledge Economy (MKE). KEMCO is the main provider of EE technical expertise across all consuming sectors, and has a staff of over 400 professionals. Under the Korean model of close public-private sector co-operation, KEMCO has considerable flexibility in its activities. In addition to supporting policy implementation, KEMCO delivers energy management and audit services directly to asset owners, provides training and initiates CDM projects. About one-third of its revenue comes from non-governmental sources, including commissions from soft-loan programmes, revenues from CDM projects, fees from audits and inspections and training consultancies. As a statutory clean energy corporation, KEMCO benefits from high credibility with other public agencies, a firm basis in law and considerable autonomy, while retaining the ability to influence the details of EE policy and implementation.

As a purpose-driven statutory agency focused on clean energy, the Energy Trust of Oregon (ETO) has a unique culture which is hard to recreate in an energy utility or government body. ETO is not subject to the sometimes contentious regulatory process that accompanies most utility EE programmes. ETO also has political independence and a degree of autonomy difficult to attain in a government agency, while still benefiting from the support of a broad coalition of stakeholders. The ETO has also established high credibility with consumers and has over the years been able to create a large EE industry, co-ordinated through ETO's back office systems for procurement, disbursement and grant applications.

In Chile, a new approach to energy efficiency implementation is expected to begin in late 2010. The creation of a Ministry of Energy (MoE) has provided an opportunity to rationalise and streamline EE policy and programme implementation through the creation of a new EE agency, the *Agencia Chilena de Eficiencia Energética* (ACHEE). This new institutional framework would place MoE as the apex energy agency, delegating policy implementation to other organisations not directly subordinate to the MoE, but closely linked to it through funding and oversight arrangements. ACHEE will be a private legal corporation in which the state and the private sector will participate in developing and delivering EE programmes. ACHEE's board of directors will include key public and private sector EE stakeholders and be chaired by MoE. ACHEE will concentrate on activities for which its dual public-private nature confers a comparative advantage, such as

providing technical assistance and implementing programmes requiring logistical expertise and flexibility (APEC, 2009a).

Energy efficiency utilities

Energy providers are often included in efforts to improve energy efficiency. Chapter 7 provides a detailed exploration of their role in EE implementation. The topic is introduced here to describe a new type of EE agency: the EE utility. In many IEA member countries (such as Australia, Canada, the United Kingdom and the United States) much of the electricity-focused efficiency efforts were implemented by energy utilities up until the energy sector liberalisation efforts of the 1990s. Before deregulation and privatisation, utilities agreed to undertake energy efficiency and other "public purpose" activities as long as they were allowed programme cost-recovery and some compensation for revenues foregone as a result of lower sales. Energy providers have natural advantages as EE implementers including ready access to capital; an existing relationship with end users, including billing systems and market data; a familiar brand name; and a widespread service and delivery network within their jurisdiction.

As long as their revenue stream and profitability is dependent upon energy sales or demand growth, energy providers as EE implementers have a built-in conflict of interest. Regulatory mechanisms are required to induce energy providers to give as much attention to demand-side investments as they have traditionally paid to supply-side investments.

This perception of an institutional bias against energy efficiency by energy providers has led to experimentation with the concept of an **energy efficiency utility**, which combines the cultural advantages of a clean energy government agency or statutory authority with the core competencies of an energy provider.

Energy efficiency agencies based on the EE utility concept are in place in several North American states and provinces, including Delaware, Maine, New Brunswick, Nova Scotia, Oregon and Vermont.[8] An EE utility works in the same way as a regulated monopoly energy provider, with the regulator awarding a multi-year franchise (3 to 20 years) to a competitively selected operator. The EE utility is funded through rates or SPBCs collected by regulated energy providers. The EE utility proposes targets and programmes to the regulator, which approves them and then monitors progress against performance benchmarks. Stakeholders, governments and regulators are attracted to the concept of such a focused, purpose-driven EE agency. As explained in Delaware's Sustainable Energy Utility (SEU) blueprint, "The most important feature of the SEU is that energy users can build a relationship with a single organisation whose direct interest is to help residents and businesses use less energy and generate their own energy cleanly. Directly put, the SEU becomes the point-of-contact for efficiency and self-generation in the same way that conventional utilities are the point-of-contact for energy supply" (SEU, 2007).

The results of EE utilities have so far been impressive, although this new organizational form has so far been restricted to North America. All of the states and provinces with EE utilities rank well above the median level for EE investment. Vermont delivered more EE investment per capita in 2009 than any other North American jurisdiction — more than three times the median level for the United States (Nevius, Eldridge and Krouk, 2009).

[8] www.efficiencynb.ca/enb/home.jsp; www.nspower.ca/en/home/aboutnspi/mediacentre/NewsRelease/2010/2011plan.aspx; www.efficiencymaine.com/ ; http://www.seu-de.org/docs/SEU_Final_Report.pdf

Internal organisation

Three main approaches to organising the activities of energy efficiency agencies have been observed: by consuming sector, by function and by activity (Table **5.6**). In some cases, organisations apply a matrix or hybrid approach.

Table 5.6 **Approaches to internal organisation for EE agencies**

Internal organisation	Example
By consuming sector or major markets	Canada: Office of Energy Efficiency
By function	Thailand: ECCT
By activity or technology	Finland: Motiva Oy
Matrix/team	United States: Efficiency Vermont
Hybrid functional/sectoral	Tunisia: ANME United States: Efficiency Vermont

Additional details of these examples are provided below:

- The Office of Energy Efficiency within Natural Resources Canada is organised roughly by sector (*e.g*. buildings, housing, equipment, analytic, transport, industrial, biofuels.)
- The Finnish parastatal Motiva Oy comprises three sections: energy efficiency and conservation, renewable energy and materials efficiency.
- The Energy Conservation Centre of Thailand (ECCT) is organised functionally, with an Administration Division, an Engineering Services Division, a Technical Services Division, and a Training and Marketing Division.
- The National Agency for Energy Management (ANME) in Tunisia has a hybrid functional/sectoral organisation, with an assistant director responsible for common functions (communications, legal, procurement, administrative) and another assistant director responsible for technical work organised by sector (industrial, commercial and public sector, transport)
- Efficiency Vermont also has a hybrid organisation, with separate sector units for the major markets (buildings, households, industrial key accounts) plus technical support, policy and planning, business development/marketing, administration and IT groups supporting all the sector units. The company also has teams within each sectoral unit that focus on market segments important in Vermont, such as hospitals, colleges and universities, dairy farms, ski areas and hospitality.

Conclusions and guidelines

Based on a consideration of the literature plus practical results and experience on the ground, several conclusions and guidelines can be offered for policy makers and decision makers considering how to establish and organise their EE agencies.

A statutory basis confers status and permanency. As discussed in Chapter 2 on energy efficiency laws, having a statutory basis confers an institutional advantage for an EE agency, especially if the legal basis includes provisions for funding or other resources. The most well-known and effective energy agencies all

have a statutory basis, including India's Bureau of Energy Efficiency (BEE), Korea's KEMCO, Japan's ECCJ, Brazil's National Electrical Energy Conservation Program (PROCEL), France's ADEME, Finland's Motiva Oy, Mexico's National Commission for Energy Efficiency (CONUEE) and New Zealand's Energy Efficiency and Conservation Authority. In creating a statutory EE agency, policy makers and legislators have an opportunity to work through the issues involved in aligning a new EE agency with EE drivers, sector objectives, existing institutions, and oversight and funding requirements. This process includes selection of the most logical organisational type for a given sector and country context. An agency with a statutory basis typically benefits from better institutional status relative to agencies created administratively. Because such agencies cannot be easily abolished, it may be easier to attract qualified management and staff.

Multiple organisational options are available to meet diverse needs. This review and previous studies identified many different energy efficiency organisational types: generalised government energy agencies; specialised government EE/clean energy agencies; independent EE/clean energy authorities or parastatal corporations; EE/clean energy NGOs; and EE/clean energy public-private partnerships. Each of these organisational types has advantages and drawbacks, and there is no evidence that any one is always preferable. Rather, the choice of organisational type should reflect historical development, country context, alignment with sector and EE objectives, existing institutions and many other factors.

New organisational designs still to be discovered and developed. Experimentation with energy efficiency and clean energy organisational arrangements will continue. Views on the efficacy of some organisational types are also changing, as evidenced by the recent debate on statutory authorities and quasi-governmental organisations in the United Kingdom (Morris, 2010).[9] The development of EE utilities as a fusion of regulated energy provider and EE agency is an exciting development worthy of consideration as a new organisational type or a variant of those already identified. The search for effective EE policy implementation arrangements must continue, and policy makers should not hesitate to experiment and innovate.

Critical factors and core competencies contribute to success. Many interviewees identified success factors, core competencies and key capabilities associated with effective EE agencies. Strong leadership and good external co-operation, including private sector involvement, are important to any organisation. Consensus documents such as strategies, plans and targets help build consensus and establish expectations. Professionalism and high calibre of staff, financial independence, and strong incentives for staff and management are all intertwined under the category of sufficient resources. More direct involvement in energy planning and effective co-ordination across government require the co-operation of sister institutions. Detailed data and knowledge concerning energy use and efficiency opportunities in key sectors require strong analytic capability and authorisation to access public and private databases.

[9] These quasi non-governmental organisations or Quangos (non-departmental public bodies in the United Kingdom) can fall into several organisational types defined here, including statutory authorities, public corporations or public benefit organisations.

6. Resourcing requirements

Introduction

Energy efficiency (EE) institutions require resources, staff and operating budgets in order to implement energy efficiency policies and programmes. These resource needs can be funded through a variety of mechanisms, as discussed in Chapter 4 on funding mechanisms. This chapter considers the **resourcing requirements** – that is, the financial and human resources (staff, operating expenses, intervention delivery costs) needed for implementation activities.

Key issues and research questions

- What resources (financial, human, operating, information delivery) are needed for energy efficiency institutions?
- How do energy efficiency policies and programmes vary in their resourcing needs?
- Is it possible to benchmark energy efficiency resourcing requirements across policies, sectors and countries?

Importance

Estimating the resources required to implement EE policies and programmes, across countries and in a comparable way, serves three purposes:

- a basis for benchmarking the costs of implementing different energy efficiency policies. Some policies (*e.g.* building codes and appliance standards) require much less government resourcing than others (*e.g.* direct investment). Eventually, it may be possible to suggest general resourcing guidelines for implementing different policies.
- a partial measure of the effectiveness of energy efficiency spending. Data on spending together with data on results make it possible to estimate policy or programme effectiveness (*e.g.* the ratio of spending to results.
- a practical input for policy makers and decision makers engaged in organising, staffing and budgeting for energy efficiency institutions. Governments need guidelines on the resources needed for implementing organisations.

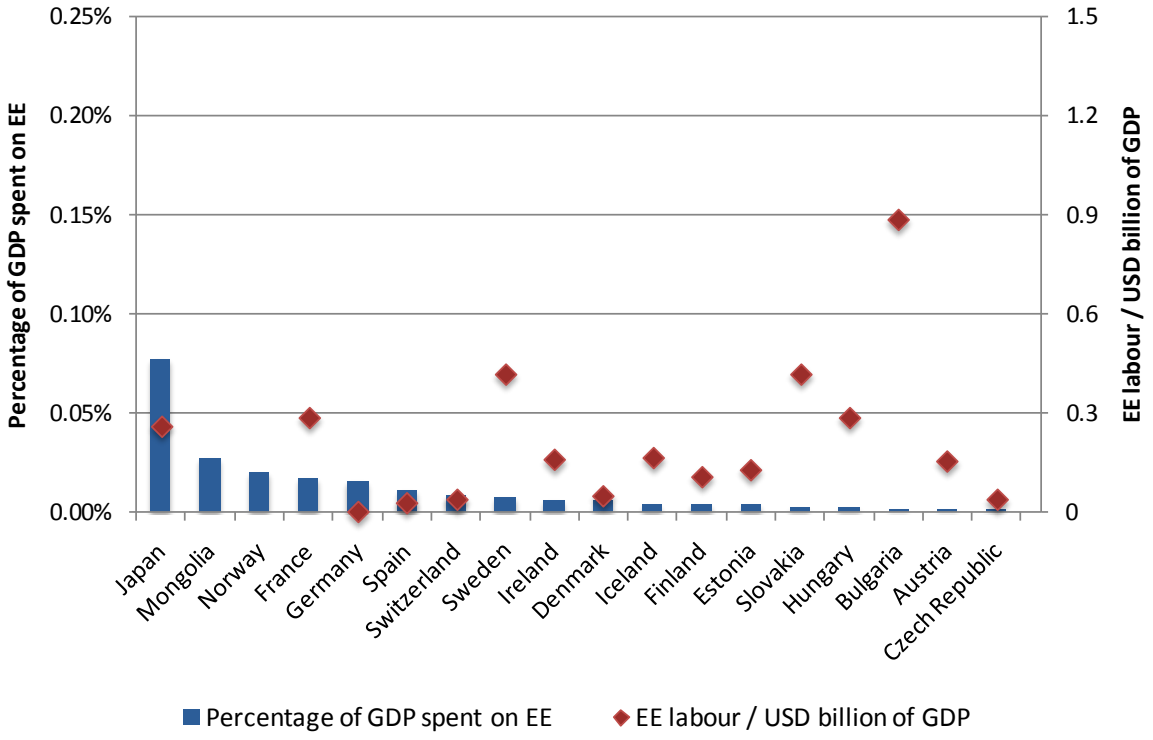
Few attempts have been made to estimate and compare EE resource requirements across countries. The examples discussed here do not yet provide the level of detail or comparability needed to serve such purposes.

This study attempted to gather resourcing information through a resourcing survey, fielded in parallel with the main institutional survey. A survey approach proved much less effective for gathering resourcing information than for gathering institutional information. This section analyses why collecting resourcing data is so difficult, and provides suggestions for improved practice in this area.

Literature review

Although efforts have been undertaken to estimate EE resourcing requirements on a regional and sectoral basis, no global assessment has been carried out. A recent paper prepared under the auspices of the Energy Charter Secretariat's Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA) compared the EE organisation budgets for most of the Energy Charter's member countries (ECS, 2009). This study compiled operating budgets and staff sizes for 36 national EE organisations, and expressed the data as indices of budget and staffing per unit GDP (Figure **6.1**).

Figure 6.1 **Energy efficiency spending and employees per unit GDP**



Source: Energy Charter Secretariat, 2009.

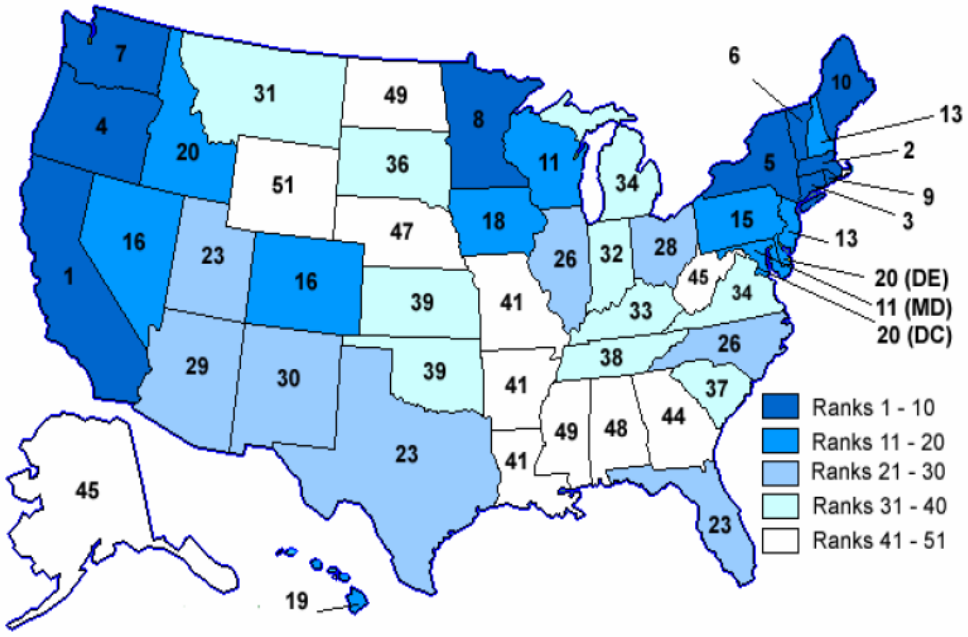
According to these data, EE spending in Energy Charter member countries ranges from over 0.08% of GDP (Japan) to nil (Indonesia). Ignoring outliers, staffing falls within an order-of-magnitude range (0.05 to 0.4 employees per USD billion GDP). These results underscore the difficulties involved in comparing agency staff or budget at an aggregate level without considering the other variables affecting resource requirements. Conducting an aggregate comparison is difficult due to the diversity of several factors: types of policies; implementation assignments; devolvement to sub-national levels of government; use of outsourcing or other arrangements; cost and labour intensity of programmes; previous experience with EE implementation; and stage of overall economic development.

Studies that provide EE resourcing data on a more limited scale and scope have produced more meaningful indices. A good example is the annual report produced by the Consortium for Energy Efficiency (CEE), which compares utility EE programme expenditures by sub-national jurisdiction in North America (Nevius, Eldridge and Krouk, 2009). The scope is limited to ratepayer-funded, utility-managed programmes only. The

methodology is straightforward, directly surveying the funding source, in other words, utilities. Focusing on one category of EE programme implementers reduces the number of institutions surveyed and improves the comparability of results.

Some studies have successfully compared the scope and scale of EE activities across similar government entities. In the United States, State Energy Efficiency Scorecards, which are prepared by the American Council for an Energy Efficient Economy (ACEEE), are useful for comparing EE activities implemented by energy providers and by state and local energy efficiency organisations. The scoring system includes policies across consuming sectors (such as building codes, vehicle efficiency, public transit and residential weatherisation) and energy provider programmes (ACEEE, 2009). The resulting composite score is useful in highlighting disparities in the overall level of effort across jurisdictions (Figure **6.2**).

Figure 6.2 **Map of US State Energy Efficiency Scorecard results**



Source: ACEEE, 2009.

Other studies review energy efficiency activity at national and sub-national levels within a particular region. Many of these provide spending estimates and EE organisation staff size as part of the policy and programme descriptions. The Asia-Pacific Energy Research Centre (APERC) and the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) have both compiled detailed descriptions of the energy efficiency activities for their regional groupings (APERC, 2010; UNESCAP, 2010). One shortcoming of such compilations is a lack of consistency in the data reported across countries, as programmes and policies in each country are organised and reported in different ways. This makes benchmarking difficult unless the programmatic detail can be standardised by policies or sectors.

These sources offer useful information, but none of them provides a dataset that meets the objectives of comprehensiveness across policies and sectors within a country, and comparability among different countries. Data provided by these papers, however, can fill interpretive gaps that would necessarily arise in a dataset gathered by means of a survey.

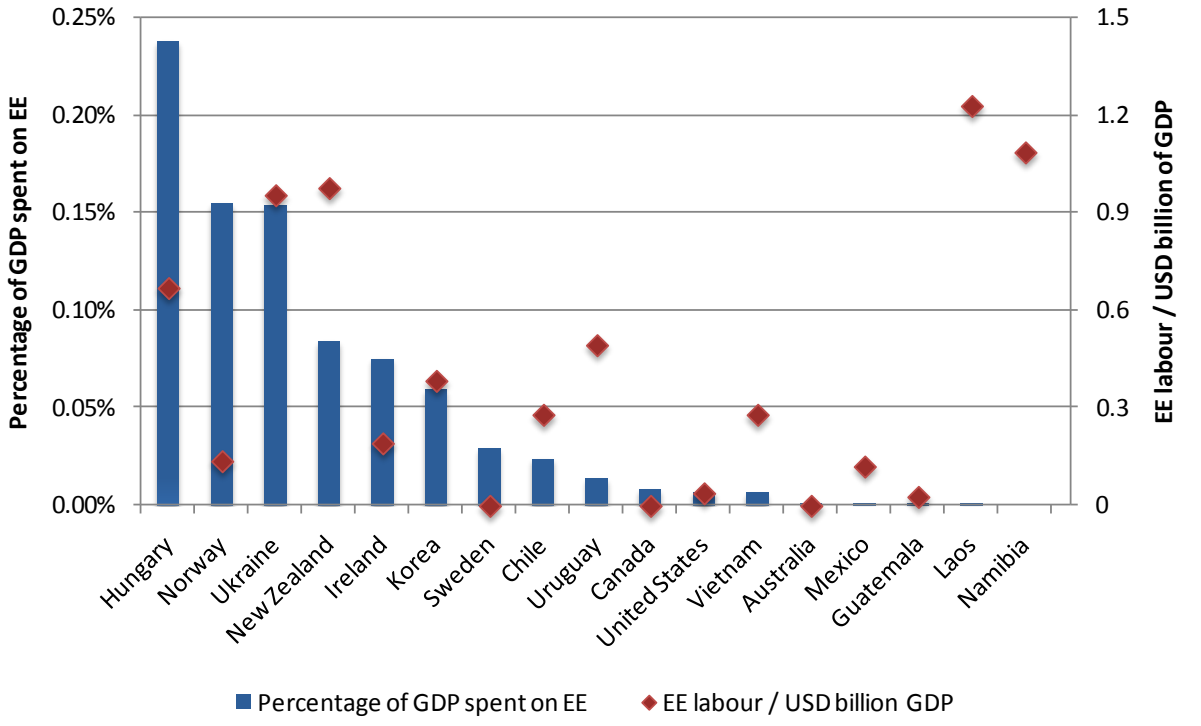
Findings and discussion

The resourcing survey asked respondents to estimate the financial and staffing resources devoted by governments to designing, developing, implementing and evaluating EE policies and programmes in their countries. It was divided into two parts. The first part sought to collect general information about the respondent and the respondent's country, obtain estimates of the overall EE spending at the national level, and identify the origin of EE resources. The second part sought a list of all relevant EE government agencies, institutions and programmes, and their related budgets.

The resourcing survey proved much more difficult to conduct than the institutional survey. This is reflected in the resourcing survey response rate: 20 responses received from 112 countries (18% response rate), compared to a 35% response rate for the institutions survey (175 responses out of 465 fielded). The completeness of the resourcing survey responses was also problematical: several responses were discarded as non-responsive. These results demonstrate the difficulty of gathering hard data on EE spending and staffing.

Figure **6**.**3** presents the limited results of the EE resourcing survey, normalised by GDP. Eliminating outliers, annual energy efficiency spending reported ranges from over 0.2% of GDP (Hungary) to nil (Namibia). Staffing falls within a somewhat narrower range of 0.02 to 1.2 employees per USD billion GDP. Although anecdotal, these PEEREA and IEA results suggest boundaries for total spending on energy efficiency: no country spends more than 0.25% of GDP, and most countries spend in the range of 0.02% to 0.15% of GDP. The consistently lower spending reported in the PEEREA report (compare Figure **6**.**1** and Figure **6**.**3**) may reflect a more limited range of EE institutions surveyed. These differences in methodology can have a significant impact on the estimated values. This is borne out by the handful of countries covered by both the PEEREA and IEA surveys (Norway, Ireland, Sweden, Hungary). Results from two surveys of the same countries differ by one or even two orders of magnitude, highlighting the importance of methodology and definitions when developing comparable data.

Figure 6.3 **Energy efficiency spending and employees per USD billion of GDP**



Source: IEA estimates.

Issues in estimating energy efficiency resourcing needs

Matching resourcing requirements to activities

Resourcing needs vary depending on the activities involved in policy implementation. Complex or human resource-intensive policies and programmes will have higher resource requirements. Some policies require significant resources for preparation, but only modest resources for implementation. The UK's Carbon Trust, for example, administers the Enhanced Capital Allowance (ECA) tax credit for large businesses. The main activities involved in implementing the ECA are: developing the generic criteria eligibility; processing applications for specific products that aim to qualify for accelerated depreciation (the Product List); and providing promotion and assistance to large businesses seeking advice.[10] The Carbon Trust has a modest administrative budget of about GBP 2 million per year to administer this programme, which disburses GBP 100 million per year in tax benefits, *i.e.* a 2% administrative overhead cost.

In contrast, the Energy Assistance Programme (EAP), administered by the UK's Energy Saving Trust, focuses on providing detailed advisory and referral services by phone to low-income households in Scotland. This programme seeks to mobilise energy efficiency to reduce fuel poverty for the particularly vulnerable: people with disabilities, older people and families with young children. The Energy Saving Trust identifies low-

[10] The ECA offers accelerated depreciation on products that are in the top quartile of energy efficiency performance for a particular product or materials classification.

income households, advises and counsels them, including screening for entitlement and social tariff eligibility, and arranges for delivery of both standard energy efficiency measures under supplier obligations and enhanced EE measures offered under a supplemental government-subsidized program. Implementing the EAP is very staff-intensive and costly relative to the energy efficiency benefits delivered. This is typical for EE programmes with a strong social welfare component.

Each of these programmes delivers about the same level of support and investment to end-users (about GBP 100 million); however, the nature of the policy intervention and role of the implementing organisation demands quite different resourcing requirements. Comparing the administrative cost burdens of these two programmes would be very difficult, as they involve different policies and different implementation requirements.

This example illustrates the importance of developing a resourcing comparison structure that accounts for the different activities associated with policy implementation. A possible approach would be to differentiate between administrative expenses and programme outlays (*e.g.* pass-through costs, which are actually benefits to end-users). Reporting on EE organisation programmes by type of policy and by type of spending would provide a much more comparable benchmarking structure (Table **6.1**).

Table 6.1 **Operating and programme expense categories**

Operating expenses	Programme expenses
General and administrative	Direct investment
Evaluation	Subsidies, incentives, financing
Reporting	Technology development
Finance and personnel	Promotion and awareness
Planning	Labelling and certification
	Compliance and enforcement

Data collection issues

EE implementation resources are associated with a programme, a policy or an institution. This results in several data collection problems: (i) aggregate estimates require a number of sub-estimates gathered from multiple agencies at national and sub-national levels; (ii) spending on energy efficiency is often difficult to separate out from other spending by the same agency or ministry; and (iii) attempts to compare organisations and countries are hindered by the diversity of programmes, policies and institutions, and by the mixture of staff, operating expense budgets, capital outlays and other expenditures.

Identifying energy efficiency-specific spending

Separating out energy efficiency from other organisational activities can be difficult. The task is simpler for specialised EE organisations for which the entire budget is earmarked for energy efficiency. However, larger institutions often have multiple responsibilities, many of which may only be partially linked to energy efficiency. This makes it more difficult to specify the share of total spending that supports EE implementation.

Extracting EE resourcing estimates is particularly difficult when multiple institutions have EE assignments as part of their other responsibilities. In such situations, aggregate energy efficiency spending has to be estimated by summing the energy efficiency budget shares across multiple divisions. This then needs to be repeated across all institutions with EE responsibilities.[11] Such cases of diffuse spending are very difficult to assess, since the data is often not available within the institution itself. Resourcing estimates thus often need to be limited to EE organisations, clearly identified EE programmes, and those institutions for which diffuse spending can be measured.

Making resourcing estimates comparable

Only data collected at the specific EE policy or programme level can be compared in a straightforward way. Any aggregate data will be meaningless without context because of the wide range of policies and programmes, implementing organisations, market conditions and consuming sectors. One way to increase comparability is to associate resourcing data with the consuming sector and agency activity. This method was tried in the resourcing survey: respondents were asked to partition energy efficiency resourcing according to seven sectors and nine agency activities (Table **6.2**). The survey asked for a breakdown of resourcing data into percentages attributable to one or more of these interventions. However, a survey approach was not effective in obtaining this level of detail. A desk-study and/or in-depth review would be required to obtain a truly disaggregated response by sector, policy or activity.

Table 6.2 **Allocating resourcing needs by sector and agency activity**

Sectors	Agency activities
	• Policy, planning and administration
	• Direct investment
• Cross-sectoral	• Subsidies, incentives and provision of financing
• Buildings	• Technological development
• Appliances	• Promotion and awareness building
• Transport	• Labelling, certification and accreditation
• Industry	• Regulation
	• Enforcement
	• Results monitoring

Comparing resourcing requirements across different institutional structures

The number and variety of institutions involved in EE implementation is another barrier to collecting and comparing EE resourcing requirements. Since every country is unique, the analyst must have a detailed knowledge of each country's EE institutional arrangements. It may, in practice, be more effective to circumvent the implementing organisation and collect resourcing data directly at the funding source (for example, the treasury or ministry of finance).

[11] Singapore is a good example of a country in which several departments (Land Transport Authority, Buildings Control Authority, Economic Development Board, Energy Market Authority) with several persons are responsible for energy efficiency, but energy efficiency is only one aspect of their responsibilities. In other countries EE responsibility is spread across multiple ministries with sectoral responsibilities (*e.g.* transport, buildings, industry).

Conclusions and guidelines

Documenting EE resourcing at the sectoral, policy or activity level requires significant investment. Standard reporting frameworks that differentiate between administrative and programmatic spending are needed to develop reliable and comparable estimates of EE resourcing. An EE resourcing reporting framework suitable for international benchmarking, comparing EE spending effectiveness and gauging the costs of EE policy implementation, should meet the following criteria:

Encompass all of a country's EE institutional arrangements. Understanding the institutional structure and identifying contacts within each of the major energy efficiency institutions is essential.

Aim for recoverable data. In some cases, EE resources are too diffuse within an institution to be measurable. A simple criterion would be whether the institution itself can readily access this data.

Link resources with sectors, policies and activities. The sector type of intervention matrix used in the resourcing survey proved to be a satisfactory although overly complex means of allowing comparability across countries. A simpler version that tags spending items according to sector and intervention type would improve comparability.

Gather data at the source, if possible. While external aggregate estimates can sometimes be useful, one way to ensure both comprehensiveness and comparability in the collected dataset is to estimate resources for each institution individually.

An appropriate reporting framework could be developed for IEA countries, and then extended worldwide. However, this would be a large and time-consuming undertaking. One of the central lessons of the resourcing survey attempted in this study is that there are no shortcuts to gathering the type of data needed to address the two EE resourcing research questions.

Using existing IEA resources on energy data collection could be a possible way forward. Every year, the IEA asks its member countries and several large non-member countries to provide data needed to analyse energy supply and demand. At present, spending data are not gathered for any sector; however, a new questionnaire could be designed along the lines suggested here.

7. Role of energy providers in implementing energy efficiency

Introduction

Energy providers represent another potential energy efficiency (EE) implementing organisation. In fact many of the earliest government-sanctioned EE programmes were implemented by either state-owned or investor-owned utilities, especially in IEA member countries (United States, Australia, United Kingdom, and Canada). Prior to the deregulation and privatisation of the power sector in the 1990s, many utilities were willing to take on energy efficiency and other "public purpose" activities, as long as they could recover programme costs and be compensated by government or regulators for any foregone revenues.

The functional unbundling of electric utilities, coupled with the introduction of wholesale and retail competition, fundamentally altered the incentive structure for regulators, energy utilities and consumers. The emergence of a competitive energy industry also raised concerns about the role of energy providers as EE implementers, including: (i) overlap of commercial and societal interests; (ii) competitive disincentives to incur costs, increase prices or reduce sales; and (iii) regulatory difficulties in policing anti-competitive behaviour in competitive markets (King *et al.*, 1996). Energy providers dependent on energy sales or demand growth for their profitability might be a poor choice to implement energy efficiency, as EE improvements would reduce their revenues. This dynamic can exist under both traditional cost-of-service regulatory regimes and competitive retail market regimes, unless regulatory arrangements or market mechanisms are established to compel or reward energy provider participation (US EPA, 2007c).

Key issues and research questions

- What role can energy providers play in implementing energy efficiency policies?
- What enabling conditions allow energy providers to become effective implementers of EE programmes/projects?
- What has been the experience with energy providers as EE implementers?
- What criteria should policy makers use to determine whether energy providers are a viable EE implementing agency in their country?

Importance

If the right institutional framework and enabling conditions can be established, energy providers can have distinct advantages as EE implementers. In the United States, Canada and the United Kingdom, regulated distribution companies and competitive retail electricity suppliers are one of the primary designers and implementers of energy efficiency programmes. Competitive advantages and core competencies of energy providers include ready access to capital, an existing relationship with end users, including billing systems and market data, a familiar brand name and a widespread service and delivery network within their jurisdiction. Importantly, many energy providers also have resource adequacy responsibilities, that is, they must plan for and accommodate energy and peak demand growth (Eto, Goldman and Kito, 1996; Waide and Buchner, 2008; Sarkar and Singh, 2010).

In smaller, emerging countries with limited institutional capacity, the existing energy provider may be the only viable option for implementing EE programmes. This reality has prompted the World Bank and other multi-lateral development banks (MDBs) to fund many utility demand-side management (DSM) programmes around the world, working closely with energy providers (World Bank, 2005; Waide and Buchner, 2008).

In North America and elsewhere, many EE programmes are implemented by energy providers, with the programme costs being reflected in rates to consumers. Such ratepayer-funded EE programmes are one of the fastest-growing energy efficiency segments. Two recent studies on ratepayer-funded EE programmes for gas and electricity in the United States and Canada put 2009 spending at USD 6.1 billion and forecast that US spending alone would top USD 10 billion by 2015 (Nevius, Eldridge and Krouk, 2009; Barbose, Goldman and Schlegel, 2009). In some US jurisdictions, utilities spend as much as 3% of collected revenue on energy efficiency (ACEEE, 2010). Utilities in Brazil collect 1% of electricity revenues, which is used to fund EE programmes as well as research and development. In the United Kingdom, energy provider spending on energy efficiency is about USD 3 billion under the Carbon Emissions Reduction Target (CERT) supplier obligation. Clearly, energy providers play an important role as EE implementers, at least in some countries.

This chapter explores the advantages and disadvantages of energy providers as energy efficiency implementers, and reviews the experience of energy providers as EE implementers around the world. It also provides a series of guidelines for getting the most out of energy providers in an EE implementation role.

Literature review

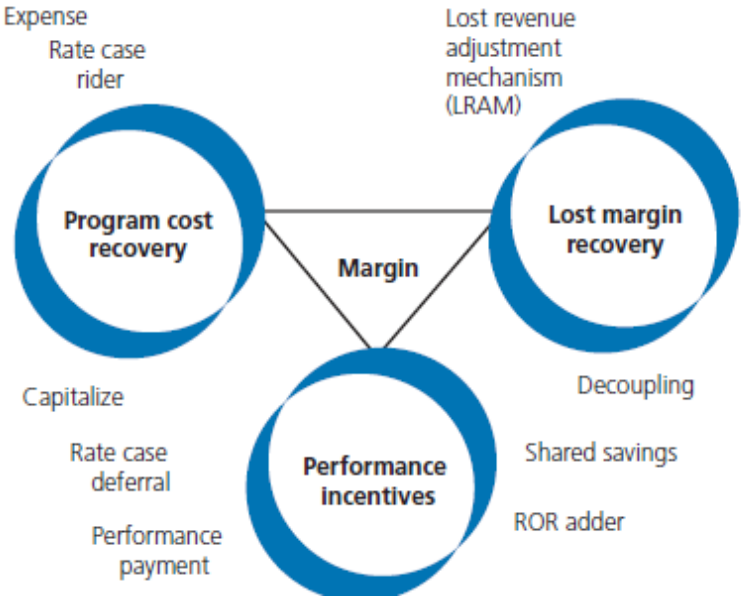
Demand-side management includes energy efficiency and any other policy or programme that seeks to influence power supply and demand by changing customer consumption patterns (Charles River Associates, 2005). Utilities have implemented DSM programmes for decades (Nadel and Geller, 1996; Waide and Buchner, 2008). Such programmes, including end-use EE improvements, have value to utilities because they reduce the amount and type of generation needed to satisfy energy and peak demand. In the developed country context, the resource value of demand-side management and energy efficiency is recognised by including these programmes within an integrated power development plan (Hirst and Goldman, 1991; IEA DSM Implementing Agreement, 1996; US EPA, 2007c). In the developing country context, utilities have implemented EE programmes to mitigate the effects of power shortages, and also because they often have the strongest technical and implementation capacity (IEA, 2005; Heffner *et al*., 2010).

Certain enabling conditions are needed before energy providers will be ready to embrace the role of EE implementer, including: (i) ability to recover programme costs; (ii) compensation of foregone revenues owing to lower sales; (iii) institutional or financial incentives for management and/or shareholders to engage; and (iv) acceptable levels of regulatory and other risk (US EPA, 2007b).

Establishing these enabling conditions requires institutional, regulatory and market mechanisms that reflect sector and market structures, plus the willingness of energy providers to participate. If the energy provider is a for-profit entity operating in competitive markets, there must be a mechanism to adjust prices or rates in order to recover programme costs and make a profit. If the energy provider is regulated, there are numerous performance incentive approaches including “shared savings” schemes, shareholder or management bonuses for reaching energy efficiency goals, or rate-basing of energy efficiency investments. Compensation of foregone revenues is often provided through lost revenue adjustment mechanisms (LRAMs), which adjust tariff levels in order to collect required revenues regardless of sales. Other tools include obligations to undertake energy efficiency as a condition for doing business and special charges (network or carbon) to offset programme costs. State-owned energy providers might also be considered as a type of EE organisation, but will have particular incentive structures depending on organisation, autonomy and resourcing (see Chapter 5).

All energy providers, regardless of type, should be able to expect objective, timely and transparent regulatory treatment of their plans and results. The regulator or obligation administrator must establish procedures for setting obligations or processing rate applications and for oversight of programme operations, including review mechanisms to determine regulatory compliance. This combination of conditions creates favourable environments for energy providers to implement energy efficiency (Figure **7.1**).

Figure 7.1 **Enabling conditions for energy providers to deliver energy efficiency**



Source: US EPA, 2007b.

Practical experience with energy provider implementation of energy efficiency suggests additional issues to be considered when establishing institutional and regulatory arrangements:

- **Link EE implementation to resource plans and targets:** EE programmes delivered by energy providers are particularly effective when tied to a power development plan or resource delivery target. Treating these programmes as equivalent to a supply-side resource makes it much easier to gauge cost-effectiveness, evaluate results and justify programmes.
- **Cost-effectiveness:** Establishing mechanisms for cost recovery, financial incentives, continued profitability and acceptable regulatory risk all add to the overhead costs of delivering EE programmes through energy providers. The end result may or may not be more cost-effective than other implementation arrangements.
- **Market transformation:** Energy provider programmes can be effective over the long term in delivering large-scale market transformation programmes. In particular, energy providers are well positioned to undertake so-called market pull strategies, wherein the energy provider co-operates with equipment manufacturers, wholesalers, retailers and installers to develop and bring new energy efficient technologies to the marketplace (Charles River Associates, 2005).

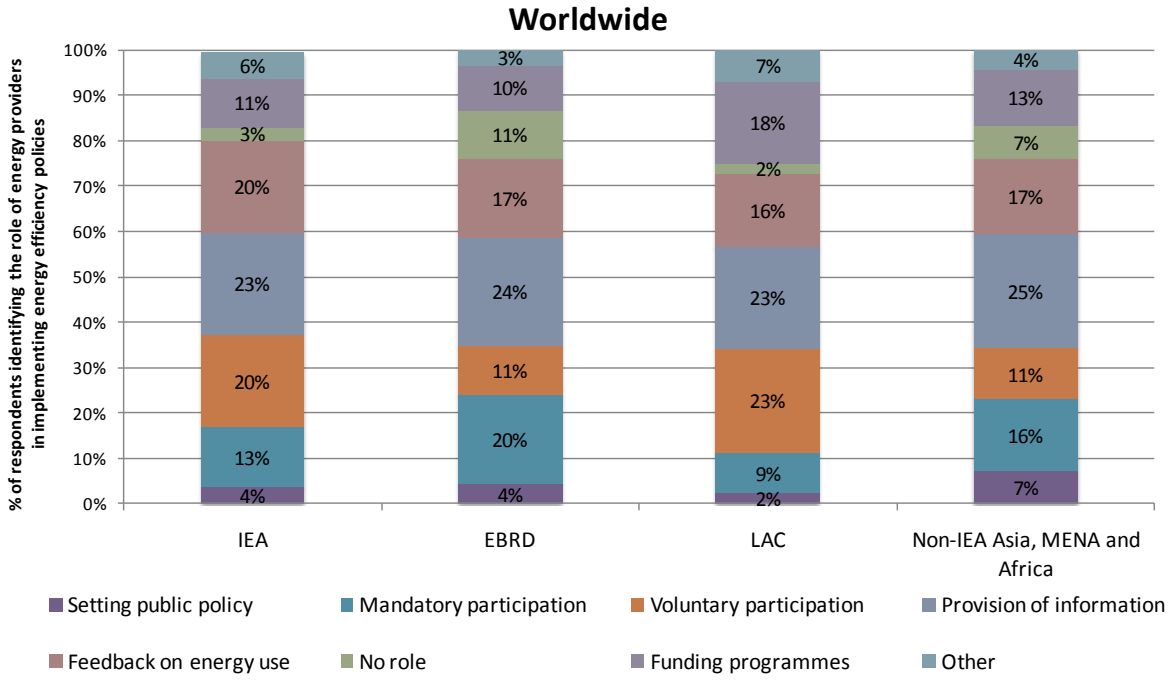
Findings and discussion

The institutional survey and the EE expert interviews, together with an extensive literature search, provided the basis for this discussion of energy providers as EE implementers. The institutional survey asked what role utilities play in promoting energy efficiency, while the interview template asked respondents which organisations were the most active in promoting energy efficiency in their country.

Most respondents indicated that utilities played some role in promoting energy efficiency in their country. The most frequently cited utility role was providing information on and promoting awareness of energy efficiency. The delivery of EE services, either voluntarily or under a regulatory mandate, was also important, particularly in IEA member countries and the Latin America and Caribbean (LAC) region (Figure **7**.**2**).

In many countries and federal states, gas and electric distributors or suppliers play key roles in implementing EE policies and programmes. This is true in Brazil, Canada, Chile, Costa Rica, South Africa, Thailand, the United States and the United Kingdom, among others. Countries in which utilities play a limited role, mainly providing information and promoting awareness, include Finland, Hungary, Indonesia, Ireland, Japan, Korea, Mexico, New Zealand, the Russian Federation, Singapore and Turkey. Several countries reported that energy providers play little or no role in EE promotion or implementation, including China, the Czech Republic, Egypt, Hungary and Tunisia.

Figure 7.2 **What role do energy providers play in promoting energy efficiency?**



Case studies from several countries reflect the considerable diversity in utility-implemented EE programme designs, as well as the variety of sector conditions, institutional and regulatory arrangements, and funding mechanisms. Brazil is a middle-income country with a long-standing, regulator-driven DSM programme that has proven quite effective, although mainly in niche markets where regulator and utility interests intersect. In Thailand, utility DSM programmes instituted through an international development assistance (IDA)

programme proved quite effective during the early days of Thailand's EE efforts. However, as EE implementation capacity increased, the role of the utility (Electricity Generating Authority of Thailand, or EGAT) diminished. South Africa provides an example of how an energy provider can sometimes be ill-suited to the role of EE implementer – and of finding an alternative solution. The State of Massachusetts in the United States is cited as a leading example of ratepayer-funded, energy provider-implemented efficiency programmes (Barbose, Goldman and Schlegel, 2009). In Canada, state-owned energy providers in the provinces of Ontario and British Columbia, among others, have been very effective in undertaking EE implementation. This is in large part due to effective institutional arrangements between government, energy provider and regulator. The United Kingdom provides an example of how unregulated retail energy suppliers may deliver energy efficiency savings, but only with careful oversight by a quasi-regulatory portfolio administrator.

Brazil

Brazil's energy providers have a long history of involvement in energy efficiency implementation. The National Programme for Electricity Conservation (PROCEL) was established under the state-owned generation and transmission utility Eletrobras in 1985. The regulator, *Agência Nacional de Energía Elétrica* (ANEEL), is responsible for supervising the production, transmission, distribution and commercialisation of electricity in Brazil, including EE programmes implemented by concessionaires. Privately owned distributors are the main implementers of demand-side programmes.[12] A 2000 law established Latin America's first-ever system public benefits charge (SPBC), set at 1% of utility revenue, and recently extended until 2015. PROCEL runs national programmes including appliance standards and labelling, industrial energy efficiency and public sector energy efficiency, while regulated electricity distribution companies implement additional efficiency programmes valued at between USD 150 to USD 200 million annually (Januzzi, 2004; Taylor *et al*., 2008). Utilities are given the discretion to target energy efficiency spending in areas that are beneficial from their business standpoint. Typical EE programmes include replacing refrigerators with high-efficiency models, audits of building and factory energy use, and installing load-limiting devices in over-loaded neighbourhoods. However, the majority of end-use investment has been dedicated to public lighting owned by municipalities, who pay lower rates than commercial customers (Taylor *et al*., 2008).

Regulation of utility EE programmes in Brazil includes an evaluation of cost-effectiveness and an approval process that accommodates multi-year programmes. However, ANEEL's regulatory framework has not yet addressed all of the disincentives hampering utility-led EE implementation, notably the impact of reduced sales. As a result, utilities are only willing to undertake EE programmes that serve other business objectives. Some utilities have seen business opportunities in their regulated EE programmes and have created their own unregulated energy services companies (ESCOs). Other utilities have used their EE programmes as part of a strategy to retain large and desirable industrial customers or minimise sales to subsidised and undesirable customers such as **municipalities** (Taylor *et al*., 2008).

The Brazilian example underlines the importance of the energy provider-regulator relationship in delivering EE programmes via energy providers. For-profit energy providers serve a wide variety of customers with different needs, and operate in a changing business environment with many pressures. In designing and targeting their EE activities, they will also seek business or competitive advantages. Although this can lead to win-win situations, such as investments in energy efficient municipal street lighting, it also results in unequal allocation of energy efficiency funding across customer segments. Part of the regulator's responsibility lies in ensuring that the EE portfolio is cost effective, equitable and responsive to public policy objectives. Such

[12] Major distributors include CEMIG and DME (Minas Gerais), ELETROPAULO, Bandeirante, CPFL and Elektro (São Paulo), LIGHT and CERJ (Rio de Janeiro).

considerations call for close co-operation and consultation between the energy provider and its regulator, as well as the energy provider and its customers.

Thailand

The Electricity Generating Authority of Thailand (EGAT) was one of the first organisations to implement energy efficiency in Thailand. Its familiarity throughout the country enabled EGAT's Demand-Side Management Office (DSMO) to develop and promote a voluntary, national scheme for appliance labelling.

Management of demand growth has been the driving force for EE policy in Thailand. DSM began in the late 1980s as part of a bid to reduce double-digit electricity demand growth. EGAT worked with the World Bank (WB) and the Global Environment Facility (GEF) to develop the Promotion of Electricity Energy Efficiency Project (PEEEP), a five-year USD 60 million effort focused on reducing peak demand by saving energy. The project included the creation of the DSMO within EGAT; the promotion of appliance labelling and minimum energy performance standards (MEPS); establishment of the first energy services companies (ESCOs) in Thailand; and the creation of other EE programmes (including energy efficient lighting for buildings and municipalities as well as high-efficiency motors for industry).

EGAT's PEEEP was highly successful in most regards. The voluntary appliance-labelling programme initially targeted household refrigerators, which constituted one-quarter of household energy use. This began a market-transformation process for household appliances that continues today. Because consumers looked for and preferred higher-efficiency products, Thai manufacturers have stopped making less-efficient refrigerators and other appliances (World Bank, 2006a).

A post-implementation assessment of PEEEP covering the period 1994 to 2004 estimated that EGAT's DSM programme resulted in the sale of 85 million high-efficiency fluorescent lamps, 5 million compact fluorescent lamps (CFLs), 12.4 million high-efficiency refrigerators and 2.8 million high-efficiency air conditioners (World Bank, 2006a). The project delivered reductions in energy and demand that were more than double its original targets.

Since the completion of the WB/GEF-funded PEEEP, responsibility for energy efficiency in Thailand has shifted away from EGAT and towards government-managed agencies, such as the Department of Alternative Energy Development and Efficiency (DAEDE) and the National Energy Policy Office. New revolving funds have been created to encourage banks to extend credit to building and factory owners, as well as to ESCOs, for financing of EE projects. Although EGAT continues to administer the appliance labelling programme, DAEDE implements the other EE policies and programmes, including awareness raising, import duty rebates for energy efficiency equipment, support for industry and building audits, and capacity building. The National Energy Policy Office (NEPO), in co-operation with EGAT, has developed MEPs for a range of household and commercial equipment types (efficient lighting, pumps and motors, electric cooking pots, etc.).

This trend suggests an important point to be considered when assigning EE implementation responsibility. The EGAT DSMO, through the donor-financed PEEEP, was the only organisation with the technical capacity, ready funding and consumer credibility needed to launch a mass-market EE programme in Thailand. The close of the PEEEP in 2000 reduced available funding at the same time as new energy efficiency entities emerged. EGAT now must seek programme funding from the government-operated Energy Conservation Fund (ENCON), which requires approval by DAEDE.

South Africa

South Africa is a developing country whose economy is driven by its energy-intensive resource extraction industries. Power production is heavily reliant on coal, with the result that South Africa is a leading global emitter of carbon dioxide (CO_2) on a per-capita basis. The South African government has recognised the importance of energy efficiency as part of its sustainable development strategy, and is developing new approaches to energy efficiency through a variety of implementers: energy agencies, municipalities, the national parastatal utility Electricity Supply Commission (Eskom), and others.

The National Electricity Regulator of South Africa (NERSA) is charged with ensuring sufficient installed generation capacity to meet electricity demand growth. In 2004, NERSA promulgated the Regulatory Policy on Energy Efficiency and Demand-Side Management for the South African Electricity Industry, which made energy efficiency and DSM one of the licensing conditions for all electricity distributors. It also established a DSM Fund to be administered by Eskom (the EE/DSM Fund), defined the roles of energy service companies, and created an accreditation system for independent monitoring and verification (M&V) organisations.

The EE/DSM Fund was a major funder of government-supported energy efficiency from 2004 to 2008. Municipal distribution companies, factory/industrial managers and third-party ESCOs could apply for subsidies of up to 50% to finance investments in energy efficiency. Eskom disbursed about ZAF[13] 200 million (USD 30 million) and procured about 100 MW of demand savings annually through the fund.

Administration of the EE/DSM Fund proved complicated. Eskom established the fund and recovered its costs through customer tariffs under NERSA oversight. Eskom also evaluated and approved EE/DSM projects submitted by ESCOs and direct-serve customers, including proposals from customers of municipal distributors. ESCOs would develop EE/DSM projects with customers and submit project proposals to Eskom or distributors, along with a letter of intent from the customer. A maintenance contract between the ESCO and the customer was a condition of project approval.

The EE/DSM fund quickly came under criticism as unwieldy and overly bureaucratic, with long approval periods and occasional refusal of project proposals. Eskom's DSM group applied the same engineering review standards as those used in power plant development projects, resulting in a cumbersome and painstaking review process. Project developers complained that project approval criteria were unclear and inconsistently applied, resulting in a lack of transparency for the entire process. Adding to the complexity were the use of separate and successive technical, financial and procurement reviews conducted by separate Eskom committees. Any issues brought up in the review process required the applicant to change and resubmit the proposal, with the review process starting all over again. Once approved, the project was subject to a contract negotiation process that introduced additional complexity, time and transaction costs.

Difficulties in administering the EE/DSM fund resulted in loss of stakeholder support for utility-led energy efficiency in South Africa. While ESCOs saw Eskom as a barrier rather than a facilitator of EE/DSM, Eskom maintained that the process constituted necessary due diligence to ensure ratepayer funds were spent judiciously. The one thing that Eskom, ESCOs and customers agreed on was that the goals of the EE/DSM fund were not being met (World Bank, 2010b).

In May 2008, NERSA refused an increase in the EE/DSM levy surcharge. At the same time, the National Treasury Department provided ZAF 2 billion (USD 290 million) of EE/DSM funding directly to the Department of Public Works, the National Energy Efficiency Agency (NEEA), and selected municipalities, to be managed by the Department of Energy. The government initiated a joint review of international best practice for DSM financing mechanisms.

[13] ISO currency code for South African Rand.

Based on this review, the Department of Energy issued a policy in May 2010, establishing the Standard Offer Programme (SOP) as the new model for disbursing EE/DSM incentives. The SOP will be financed from ratepayer funds collected by Eskom at a level to be approved by NERSA. The SOP will provide payments for verified savings based on the avoided costs of electricity supply. "Deemed Savings" for mass-market EE technologies, including solar water heaters, will reduce M&V costs. An approved product list will specify the types of technologies eligible for the SOP payments and the minimum requirements for each. Government-owned buildings, commercial buildings, existing housing, solar water heating and industrial EE projects will all be eligible for the SOP. The Development Bank of South Africa (DBSA) has been designated as the interim SOP administrator (World Bank, 2010b).

This brief account traces an important shift in perspective regarding institutional responsibility for EE/DSM implementation in South Africa. The SOP streamlines and simplifies the processing of project proposals, and a quasi-governmental body will eventually administer the programme. Eskom will have a reduced role, mostly as a collection agency for EE/DSM funds. NERSA will retain its role as an oversight agency, but under a new regime for setting the overall EE/DSM funding level. The funding level itself will derive from an integrated resource planning process.

The South African example is a useful case study for any country considering institutional arrangements and funding mechanisms for implementing energy efficiency. In South Africa, cumbersome administration on the part of Eskom prompted the regulator to relieve the energy provider of responsibility for the EE/DSM fund. The new policy calls for a non-utility funds administrator, and for a streamlined and simplified approach to processing project proposals and disbursing subsidies. The South African case also shows the importance of creating implementation arrangements that are transparent, predictable and credible.

Canada

Canada has a federal system of government with individual provinces largely responsible for setting gas and electricity efficiency policy. Several provinces, notably Ontario, British Columbia and Quebec, have large EE programmes operated by energy providers. Ratepayer-funded, utility-administered EE programmes accounted for almost USD 750 million in 2009, with funding expected to increase in 2010 (Barbose, Goldman and Schlegel, 2009; Nevius, Eldridge and Krouk, 2010). This section briefly describes provincial energy provider efficiency programmes in Ontario and British Columbia.

Ontario

The Ontario Power Authority (OPA) was established in 2004 as an independent, non-profit corporation licensed by the provincial regulator, the Ontario Energy Board (OEB). The OPA was established as part of an overall provincial power sector restructuring, and is responsible for developing an integrated power system plan and procurement process that ensures adequate and balanced electricity supply in the province. It is accountable to the provincial legislature, through the provincial Ministry of Energy.

Energy efficiency implementation is guided by the provincial power development plan, which sets a target of 6 300 MW of cost-effective energy efficiency (out of a total resource acquisition target of 30 000 MW) for the next 20 years.[14] OPA receives additional guidance on EE portfolio requirements from the provincial regulator and energy agency. A Conservation Bureau was created within OPA, headed by a Chief Energy Conservation Officer, to provide leadership in planning and co-ordination of electricity conservation and demand management. Energy efficiency spending of USD 250 million in 2009 was financed through rates.

[14] The renewable energy target is even larger: 15 700 MW by 2025.

Successive ministers have overlaid additional portfolio requirements on OPA, including low-income and municipal programmes, which are not strictly least-cost and resource-based. Ratepayer funding comes from a Global Adjustment Mechanism, created by the regulator, which allows OPA to procure "any resource" at the prevailing cost and then socialise the costs across all customers and sales.

Under recently enacted provincial legislation (the Green Energy Act), responsibility for implementing energy efficiency has been devolved to local distribution companies (LDCs), that have been given compulsory EE targets. OPA is now developing a suite of provincial programmes that will be available for all customer classes, but branded by each individual LDC. There is also built-in flexibility for LDCs to develop their own localised programmes. These programmes will be assisted by OPA under the oversight of the provincial regulator OEB.

British Columbia

British Columbia has set an ambitious electricity conservation target: meeting 50% of BC Hydro's incremental resource needs in 2020 through energy efficiency. Achieving this goal will require 10 000 GWh of forecast electricity needs to be met through demand reduction measures, including energy efficiency, conservation, load displacement and fuel switching. Half of the electricity savings will come from BC Hydro's long-standing and branded Power Smart programmes, with 30% coming from government codes and standards, and the remainder from conservation rate structures. Other utility activities include increasing public awareness, providing education and information on energy efficient technologies and conservation actions, engaging with communities and municipal leaders to include energy efficiency in their plans, and investing in the promotion of innovative technologies to reduce electricity consumption (BC Hydro, 2008).

Summary

The Canadian approach to utility DSM illustrates the value of anchoring energy efficiency programmes in long-term resource planning. Although this works quite well, it creates considerable organisational and co-ordination overhead. The regulator, government ministry and energy provider must develop procedures and protocols for evaluating the resource impacts of programmes, setting programme budgets, ensuring cost-recovery in rates, performing *ex ante* cost-effectiveness analysis of programmes, promulgating portfolio requirements on providers, and establishing measurement and verification protocols. Both the OPA and BC Hydro DSM programmes have specific time-bound targets that are allocated to customer segments, and programme designs based on estimated market potential. The Canadian experience also shows that funding energy efficiency through rates can be as effective as a system public benefit charge (SPBC), as long as regulatory and public support remains constant.

United Kingdom

The Carbon Emissions Reduction Target (CERT) is the UK government's main energy efficiency instrument for the households sector. The Department of Environment and Climate Change (DECC) is responsible for the policy, while the regulator (Ofgem), with assistance from the Energy Saving Trust (EST), administers the programme. CERT places a three-year obligation on competitive retail energy suppliers to deliver carbon savings. Suppliers meet their targets by financially supporting delivery of a variety of energy-saving measures to their customers (Table **7.1**).

Table 7.1 **Physical results of CERT programme for the first two years**

	Type	No
Insulation	Cavity wall	1 121 317
	Loft insulation (excluding DIY)	1 390 230
	Solid wall insulation	29 340
Heating	Fuel switching	37 282
Lighting	Compact fluorescent lamps	232 827 748
Micro-generation	Heat pumps (ground source)	2 094
	Solar water heating (m^2)	468
	Small-scale combined heat and power	1

Note: DIY = Do-It-Yourself.
Source: DECC, 2010.

Using obligations to require competitive retail energy suppliers to deliver energy efficiency measures for their customers should be an effective arrangement. Through their billing and metering processes, energy suppliers are well-placed to inform consumers about energy-savings opportunities and to offer a menu of EE goods and services. Suppliers can mitigate the perceived risks of energy efficiency investments through information and their own commercial credibility. Suppliers can address the first-cost hurdle of EE investments through partial subsidies or financing, and by passing along the economies of scale of a programmatic approach. Including a portfolio requirement allows a balance to be struck between a strictly least-cost approach to meeting the CERT and achievement of other public policy objectives (*e.g.* reducing fuel poverty).

Overall, the CERT programme is progressing well. As of November 2010, the programme has achieved 86% of its CERT target. Based on these results the programme and CERT targets were amended and extended on a pro-rata basis to end-December 2012. New sub-programmes include an Insulation Obligation and a Super Priority Group (SPG) Obligation designed to provide additional EE measures for targeted groups including low-income and vulnerable groups.

One of the areas in which the CERT was amended concerned the distribution of CFL products to households. Mid-way through the first two years of the CERT, concerns emerged regarding how the lighting portion of the portfolio was being addressed. Over 230 million CFLs (Table **7.1**) were distributed, most of them by direct mail, compared to about 2.5 million homes insulated. This works out to about 9 CFLs for each household in the United Kingdom. DECC expressed their concern about over-reliance on this distribution approach in a consultancy report:

> We are concerned that the number of bulbs already directly distributed in CERT has been so high – reaching an average of 8 per household. This is equivalent to the number of highest use light fittings in a house (estimated at 8-10). Four direct mail bulbs per customer was the notional ceiling envisaged by Government as a fair distribution. We also understand that some households have received more than an average number. As such, there is an increasing risk to carbon savings under the scheme where lamps are not used, are installed on low use light fittings, or replace existing CFLs (DECC, 2009).

The UK experience with CERT illustrates the challenge of achieving a balanced portfolio of EE measures through implementers subject to competitive business pressures. If required by a portfolio standard, energy suppliers will deliver the specified carbon savings for a specified target group, even if the unit cost is higher. However, this creates an understandable incentive for the supplier to develop lower-cost EE measures for other groups, to avoid passing on programme costs to customers. As in the UK example, the solution is increased specification of the portfolio standards imposed on suppliers and increased evaluation protocols to identify potential problems on the part of the regulator.

Massachusetts, United States

Massachusetts is a New England state with a long history of utilising energy providers as EE implementers. These programmes were proposed by utilities and approved by regulators, with programme costs included in rates. In 1995, the Electric Utility Restructuring Act established the Department of Energy and Resources (DER) as the overseer of energy efficiency, and established a system public benefit charge (SPBC) as an alternative to funding through rate cases. DER was responsible for planning the efficiency programmes and allocating SPBC revenues to energy providers and other institutions. The Department of Public Utilities (DPU) was responsible for regulatory oversight – checking programme results, ensuring cost-effectiveness and approving shareholder incentive claims from investor-owned utilities. The SPBC was capped at USD 0.25/kW, a level insufficient to meet programme demand.

In 2008, the Green Communities Act (GCA) was passed, which required EE programme administrators (*e.g.* gas and electric utilities) to pursue "all cost-effective energy efficiency." It also removed the cap on the SPBC in order to fund scaled-up programmes. During the legislative approval process, the possibility of assigning EE programme implementation responsibility to entities other than energy utilities was considered but ultimately discarded. The credibility of Massachusetts' energy providers as EE implementers convinced legislators to continue this arrangement.

The GCA also established an Energy Efficiency Advisory Council (EEAC) to act as a statutory stakeholder group. This Council has representation from consumer, environmental and industry groups, plus the state attorney general. Efficiency programmes are proposed by utilities and reviewed by the EEAC before they go to the regulator for approval, thus streamlining the approval process. Companies prepare three-year plans in accordance with portfolio guidelines, thereby ensuring that EE measures are available for each customer segment. This also supports efficient regulatory treatment as guaranteed by law.[15] Performance-based incentives for energy provider shareholders were carried forward.

To prepare the energy efficiency programmes, it was necessary to determine what the legislature meant by "implement all cost-effective energy efficiency". The EEAC analysed cost-effective EE potential and set a kWh reduction target of 2.4% for 2012. Reaching this target will require tripling energy efficiency expenditures – from USD 25 per capita (/cap) in 2008 to USD 75/cap in 2011 – and will result in negative energy demand growth over the period.

The GCA also streamlined how energy providers work together. Energy providers formed sector-based working groups in order to identify best practice programme design. They also agreed that core EE programmes by customer segment should be uniform, even when run by different providers. Evaluation approaches were harmonised to permit cost-savings through state-wide evaluation for each EE programme. Gas and electric efficiency programmes were combined, and programmes that encouraged uneconomical fuel switching were eliminated.

[15]The initial three-year plans were filed in October 2009, approved in January 2010, and are now being implemented.

Finally, the state regulator issued an order creating a regulatory procedure that protected gas and electric utilities from revenue erosion. These utilities now file rate plans that separate the revenue collected from the electricity or gas sales they need to cover their operating costs plus profit; *e.g.* the revenue requirement is "decoupled" from electricity sales. Utilities will be able to file annually for rate adjustments to offset base revenues that decline along with sales.

The Massachusetts model includes most of the governance elements considered important for energy provider-implemented EE programmes (Box 7.2), including:

- Sufficient EE funding to reach the overall target.
- Institutional arrangements to remove the risk of lower sales, programme cost non-recovery and adverse regulatory treatment through automatic mechanisms.
- Appropriate incentives to motivate utilities to deliver energy efficiency through a performance-based shareholder scheme.
- Harmonisation and standardisation to align with other government-sponsored programmes, and to eliminate multiple programme offerings.
- A statutory stakeholder engagement process that provides a forum for consensus building on future energy efficiency programmes.
- *Ex ante* cost-effectiveness evaluation mechanism that ensures programmes are economical, as well as *post ante* evaluations that are co-ordinated to reduce the drain of evaluation on programme budgets.
- Effective programme design that can deliver real resource value, which in turn is linked to specific resource targets.

Box 7.2 **Highlights of the Massachusetts energy efficiency governance model**

- Well-defined targets (implementation of all cost-effective EE)
- Flexible spending cap to deliver adequate funding
- Streamlined regulatory approvals
- Energy provider protection from sales erosion
- Multi-year programme cycle
- Consolidated gas and electricity measures
- Motivation for investor-owned utilities to implement EE
- Built-in stakeholder engagement process
- Economical approach to evaluation
- Standardisation of EE measures and offers

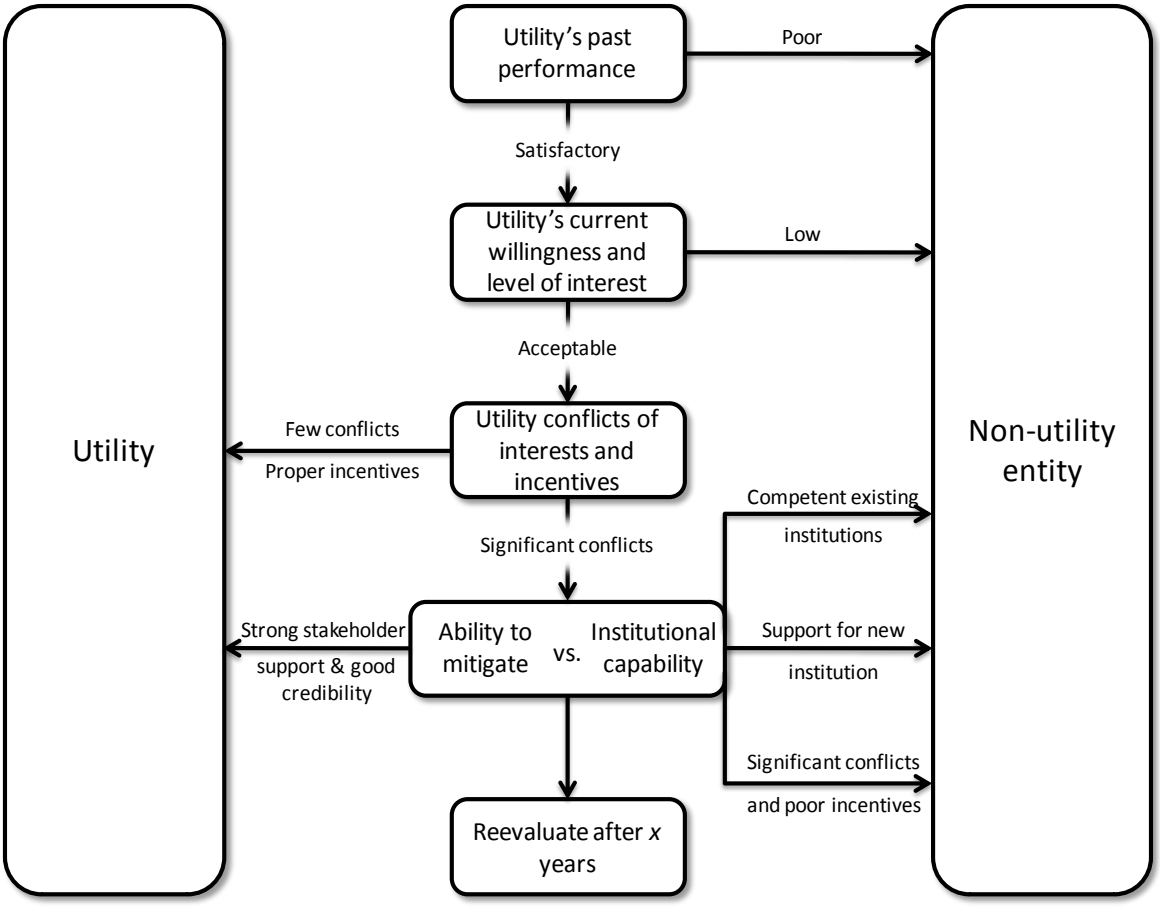
Conclusions and guidelines

Case studies, survey and interview results, and literature reviews suggest procedures for evaluating whether energy providers can effectively implement energy efficiency and how they can be harnessed to the task. These guidelines are not universal and should always be adapted according to country context, sector conditions and market structure.

Decide whether energy providers should implement energy efficiency. Selecting an energy efficiency implementer should take into account the historical development of the energy sector, relationships among stakeholders, institutional credibility, market conditions and the regulatory regime. The organisational culture of energy providers in some jurisdictions (*e.g.* Massachusetts, California, British Columbia) supports energy efficiency, resulting in high credibility and outside political support. In other jurisdictions (*e.g.* South Africa, Oregon, and New York), uneven performance by energy providers has resulted in EE implementation responsibility being assigned to other entities. In other countries (*e.g.* Tunisia, Ukraine and Vietnam), the energy provider may not have sufficient capacity or interest to take on an EE implementation role.

Criteria for evaluating whether an energy provider is a viable candidate for implementing EE programmes should include: (i) past performance; (ii) willingness and interest in energy efficiency; (iii) real or perceived conflicts of interest; (iv) management and shareholder incentive structure; (v) compatibility with EE policy goals; (vi) institutional capacity; (vii) credibility with stakeholders, policy makers and consumers; and (viii) difficulty or potential cost associated with creating the necessary enabling conditions (Figure **7.3**).

Figure 7.3 **Should utilities administer energy efficiency programmes?**



Source: Eto, Goldman and Kito, 1996.

The logical framework for deciding whether energy providers should be energy efficiency implementers (Figure **7.3**) closely reflects the evidence obtained from interviews. Jurisdictions in which energy providers have retained a central role in delivering energy efficiency were those in which:

- stakeholders were satisfied with the energy provider's past performance in delivering energy efficiency;
- senior managers were seen as engaged in EE policy development and supportive of objectives for energy efficiency; and
- stakeholders, policy makers and consumers did not perceive a conflict of interest.

Use a resource value approach to implement EE programmes. Energy providers are in the business of delivering gas and electricity in response to consumer demand. A well-managed energy provider will be adept at forecasting demand and procuring the infrastructure and resources necessary to satisfy it. This commitment to balancing supply and demand means that energy providers focus on energy efficiency programmes that have resource value. Although energy providers can and do undertake promotional and information activities, they generally have little distinctive competence in this area. Many of the most successful energy provider-implemented EE programmes are tied to a resource plan, particularly in Canada and the United States. Treating energy efficiency as equivalent to a supply-side resource within the context of a power development plan also makes it much easier to gauge cost-effectiveness, evaluate results and justify programmes.

Establish the necessary enabling conditions. Energy providers must be enabled to implement energy efficiency. An important aspect of this is mitigating their exposure to the risks of promoting energy efficiency, including non-recovery of programme costs and lost revenues and profits. Even when these disincentives are removed, many utility managers still lack the motivation to actively pursue energy efficiency. Some policy makers advocate motivating utility managers to implement EE programmes through financial incentives. Such incentives can make energy efficiency a priority for shareholders and managers, and have been extensively used in the United States, usually in conjunction with a performance-based ratemaking approach. Utilities are required to deliver on their energy targets or face penalties, while superior performance earns incentives for shareholders or management (US EPA, 2007c).

Other policy makers consider that paying financial incentives is too costly, and energy efficiency should rather be an obligation applied uniformly across all energy providers. This is the case with the UK CERT programme. However, an obligation approach in a competitive retail market creates incentives for energy suppliers to seek the lowest-cost EE measures (*e.g.* cream-skimming), rather than those with the largest, long-term savings and impacts.

The best combination of incentives and obligations will depend on the country context. In any situation, the goal should be to find a practical and not-too-costly approach to mobilising energy providers to implement energy efficiency.

Prefer energy distributors over network companies or energy producers. Energy distributors are generally in a better position to implement energy efficiency than network companies or energy producers. Downstream energy providers directly serve end-use customers, and have the advantage of a commercial relationship plus extensive data on consumption, appliance holdings and demographics. Such access to customer data is the main source of competitive advantage for energy providers. Downstream energy providers are also better positioned to mobilise trade allies, co-operate with local communities, complement energy efficiency delivery with awareness-building and other non-resource-based EE activities, and provide co-financing or on-bill repayment.

Prefer simplicity over complexity in procedures. Developing economical and effective EE programmes for implementation by energy providers is not easy. Creating the oversight arrangements described above adds additional complexity and increases overhead costs. It is important to avoid unnecessary complexity, overlap or duplication whenever possible. Rules and procedures should be appropriate to the nature of the

programmes. For example, a deemed savings approach for evaluating mass-market programmes (such as domestic solar water heating) simplifies programme review and saves on evaluation costs.

The South African case study shows that overly complex procedures can stifle EE implementation and ultimately affect credibility if led by an energy provider. Improving administrative mechanisms through approaches such as the standard offer programme (SOP) model can be as important as finding the right EE implementer.

Balance commercial acumen with a portfolio framework. Energy providers have advantages and competencies that can make them effective EE implementers. They should be given discretion to develop measures and programme designs that reflect their understanding of customers and markets. However, programme development should take place within a portfolio framework that ensures that all customer segments have access to cost-effective EE programmes.

Establish strong oversight arrangements to guarantee results. Energy providers need strong arrangements for oversight by regulators or government agencies. These oversight arrangements add to the cost of programmes, but are important in ensuring that programmes serve energy policy objectives and are working as designed. An energy provider-led efficiency programme should include the following components:

- a formal programme plan prepared by the energy provider in accordance with portfolio and other criteria, and subject to the approval of the oversight agency;
- *ex ante* determination of cost-effectiveness for all proposed measures;
- an *ex post* mechanism to measure and verify results;
- regular programme results reporting, including costs, impacts and cost-effectiveness; and
- opportunities for stakeholders to comment on programme plans and results.

Apportion oversight and regulatory responsibilities carefully. A well-developed governance system for energy provider-led EE implementation entails many "moving parts" that need to work together. Developing effective institutional arrangements for the energy sector – including sector-wide policies, power system planning, gas and electric ratemaking, permitting and licensing, market operations, and EE programme delivery – can take years and often much trial and error. In assigning these responsibilities, decision makers should consider the capacity and resources of existing institutions. In some cases, they may need to create new institutions. It may also be important to assign appropriate responsibilities to different institutions. For example, a regulator may not be the most appropriate entity to prepare an integrated resource plan and an energy ministry working in conjunction with energy providers may be more effective. A regulator, however, is in the best position to establish SPBCs or other mechanisms for ratepayer funding, and to trade-off issues of rate impacts vs. funding needs. Some tasks are best done collaboratively, such as establishing portfolio standards or allocating funding by customer segment. Entirely new institutions or administrators may be needed to take on other responsibilities, such as evaluation.

Consider system public benefit charges as an EE funding mechanism. As discussed in Chapter 4, SPBCs are an effective way of providing steady and reliable funding for EE programmes. The SPBC mechanism can be adjusted as needed to fund scaled-up energy efficiency efforts, or to meet overall resource or greenhouse-gas (GHG) emission-reduction targets. The funds can be targeted on specific activities or customer segments in response to EE policies and stakeholder needs. Utilities or energy providers can collect and disburse the funds under regulatory oversight, or act merely as collection agencies, with a third-party administrator responsible for disbursement to one or more programme implementers. The close connection between funding source and programme design can be used to fine-tune EE spending to suit the demand for programmes on a sectoral basis. This makes it more difficult for customers to argue that they are being disadvantaged by higher rates due to the SPBC.

8. Stakeholder engagement

Introduction

Stakeholders increasingly expect to be engaged in the development of new government policy initiatives. This expectation is part of a trend towards more active citizen participation in decision making. The desire for more stakeholder engagement and citizen participation in environmental and energy policy making has been expressed in the Rio Declaration of 1992, the 5th Programme on the Environment launched by the European Commission in 1993, and the Aarhus Convention of 1998. As a result, public officials expect and feel obliged to engage stakeholders as a normal part of the policy development process (O'Connor, 2010).

Stakeholders contribute to policy development by calling attention to issues needing consideration by governments, by commenting on policy proposals, and by assisting in policy implementation. But what is the rationale for including stakeholders in the policy development and implementation process, and how does stakeholder participation contribute to good energy efficiency (EE) governance? This chapter draws on a number of case studies, as well as evidence from the institutional survey and interviews, to explore the role of stakeholder engagement in EE governance.

Key issues and research questions

- Why is stakeholder engagement important?
- Does stakeholder engagement contribute to successful energy efficiency policy outcomes?
- What can be learned from experiences with stakeholder engagement?
- How does stakeholder engagement fit into the overall EE governance framework?

Importance

Engaging relevant stakeholders in EE policy development and implementation adds value in several ways. Complexities in the energy sector, the impact of energy policies on many stakeholders, and the considerable barriers to scaling-up energy efficiency all make developing EE policy a challenging task. Experts on stakeholder engagement argue that such complex, multi-attribute issues require the consideration of diverse perspectives and viewpoints (Santos *et al.*, 2006). Stakeholder participation is one way to capture this diversity in policy development, with the view that more responsive and effective solutions will be the result.

Implementation of EE policies requires the co-operation of many institutions and organizations, all of whom are *de facto* stakeholders. Engaging with these stakeholders during policy development is an important way to build consensus. Public input and stakeholder feedback are also essential components of the lesson-learning process. Broad stakeholder engagement helps ensure that EE policy development benefits from past experience.

Participatory processes such as stakeholder engagement have associated costs and risks, which should not be ignored. Stakeholder engagement is time-consuming and expensive, and there is no guarantee that it will result in increased trust, political consensus or better policies. Open participation processes run the risk of being dominated by one or more interest groups.

On balance there is a strong case for stakeholder participation, despite some disadvantages and risks (Table **8.1**).

Table 8.1 **Benefits and disadvantages of citizen participation in decision making**

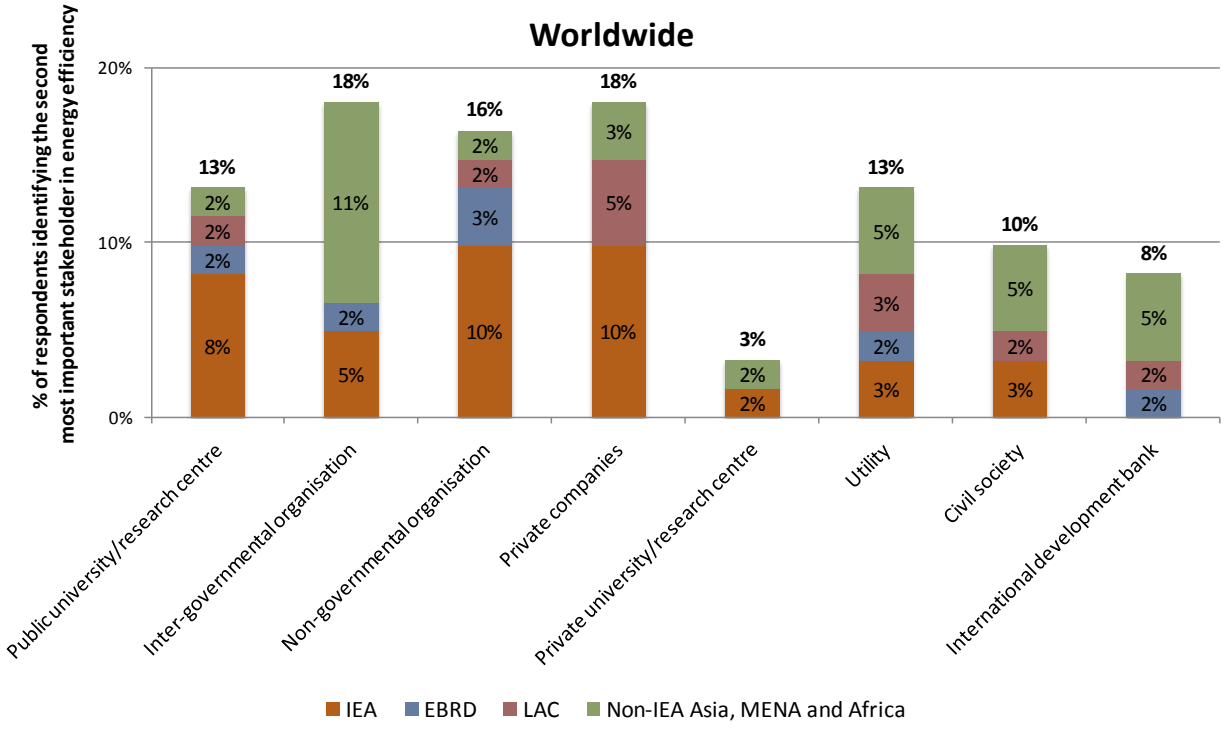
	Benefits of stakeholder participation	
	For stakeholder participants	***For government***
Decision process	Inform government of diverse opinions Learn from government	Learn from diversity of opinions and inform stakeholders
	Build strategic alliance with government	Build strategic alliances with key implementers
	Persuade and enlighten government Create ownership of decisions	Persuade stakeholders; build trust/reduce anxiety Gain legitimacy of decisions
	Educate government on lessons/past experience	Learn from past experience of stakeholders and address misperceptions
Outcomes	Break gridlock; achieve outcomes	Break gridlock; achieve outcomes
	Gain influence over policy processes	Avoid litigation costs
		Better policy and implementation decisions
	Risks/disadvantages of stakeholder participation	
	For stakeholder participants	***For government***
Decision process	Time-consuming	Time-consuming; costly
	Pointless if advice is ignored	May backfire; could create more hostility
	Less legitimacy to oppose unwanted decisions	
Outcomes	Risk of legitimising a decision heavily influenced by opposing interest groups	Loss of decision-making control
		Possibility of bad decisions that are politically impossible to avoid

Source: adapted from Irvin and Stansbury, 2004.

Findings and discussion

Survey respondents were asked which stakeholders should be involved in EE policy development to promote successful policy outcomes. Almost all respondents selected government as the single most important stakeholder in establishing EE policies, followed by private companies, inter-governmental organisations and non-governmental organisations (NGOs) (Figure **8.1**).

Figure 8.1 **Ranking of non-governmental stakeholder importance***

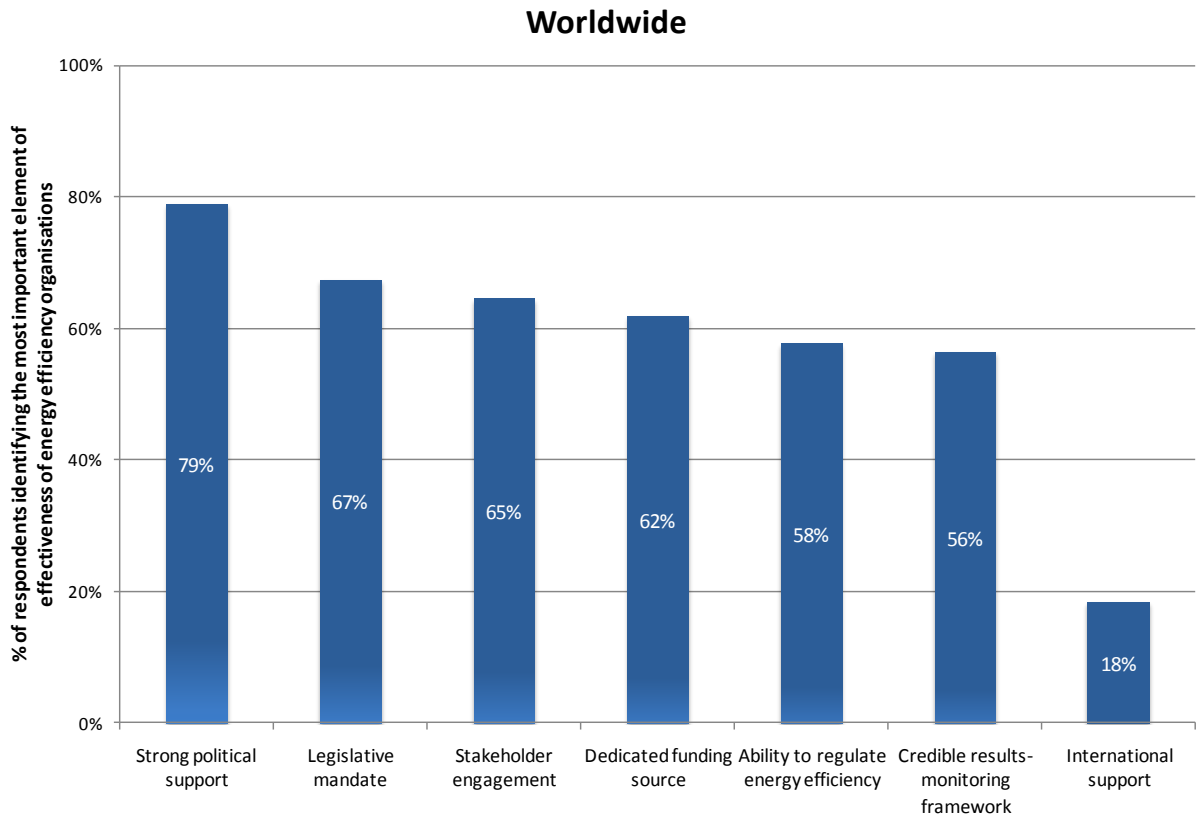


*Note: The graph represents the second-most important stakeholder (after government) chosen by the respondents (reflecting responses of 106 out of 178, or 60% of the respondents). Responses are grouped by region with EBRD being client countries of the European Bank for Reconstruction and Development and MENA being the Middle East and North Africa.

Survey results also indicated that respondents considered "on-going engagement with energy efficiency stakeholders" as one of the top three essential elements for institutional effectiveness (Figure **8.2**), more important than a dedicated funding source or regulatory authority.

Interviews with EE experts provided additional evidence of the important role that stakeholder engagement plays in ensuring commitment and support. Many countries have used consultation extensively in their EE strategy and policy development process. Australia's *National Framework for Energy Efficiency* states that stakeholder consultation is an essential and ongoing part of the development of the country's EE framework. While developing the *Framework,* the Council of Australian Government (COAG) consulted stakeholders via workshops and meetings, and the outcomes of these consultations were compiled in a Stakeholder Consultation Report (COAG, 2009). The US *National Action Plan for Energy Efficiency,* focusing mainly on utility activity, involves significant collaboration between national and state governments, and extensive stakeholder consultation (utilities, regulators, state officials, consumers). Chile's *Programa País de Eficiencia Energética (PPEE)* uses public-private advisory committees for the implementation of regional projects (APEC, 2009a).

Figure 8.2 **Success factors of effectiveness of energy efficiency organisations**



This section draws on five case studies (New Zealand, the State of Massachusetts in the United States, Sweden, Japan and India) to explore how stakeholder engagement contributes to EE policy development. The first two case studies (New Zealand and Massachusetts) illustrate the value of embedding stakeholder participation requirements into law. Sweden provides an example where an *ad hoc* expert engagement process was effective. The Japanese case study provides an example of how ongoing stakeholder engagement can be achieved without a legislative requirement. The India case study presents an example of focused stakeholder engagement centred on a specific EE policy mechanism.

Energy Efficiency and Conservation Act, New Zealand

The Energy Efficiency and Conservation Act (EECA) governs EE policy development in New Zealand. The Act requires the government to engage stakeholders in a quinquennial National Energy Efficiency and Conservation Strategy (NEECS) development process. Public consultation is used extensively in New Zealand policy development, and legislation commonly incorporates such requirements.

Embedding stakeholder engagement in legislation should in principle yield a high degree of public engagement. In the case of the EECA the legislation included detail as to how stakeholder engagement would be conducted, including specific stakeholders to be engaged (industry and commerce, environmental and community organisations, Maori organisations, local authorities and the Parliamentary Commissioner for the Environment). Such an approach is useful in ensuring important constituencies are consulted, but

may lessen the motivation to seek out the full array of potential stakeholders. The New Zealand approach relies on the relevant government institutions to undertake an effective engagement process. Results to date suggest this is largely the case. During the last two NEECS policy development cycles, the government received and reviewed 335 (2001) and 188 (2007) comments - a reasonably high degree of engagement for a small country.

One danger of embedded public consultation is "consultation fatigue", creating a reluctance to participate among some stakeholders. Moreover, some stakeholders may simply not have the resources to participate in the policy process. A further word of warning was expressed in the interviews: according to one interviewee, the fact that public participation is written into law is no guarantee that the government will deliver an effective strategy. The quality of the NEECS depends on many factors, including policy development capacity within the government and the level of commitment of implementing agencies.

Overall, the New Zealand case study provides a good model for establishing public participation as a core element of EE policy development and implementation. The central element of the New Zealand statutory public participation model is to embed consultation requirements into law, and provide detailed procedures for the process.

Massachusetts Energy Efficiency Advisory Council, United States

The State of Massachusetts in the United States has enacted a formal process for stakeholder participation in energy efficiency policy and programme development. In 2008, the State Governor signed into law the Green Communities Act (GCA), a comprehensive energy reform law. The Act created an Energy Efficiency Advisory Council (EEAC), a representative body which provides the primary conduit for ongoing stakeholder engagement on EE policies and programmes.

The purpose of the EEAC is to "seek to maximise net economic benefits through energy efficiency and load management resources and to achieve energy, capacity, climate, and environmental goals through a sustained and integrated state-wide energy efficiency effort".[16] The EEAC must approve electric and natural gas efficiency investment plans submitted by energy supply companies.

The EEAC consists of 11 members appointed by the Department of Energy Resources (DoER). The Act specifies that the membership should include one person representing each of the following: (i) residential consumers; (ii) the low-income weatherisation and fuel assistance programme network; (iii) the environmental community; (iv) businesses, including large commercial and industrial end-users; (v) the manufacturing industry; (vi) energy efficiency experts; (vii) organised labour; (viii) the Department of Environmental Protection; (ix) the Attorney General; (x) the executive office of housing and economic development; and (xi) the department of energy resources. The EEAC also has one non-voting, ex-officio member from each of the electric and natural gas distribution companies, one from each of the approved municipal aggregators, one from the heating oil industry and one from energy efficiency businesses. The EEAC is chaired by the Commissioner of the DoER

The by-law specifies a five-year term for council membership, regular monthly meetings, and rules for taking decisions (by consensus or majority vote).

[16] Article 1 of the By-Laws for the organization and operation of the Energy Efficiency Advisory Council as authorized by The Green Communities Act of 2008, see http://www.ma-eeac.org/docs/090224-By-Laws.pdf.

Although limited by statute to 11 appointed members, the EEAC encourages broader public access to the Council and its business. The EEAC has established a website (www.ma-eeac.org), which includes contact information and meeting agendas.

The EEAC provides a model of stakeholder engagement through a standing committee with broad stakeholder representation. Under this arrangement, stakeholders wield real authority, as they are empowered to review and approve the EE plans of energy suppliers before they are considered by the regulator.

Energy Improvement Commission, Sweden

Under the EC Energy Services Directive (2006/32/EC), issued in 2006, each EU member country was required to submit National Energy Efficiency Action Plans (NEEAPs) which met certain EU-wide criteria. In a two-year process from 2006 through 2008 Sweden undertook intensive stakeholder engagement in developing its NEEAP. The government created a secretarial-level special panel to make inquiries and develop EE policy proposals. A committee of 25 experts, including economists, local government representatives, energy-sector experts and business associations, assisted the special panel, called the National Inquiry on Energy Efficiency (NIEE). The NIEE presented their final report in November 2008 (Government of Sweden, 2008).

The Swedish NIEE provides a good example of how to engage experts in the EE policy process. The NIEE had a clear mandate and a high degree of political support, and was able to attract the highest calibre of experts. Engagement with a limited number of highly skilled experts representative of important constituencies meant that the process was relatively efficient with results reflective of practical experience.

However, such a process has a number of risks. Choosing panel members is critical. Some interviewees considered that the panel lacked sufficient transport and industry experts, and that consequently "transport and industry are poorly represented in the overall report of the panel".

The issue of membership is particularly important because it can lead to the process being captured by special interest groups. According to interviews, this was a risk early in the process, particularly as panel members were "tempted to push their own agenda". However, strong leadership by the NIEE co-chairs reduced this risk. At one point during deliberations, these governmental co-chairs instructed the panel members to think beyond their own sectoral interests.

Overall, the NIEE in Sweden provides a good example of how to run a focused EE policy development process that engages with a limited number of highly skilled experts.

Committee for Energy Efficiency, Japan

The Japan case study illustrates an ongoing expert engagement process. When considering energy efficiency policies and legislation, Japan convenes the Committee for Energy Efficiency (CEE). The CEE is a sub-committee of the Advisory Committee for Natural Resources and Energy (ACNRE), and consists of representatives from industry, academia and consumer organisations. These representative experts provide perspectives and input on the EE policy proposals. The CEE can mobilise additional expertise by forming technical sub-committees (*e.g.* Top Runner standards for refrigerators).

The CEE meets on an *ad hoc* basis to consider EE policy issues (*e.g.,* changes in regulations or the need for new policies). This process allows representatives from industry, academia and civil society to provide input and modify policy as deemed necessary. Participants report that the CEE has led to better understanding and implementation of the country's EE regulations.

Energy Conservation Building Code, India

The development of India's Energy Conservation Building Code (ECBC) is an excellent example of stakeholder participation focused on a specific EE policy. The ECBC was created by the Bureau of Energy Efficiency (BEE), the national EE implementing agency established by the Energy Conservation Act (ECA). The ECA requires the central government to develop and promulgate energy conservation building codes and to require building owners and occupiers to comply with them. To implement this regulation the BEE established a stakeholder consultation process, led by an Expert Committee which guided the development of the ECBC. The committee comprised representatives of 28 organisations including architects, engineers, equipment manufacturers and suppliers, developers and other building industry professionals, as well as government officials, NGOs and academics (BEE, 2006). The ECBC applies to new commercial buildings and includes specifications for building envelopes, lighting, HVAC, solar water heating and pumping, and electrical systems. The Expert Committee continues to be at the disposal of the BEE in implementing and refining the ECBC.

Conclusions and guidelines

These case studies provide useful insights and practical suggestions for governments considering their strategy for engaging stakeholders on EE policy development. No single approach will apply everywhere; rather, an engagement strategy should reflect the policy context, institutional relationships, and engagement objectives. Governments must also consider how to balance the benefits of increased participation with the additional costs and occasional risks that accompany broader participation in policy development.

Based on the case studies, the EE governance survey and the subsequent interviews, it is possible to describe several guidelines for successful stakeholder engagement.

Determine breadth of stakeholder engagement

Engagement in EE policy development should ideally be open to all interested stakeholders so that governments can capture the benefits of broad participation. As one interview respondent said, "a multi-stakeholder process is necessary for delivering high-quality energy efficiency policy". However, full inclusiveness is time-consuming, expensive, and comes with additional risks. There are most likely diminishing returns with ever-broader invitations to participate. Moreover, not all stakeholders may be equally affected.

Given these considerations, it is sometimes more efficient to rely on limited panels of expert stakeholders (*e.g*. Sweden and Japan) rather than open participation by all of civil society. The success of this approach turns on which stakeholders to include. All the case studies above suggest that stakeholder composition varies according to country and EE policy context. New Zealand stipulates that representatives of the indigenous culture should be consulted, while Massachusetts includes representatives of the low-income weatherisation project.

Despite these differences in country context, certain stakeholders appear with regularity in all the case studies. These include key government departments (*e.g.,* transport, economic development, finance, energy and natural resources), residential consumer groups, industrial, manufacturing and business groups, environmental organisations, community and low-income groups, local authorities, and energy efficiency experts. This or a similar short list of stakeholders is likely to apply in most countries.

The evidence from this study underscores the need for strong leadership in the EE policy development process, especially in giving direction to the stakeholder engagement process. This becomes more important if the stakeholders engaged are not broadly representative of society. A good example is the Swedish experience, where the co-chairs needed to "encourage" the appointed experts to think beyond their special interest group. Similarly in Massachusetts, the chair of the EEAC plays an important role in ensuring that appointed representatives are open-minded and willing to work co-operatively with other stakeholders.

Consider making stakeholder engagement a legal requirement

Two case studies (New Zealand and Massachusetts) demonstrate how stakeholder engagement can be integrated into the EE legal framework. This is beneficial, as it helps ensure that the government engages stakeholders on all policy decisions, even potentially sensitive issues. It also provides clear expectations to stakeholders in terms of the engagement process and their role in it.

Embedding stakeholder participation in the legal framework does not guarantee the quality of participation, or improved policy outcomes. Many factors other than stakeholder engagement determine whether policies are successful, including the quality of government implementation and the difficulty of overcoming market and other barriers. If a government chooses to enact statutory stakeholder participation, the statute should specify in some detail the process of consultation and the stakeholders to be consulted.

Make stakeholder engagement an ongoing process

The Japan and Massachusetts case studies are two examples of ongoing stakeholder involvement in the EE policy implementation process. This study suggests that such an integrated and ongoing stakeholder engagement strategy may represent stakeholder engagement best practice for energy efficiency.

This discussion demonstrates how stakeholders can contribute value to the policy process, and suggests that stakeholder engagement is a critical part of good EE governance. There are many public participation strategies and techniques available to governments, ranging from opinion polls to focus groups, citizen juries and consensus conferences. Governments wishing to explore how to establish effective stakeholder engagement could refer to OECD (2001) and OECD (2003).

9. Public-private sector co-operation

Introduction

Engaging the private sector in the development and implementation of energy efficiency (EE) policy and programmes constitutes an important element of good EE governance. Such co-operation is mutually beneficial. It ensures that government policies take full advantage of the private sector's resources and commercial acumen. It allows public funding to be leveraged through private investment, and private sector participation in programme delivery. Finally, public-private sector co-operation is essential for EE strategies focused on transforming markets through co-ordinated creation of supply and demand for energy efficient products. In short, government EE organisations benefit from closer private sector co-operation in designing EE policy, and the private sector benefits from participating in EE policy and programme implementation.

Key issues and research questions

- Why is public-private sector co-operation important in EE governance?
- What are some good examples of public-private sector co-operation?
- How can the private sector be mobilised in implementing energy efficiency policies?

Importance

Both government and business recognise the need for public-private sector co-operation. A recent policy statement by the International Chamber of Commerce underscored the commitment of the private sector, both suppliers and consumers of energy, for economical energy efficiency policies: "Business supports energy efficiency and given the right fiscal and regulatory frameworks can do more to help governments achieve the triple objectives of growth, jobs and environmental improvement" (ICC, 2007). The inaugural Clean Energy Ministerial in July 2010 announced several multi-governmental public-private initiatives as part of the Global Energy Efficiency Challenge. Initiatives for electric vehicles, super-efficient appliances and superior energy performance for industry and buildings will bring governments and the private sector closer together, in order to develop new, cleaner technologies as well as stronger EE standards (US DOE, 2010).

Private sector involvement in the development and implementation of government EE policies and programmes takes several forms. In some cases, the private sector acts as a delivery agent for EE products and services; in others, it is subject to regulation or obligations regarding energy efficiency. In certain cases, the private sector takes on a governance or management role for public EE programmes.

This chapter utilises experience drawn from several countries to illustrate four distinct approaches to public-private sector co-operation:

- voluntary energy efficiency agreements with large energy users;
- public-private partnerships (PPPs) to develop new EE technologies and approaches;
- using public sector EE projects to foster energy services companies (ESCOs); and
- public-private sector responsibility sharing on appliance efficiency regulation.

Voluntary agreements on energy efficiency

Voluntary agreements (VAs) are "essentially a contract between the government and industry, or negotiated targets with commitments and time schedules on the part of all participating parties" (IEA, 1997). These agreements often include inducements for EE investment as well as commitments to reduced energy use. They often cover a period of five to ten years, so that strategic EE investments can be made. International experience over two decades has demonstrated the value of VAs as an effective basis for public-private sector co-operation (Price, 2005).

VA schemes can address enterprise or industry-level barriers to EE investment, such as lack of information about technologies and concerns about the cost or competitive disadvantages of EE investments. They also allow for high-level engagement between government and private sector management, thus placing energy efficiency on the management agenda (DEA, 2002). Industry participation in VAs can be motivated by both incentives and the possibility of penalties.

Establishing a VA begins with government engagement with specific (usually energy-intensive) industries on energy efficiency potential and corporate responsibility for improvements. Audits or studies are then undertaken to identify the potential for improvements, followed by negotiations between government and industry over targets and a time frame. In this regard, it is vital that government take an industry-wide or sectoral approach, negotiating similar terms with all enterprises in an industrial grouping.

Support for implementing VA schemes, such as facility audits, assessments, benchmarking, monitoring, information dissemination and financial incentives, plays an important role. This technical and sometimes financial support builds industrial capacity for improved energy management, and reduces the risk perceived by industry of agreeing to efficiency improvement targets.

Voluntary agreement programmes can be divided into three broad categories:

- completely voluntary programmes;
- programmes that use the threat of future regulations or energy/GHG emissions taxes to promote participation; and
- programmes that are implemented in conjunction with an existing energy/GHG emissions tax or regulatory regime (Price, 2005).

Denmark launched one of the first VA schemes in 1996 as part of the Green Tax Package. The main objective was to reduce carbon dioxide (CO_2) and sulphur dioxide (SO_2) emissions from trade and industry. The Package combined three policy instruments: green taxes, subsidies and VAs (Ericsson, 2006). A company entering a VA obtains a rebate on its CO_2 tax. All agreements covered a three-year period and were based on estimates of the company's production potential and estimated investments over the agreement period (DEA, 2002). Danish VAs have other elements that underpin the effectiveness of the process, including:

- an energy management system (EMS) that maintains achieved energy savings, ensures interventions in cases of inefficient operations, and continuously evaluates new possibilities for energy; and
- tax rebates and investment subsidies for EE investments made to reach the agreed target (DEA, 2000).

Several other countries have followed the Danish example. In the United States, the Climate Leaders Partnership encourages individual commercial and manufacturing companies to develop long-term, comprehensive GHG emissions-reduction strategies. Japan introduced the Keidanren Voluntary Action Plan in 1997, with the aim of stabilizing CO2 emissions from energy-intensive industries at 1990 levels by 2010. In South Africa, the Department of Energy and Minerals, managers of 24 major energy users and other business leaders signed an Energy Efficiency Accord in May 2005. The parties agreed to individually and

collaboratively work towards government energy savings targets. The Accord established a platform for business and government co-operation, including assessment tools, peer support and capacity-building opportunities (WBCSD, 2010). In Finland, the Ministry of Trade and Industry and the private sector implemented a VA programme on EE improvements and conservation, which has proven very successful over the last ten years (ICC, 2007).

Results

Evaluations of VAs show mixed results, with some schemes providing impressive results while other schemes showed little or no influence on BAU efficiency improvements. The Danish VA programme has been one of the most successful. By 2001, approximately 330 Danish companies had entered into an agreement with the Danish Energy Authority (DEA), representing more than 50% of total energy consumption in the industry. As of 2002, 98% of energy use in heavy processes was covered by VAs (DEA, 2002). A 2005 evaluation showed significant energy saving, in some cases a doubling of historical energy efficiency improvement rates (DEA, 2006). VA schemes yielding less impressive results usually started out with weak targets or relied entirely on voluntary action by industry (Price, 2005).

Beyond direct energy savings, voluntary agreements have a further benefit not often discussed in evaluations. These programmes, through their requirements for companies to measure, monitor and manage energy use or GHG emissions, lay the foundations for eventual participation in emissions-trading programmes. Companies that understand and have experience managing energy use or emissions are more likely to feel comfortable with such programmes (Price, 2005).

Issues

Denmark experienced challenges with poor cost-efficiency in administering the VA scheme. A 1999 evaluation concluded that administrative costs for the VA process (*e.g.* initial engagement, estimating improvement potential, negotiating targets and ongoing energy management) were too high, both for the implementing authority and for the companies. Subsequent experience showed that administrative costs for both parties could be significantly reduced through learning-by-doing and increased systematisation (DEA, 2002).

A 2005 survey by the Lawrence Berkeley National Laboratory (LBNL) found that completely voluntary agreements showed low participation rates, weak results and poor coverage of industrial energy use, compared with VA programmes tied to impending regulation or trading schemes. Programmes that built on regulations or taxes, or included incentives such as emissions trading or relief from regulations, had higher participation rates and met targets more frequently (Price, 2005).

In South Africa, privacy concerns made industry cautious about submitting data to the government, and the time-lag between commitment, investment and energy savings became significant obstacles to reporting on performance. Another issue emerging from the South Africa experience was the need to address an EE "skills gap", especially in terms of finding and hiring experienced energy managers. Maintaining high-level support for implementing energy efficiency was addressed by keeping the VA scheme on the agenda of industry association conferences and business leader roundtables (WBCSD, 2010).

Public-private partnerships

Public-private partnerships (PPPs) are another means of involving the private sector in developing and implementing EE policies and programmes. PPPs are voluntary efforts in which government and the private sector collaborate to analyse public policy problems and jointly implement solutions. PPPs can be an effective alternative to regulatory approaches and can also be effective in leveraging direct government investment in technology research and project development. Public-private partnerships work most effectively when they focus on a specific issue or problem (*i.e.* are programmatic), involve broad engagement with private-sector entities, and include some form of co-financing on technology or concept development or demonstration. A PPP can act as a useful, temporary governance structure for addressing and solving problems or developing needed technologies. A PPP framework provides public sector entities with the ability to:

- work collaboratively with groups of private companies;
- influence and leverage technology development;
- build greater credibility on EE policies and programmes; and
- identify opportunities for co-financing of initiatives and projects.

Public-private partnerships can also be project-focused, with the aim of mobilising private sector resources (technical, managerial and financial) to deliver public services, such as infrastructure, health and education. Project-focused PPPs are important especially in the developing world, where private sector technical and financial capacity often outstrips that of the public sector (World Bank, 2006b).

The US Department of Energy (US DOE) uses PPPs to stimulate EE technology development, especially in the industrial sector. The US DOE's Industrial Technologies Program (ITP) focuses on reducing energy use and GHG emissions from key US industries (*e.g.* aluminium, chemicals, forest products, glass, metal casting, petroleum refining and steel). The ITP covers energy efficiency technology development programmes that span the manufacturing value chain, from raw materials extraction to assembly. Under the ITP the US DOE partners with private companies to elevate awareness of energy efficiency, identifies R&D co-financing opportunities, and helps individual factories access the latest technologies and energy management practices. This ongoing PPP has helped develop hundreds of new energy-saving industrial technologies (US DOE, 2007b).

The ENERGY STAR Building America Program, implemented by the US Environmental Protection Agency (US EPA), is another example of a successful PPP. The marketing benefits of gaining an ENERGY STAR label on a new home provide the incentive for private sector participation. The ENERGY STAR label makes it easy for consumers to identify energy-efficient products in the marketplace and participate in helping the environment at the same time. In 1995, the EPA expanded ENERGY STAR to include new home construction, in recognition of the importance of household energy consumption. Over the past 15 years, 2 500 builders have built more than 360 000 ENERGY STAR qualified homes nationwide. Over 10% of new homes built in the United States now meet these higher EE standards (US EPA, 2010a).

Public-private partnerships can also be international or supra-national. The World Bank's Global Gas Flaring Reduction Partnership has been instrumental in raising awareness of gas flaring as an energy-wasting, carbon-producing industrial practice. It has also established frameworks for governments and industry to develop national and regional solutions (World Bank, 2006c).

Mobilising ESCOs to improve public sector energy efficiency

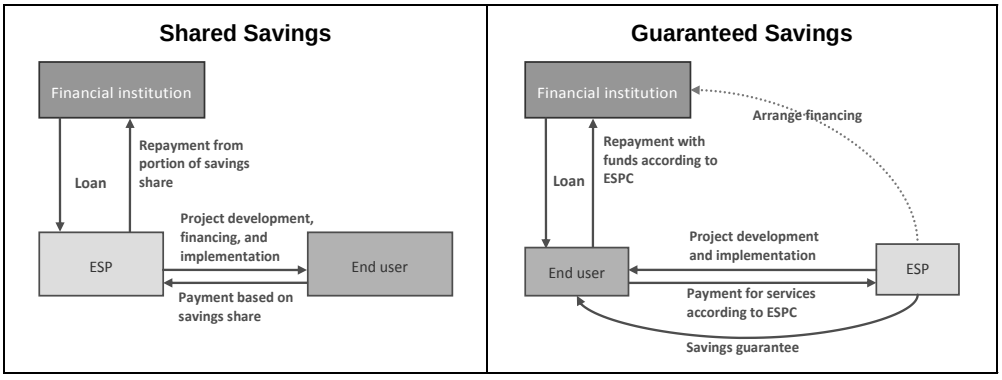
Energy service companies (ESCOs) are private companies that develop, install and finance energy efficiency projects, often using contracts that guarantee project performance or energy savings. An ESCO usually acts as a "full-service" or "turn-key" project developer, assuming responsibility for a range of tasks required to bring an energy efficiency project to fruition, including assumption of associated technical and performance risk. A full-service ESCO will typically offer the following services:

- identify and develop the energy efficiency project;
- provide or arrange project financing;
- install and maintain the energy efficient equipment involved;
- measure, monitor and verify the project's energy savings; and
- guarantee the amount of energy or cost savings.

The ESCO business model bundles performance of all these services into the project's cost, with repayment and profit paid through the financial benefits (energy bill and other savings) produced.

What differentiates a full-service ESCO from an engineering or construction firm is the concept of an energy performance contract (EPC). When an ESCO undertakes a project, the company's compensation, and often project financing, are directly linked to the amount of energy actually saved. The vehicle for this is an EPC, which governs the relationship between asset owner/operator, project financier and ESCO, and specifies the project performance and assumption of risk for any deviations from contractual expectations (Figure **9.1**). The contract may also partition any over-performance. An EPC provides guarantees to end-users and financiers that the energy cost savings of the project will materialise as forecast (Taylor *et al*., 2008; Singh *et al*., 2009).

Figure 9.1 **Shared and guaranteed savings using an energy performance contract model**



Source: Taylor *et al.,* 2008.

The ESCO scheme has proven to be a powerful vehicle for public-private sector co-operation, with the private sector providing specialised expertise, products, services and financing to many public facilities (SRC Global, 2005; Singh *et al*., 2009). The private ESCO helps overcome two of the principal barriers to EE investment by public institutions: access to financing and aversion to risk. ESCOs have found a lucrative niche in many countries serving institutional (e.g. public sector) customers that manage their own facilities but lack the capacity or financial resources to take on EE improvements (GTZ, 2008). This institutional

market includes facilities such as schools, hospitals, office buildings, military bases, and water and sanitation districts (Satchwell *et al*., 2010)

Results

The ESCO industry is most well-developed in the United States and Europe. ESCO revenues in the United States were estimated at USD 4.1 billion in 2008 and were forecast to grow to over USD 7 billion by 2011. ESCO turnover in EU member countries was in the same range, about € 4 billion in 2005 (Hansen, Langlois and Bertoldi, 2009). Since its inception, the US ESCO industry has benefited from effective public-private sector co-operation. The US ESCO market is driven by public sector and institutional clients, with governments and health and education facilities contributing 84% of ESCO industry revenues in 2008 (Satchwell *et al*., 2010). The growth of the ESCO industry has been stimulated by federal legislation, setting in place aggressive new energy-efficiency goals for federal buildings and facilities. In particular, the Energy Policy Act of 2005 (Public Law 109-58) directs federal agencies to reduce energy use in buildings by 2% per year, from 2006 through 2015, measured against a reporting baseline of 2003 (Harris and Schearer, 2006). To help mobilise the ESCO industry to meet these goals, the US DOE's Federal Energy Management Program (FEMP) has simplified and streamlined the ESCO procurement process. These super-ESCO or super-ESPC arrangements provide for a partnership between the federal agency customer and an ESCO, which allows government agencies to undertake energy projects without upfront capital costs or Congressional appropriations to pay for the improvements. After conducting a comprehensive energy audit, the ESCO, in consultation with the agency, designs and arranges financing for an EE project that meets the agency's needs. The ESCO guarantees that the improvements will generate savings sufficient to pay for the project over the term of the ESPC (US DOE, 2008).

The promise of private-sector led energy efficiency through ESCOs has led many countries to replicate the successful ESCO industries in France, Germany, the United Kingdom, and the United States. The number of ESCOs in each country varies, ranging from just a few (Belgium, Thailand, South Africa) to many (Brazil, Germany, Korea, Switzerland). Most of these ESCOs are active at local levels and very few are international in scope. The latest success stories are found in Austria and the Czech Republic (GTZ, 2008).

There are many examples of public-private sector co-operation in establishing an ESCO industry. Thailand recently established a new credit line specifically for ESCOs seeking financing for projects under EPCs. This ESCO fund provides a blend of venture capital and project co-financing to help establish new ESCOs. The Department of Alternative Energy Development and Efficiency (DAEDE) has also provided seed money to establish a Thai ESCO association that will provide self-regulation (*e.g.* accreditation and certification) for its members.

China has a large ESCO industry, which was initially developed through a succession of World Bank projects. As of 2006, over 60 ESCOs were operating in 16 provinces with total annual energy efficiency investments of USD 280 million. Estimates show annual capitalisation at USD 1 billion. The provision of loan guarantee funds via donor-supported projects constituted another form of public sector support for ESCO development in China (Taylor *et al*., 2008; World Bank, 2010c).

India's ESCO industry is relatively young, with just a few donor-supported ESCOs in Delhi, Maharashtra and Karnataka. Current revenue is small, less than USD 20 million, although the Bureau of Energy Efficiency (BEE) has shortlisted several dozen ESCOs to undertake energy efficiency improvements of public buildings at the state government level. Even at this modest turnover level, governments represent a key client for Indian ESCOs, accounting for one-quarter of revenues (Delio, Lall and Singh, 2008). Recently, BEE signed a memorandum of understanding (MOU) with the Hong Kong and Shanghai Banking Corporation Limited, India

(HSBC India), targeted at mainstreaming the energy efficiency projects implemented by ESCOs (BEE, 2010b). Under this MOU, BEE and HSBC will co-operate in the development of training and capacity-building programmes for bank staff (branch managers and loan officers) to create an environment conducive to increased project financing of EE projects.

Issues

Besides providing project opportunities, ESCOs benefit from public-private sector co-operation in other ways. Many ESCO industries started as a result of modest investment by donors and governments in supportive activities, such as loan guarantee facilities (China), creation of ESCO associations (China and Thailand), provision of regulatory regimes for certification of energy managers and accreditation of ESCOs (Singapore, Turkey), and provision of early markets in the form of public facilities (Brazil, India, Mexico, South Africa, the United States).

The ESCO model does not work everywhere. ESCOs have failed to take hold in some countries (Sweden, Slovakia, Estonia) due to difficulties in applying the energy performance contract business model or due to lack of trust between ESCOs and asset owners (GTZ, 2008). There are also significant barriers to public sector procurement of ESCO services, particularly in developing countries. These include inflexible procurement and budgeting policies, low awareness levels, and lack of organisational incentives to undertake EE improvements (Singh *et al*., 2009). While some Western countries, notably the United States, Canada and Germany, have been able to update their procurement and budgeting policies and create incentives to improve energy efficiency, the transfer of this experience to developing countries has been limited.

The ESCO industry is complex and transaction costs for market entry are high. An ESCO cannot be successful without the basic business tools needed to identify and develop projects, including technical and management capacity, project financing and working capital, and the ability to identify candidate projects. Commercial law varies from country to country, and EPCs need to be tailored to local legal and commercial conditions. Active government support for ESCO development is critical, especially in the early stages. This has been shown in North America, the European Union and, most recently, China. Government or donor support may include capacity building, market creation, business incubation, contingent financing facilities, and access to equity or venture capital. Experience shows that such early support to ESCOs leads to much greater private sector investment in energy efficiency than is the case in countries where an ESCO industry has not yet emerged (Taylor *et al*., 2008).

Regulating end-use appliance efficiency

Implementation of policies on appliance efficiency labelling and standards is a crucial area for public-private sector co-operation. Experience with co-operation on appliance regulation is extensive, as these programmes are a cornerstone of EE policy in many countries. Appliance standards and labelling are key to efforts to transform markets, such that consumers demand and manufacturers deliver more efficient appliance products.

A proven way to secure sustained improvements in the energy efficiency of appliances and equipment is through a regime of technical regulations (standards) and product labelling. International practice shows that such standardisation efforts and consumer information systems work best when they have the full participation of the private sector.

Energy performance standards require end-use equipment or systems to meet certain levels of efficiency. Energy performance standards include minimum energy performance standards (MEPS), which set a “floor”

for energy performance, and "high-efficiency" standards (*e.g.* the US ENERGY STAR and Japanese Top Runner programme), which distinguish products that have above-average levels of energy performance (IEA, 2009d).

Energy performance labelling is an important complement to performance standards. Such labels display summary information on the energy used or cost of use, helping consumers make informed product choices.

Standardisation protocols underpin energy performance standards and labelling programmes. Protocols help to guarantee the integrity of a scheme, from development and agreement on a standard to implementation (ANSI, 2007). Standards typically include the procedures used to test products for conformity with standards and labels, and the design of informational labels.

The system for assessing standards conformity incorporates many recognised elements of good governance. Conformity assessment incorporates procedures for sampling, testing and inspection, verification and assurance of conformance, and product registration. These procedures ensure that everyone in the product supply chain (manufacturers, exporters, importers, customers, inspectors, wholesalers, retailers) fulfils the requirements identified in a standard. Conformity assessment increases buyers' confidence in products and services and helps to substantiate advertising and labelling claims. Several institutions participate in the conformity assessment system:

- *Laboratories* test product samples to verify compliance with standards or labelling.
- *Certification bodies* certify testing laboratories and inspecting organisations for compliance with quality management systems standards.
- *Product certification bodies* grant licenses for manufacturers to mark their products as complying with particular standards or specifications.
- *Accreditation authorities* independently assess conformity assessment bodies, in line with recognised formal accreditation procedures (IANZ, 2007).

Although there are country-to-country variations, the private sector is usually deeply engaged in standards development, labelling and conformity assessment. Three country case studies are described - the United States, Mexico and India.

United States

Since 1975, the US DOE has established MEPS for a wide range of products. The regulations apply to manufacturers of regulated products or dealers who import regulated products into the United States. MEPS can only be set after a prescribed process of research and consultation, and the MEPS levels must be demonstrated to be technically feasible and cost-effective. MEPS levels are periodically reviewed by the US DOE, and higher levels are set if the analysis justifies a revision (NAEWG, 2002). The National Energy Conservation Policy Act of 1978 (NECPA) made the Federal Trade Commission (FTC) responsible for the design, implementation and compliance of a mandatory EE labelling programme for appliances. The National Institute of Standards and Technology, an agency of the US Department of Commerce, is responsible for the test procedures (ANSI, 2007).

In the United States, the standardisation system reflects advanced levels of both technology development and public-private sector co-operation, with government facilitating private initiatives and consensus standards serving as the cornerstone. Thousands of individual experts represent the viewpoints of industry, consumer and labour organisations, and government agencies work together with these groups to apply their knowledge, talents and efforts to the standard-setting process (ANSI, 2007).

The ENERGY STAR programme, established in 1992 and jointly run by the US EPA and US DOE, extended the MEPS and broadened appliance labelling to include office equipment and household electronic equipment. The programme promotes products and services that save energy and money, and protect the environment. Today, the ENERGY STAR label is found on over 60 product categories, including appliances, lighting, home office equipment, consumer electronics, commercial refrigeration equipment, electric motors, distribution transformers and heating and cooling equipment (NAWEG, 2002; US EPA, 2007b).

US DOE has worked with a broad range of industry stakeholders and standard-making bodies to develop codes and standards. Its concern over governance of the MEPS process has resulted in several changes to the process rules over time. In 1996, US DOE published new rules designed to support efforts to build consensus on MEPS and ensure increased use of outside expertise. The rules ensured greater consultation with stakeholders at all stages of MEPS development, with an advisory committee to oversee stakeholder access and make suggestions for process improvement (NAWEG, 2002). These rules have been largely superseded by the process improvements that led to a substantial acceleration of US standards development efforts beginning in 2006 (with a report to the US Congress and court supervised Consent Decree agreement between the US DOE and major stakeholders).

Self-certification is a central element of the MEPS and ENERGY STAR systems, by which manufacturers formally test their own and each other's products. This forces compliance; with the exception of motors and lamps, manufacturers self-certify and self-regulate (NAWEG, 2002).

The US system has some weaknesses. In particular, the US Government Accountability Office (US GAO) investigated ENERGY STAR and found that "the program is a self-certification program vulnerable to fraud and abuse". The US GAO also found that certification controls were ineffective because ENERGY STAR does not verify energy-savings data reported by manufacturers (US GAO, 2010). The US EPA and US DOE have outlined a series of steps to strengthen the ENERGY STAR programme through third-party testing. The US DOE began testing of some of the most commonly used appliances, which account for more than 25% of a household's energy bill, and both agencies are now developing a system to test all products that earn the ENERGY STAR label (US EPA, 2010c). This experience suggests that public-private sector co-operation must incorporate oversight arrangements and the means to add improvements when needed.

Mexico

The Mexican appliance efficiency standardisation and conformity assessment system was established in order to allow the Mexican appliance manufacturing industry to continue exporting products into the United States and Canada following introduction of the MEPS regulatory regime for household appliances. The current standardisation and conformity assessment system was established through the 1992 Federal Law on Standards and Metrology (LFMN), which also provided the legal framework for the Mexican government to establish energy efficiency regulations.

The LFMN was enacted in the context of the North American Free Trade Agreement (NAFTA), by which Mexico advanced into a more open standards system, and in which the private sector has a greater role in standardisation and conformity assessment. Private appliance manufacturers were an active participant in both the NAFTA negotiations and the drafting of the LFMN, having recognised that their exports to the United States and Canada had to comply with MEPS in those countries (USTRRE, 2010).

Under the Mexican standardisation system, an energy efficiency official standard includes both the minimum energy performance levels required and the test procedure for determining equipment performance. This varies from common practice in other countries in the region, in which standards or technical regulations are separately defined for the MEPS, the test procedure and the label.

The National Consultative Committee of Standards for the Preservation and Rational Use of Energy Resources is responsible for reviewing all MEPS proposals. It is established within the Comisión Nacional para el Uso Eficiente de la Energía (CONUEE), which chairs it and is mandated by law to engage stakeholders from government, trade associations, professional societies and research institutions, to participate in the decision process. This committee is a key element of energy efficiency governance in Mexico, as it has helped CONUEE develop a co-operative network of private and public organisations to oversee EE regulatory policy.

Mexico has 19 EE standards in place with conformity assessment provided by two certification organisations, and more than 30 testing laboratories approved by CONUEE and accredited by the national accreditation entity (CONUEE, 2010). All of these bodies, with the exception of the national energy laboratory (El Instituto de Investigaciones Eléctricas), are private businesses and organisations in constant formal and informal co-operation with CONUEE.

This conformance on household appliance efficiency standards has been beneficial to both Mexican manufacturers and Mexican energy consumption. Official estimates indicate that energy efficiency standards saved an aggregate of 16 065 GWh for end-users between 1995 and 2006, and resulted in 2 926 MW of avoided power capacity, or 6% of Mexico's installed generating capacity (De Buen and Segura, 2007).

India

In India, the development of appliance standards and labelling is an excellent example of public-private co-operation. Under the 2001 Energy Conservation Act, the Bureau of Energy Efficiency (BEE) is responsible for development of standards and labelling. Its initial focus was on labelling of refrigerators and air conditioners. The BEE effort was organised under the leadership of a Steering Committee consisting of representatives of refrigerator, air conditioner and compressor manufacturers, industry associations, research organisations, NGOs, consumer groups, testing agencies, government representatives, and international and local technical experts (Tathagat, 2004). The Steering Committee also established technical sub-committees to develop laboratory specifications, test protocols and product qualification standards. Most of committee members were private sector representatives.

Under the BEE approach, the government empowers manufacturers to self-certify and apply efficiency labels, and holds them accountable and liable for their validity. The government verifies the labels through testing, and if the appliances are incorrectly labelled, the manufacturers face penalties.

Conclusions and guidelines

The public sector engages the private sector in developing and implementing EE policies and programmes through four main mechanisms: voluntary agreements, public-private partnerships, energy service companies, and regulating end-use equipment efficiency. Based on these examples it is possible to draw some conclusions and suggest guidelines for public-private sector co-operation.

Guidelines for government

Aim for win-win situations. Government and private sector interests often overlap. Governments should identify these win-win situations and pursue them. Any form of public-private sector co-operation is much stronger when there are mutual benefits.

Apply an industry-wide approach. Governments should initiate public-private sector co-operation in most cases, for practical purposes and because governments are responsible for setting EE policies. The core tenets of good governance – equal opportunity, even-handed treatment for all, transparency – suggest that governments should engage broadly at the industry grouping level, rather than selectively or with individual companies. Governments need to create the arrangements for procuring ESCO services. Voluntary agreements seldom work unless government is actively involved and pressing for private sector commitments.

Although governments should initiate co-operation, their leadership is more effective when informed by stakeholder engagement. Standing councils or committees, such as the International Chamber of Commerce, the Business Roundtable and the European Roundtable of Industrialists, are important fora for continuous public-private sector engagement on energy efficiency policy (Business Roundtable, 2007).

Establish oversight and accountability. Governments seek public-private co-operation to benefit from the commercial resources and entrepreneurial spirit of the private sector. However, all private companies are motivated by profits, and some may occasionally seek loopholes or shortcuts that undercut the intentions of public-private co-operation. Government must ensure that the institutional arrangements are delivering the desired policy and programme outcomes.

In the United States, the well-known and successful ENERGY STAR labelling programme, which is based on self-certification of its participants, was found to be vulnerable to fraud and abuse by the US watchdog agency, the US GAO. In response, the US DOE undertook to set up a system of independent verification for all products registered under the ENERGY STAR label (Wald, 2010).

Guidelines for the private sector

Create incentives to co-operate. There must be clear incentives to motivate private companies to co-operate. In the case of voluntary agreements, completely voluntary efforts have been shown to have lower participation rates, weaker results and smaller market shares. Programmes in which the private firm had an incentive to co-operate (for example, to stave off regulation or to register emissions reductions in anticipation of cap-and-trade regimes) delivered much better results.

There are occasions when the private sector has an urgent need to instigate public sector co-operation. In the case of appliance standards in Mexico, NAFTA was the impetus for creating a MEPS programme that would mirror newly-established energy efficiency regulatory policies in the United States and Canada. Quick action by manufacturers and the government was needed to retain Mexico's appliance export markets.

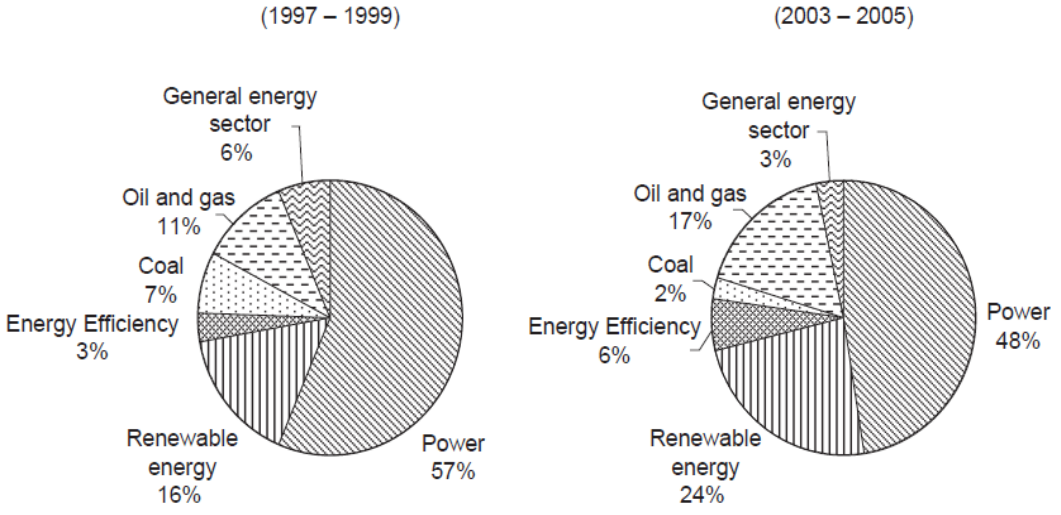
10. International development assistance for energy efficiency

Importance

International development assistance (IDA) has played an important role in establishing enabling frameworks, institutional arrangements and co-ordination mechanisms for energy efficiency (EE) policy. Such assistance is provided by donors and other international organizations as part of co-ordinated efforts to scale-up EE investment in response to energy security, climate change mitigation and economic development concerns.

International support for energy efficiency is stronger than ever, with international financial institutions and development agencies strongly encouraging policy and programme development. A recent study of bilateral and multilateral assistance to the energy sectors of developing countries showed a doubling of support for EE projects between 1997 and 2005 (Figure **10.1**). The study also identified a shift in aid modalities, from funding of physical projects to providing technical assistance in support of policy development and institution building (Tirpak and Adams, 2008).

Figure 10.1 **IDA support for energy by category, 1997-99 and 2003-05**



Source: Tirpak and Adams, 2008.

This chapter briefly examines the role of IDA in promoting EE governance in developing and middle-income countries, with the objective of identifying successful examples and developing guidelines for effective IDA programmes.

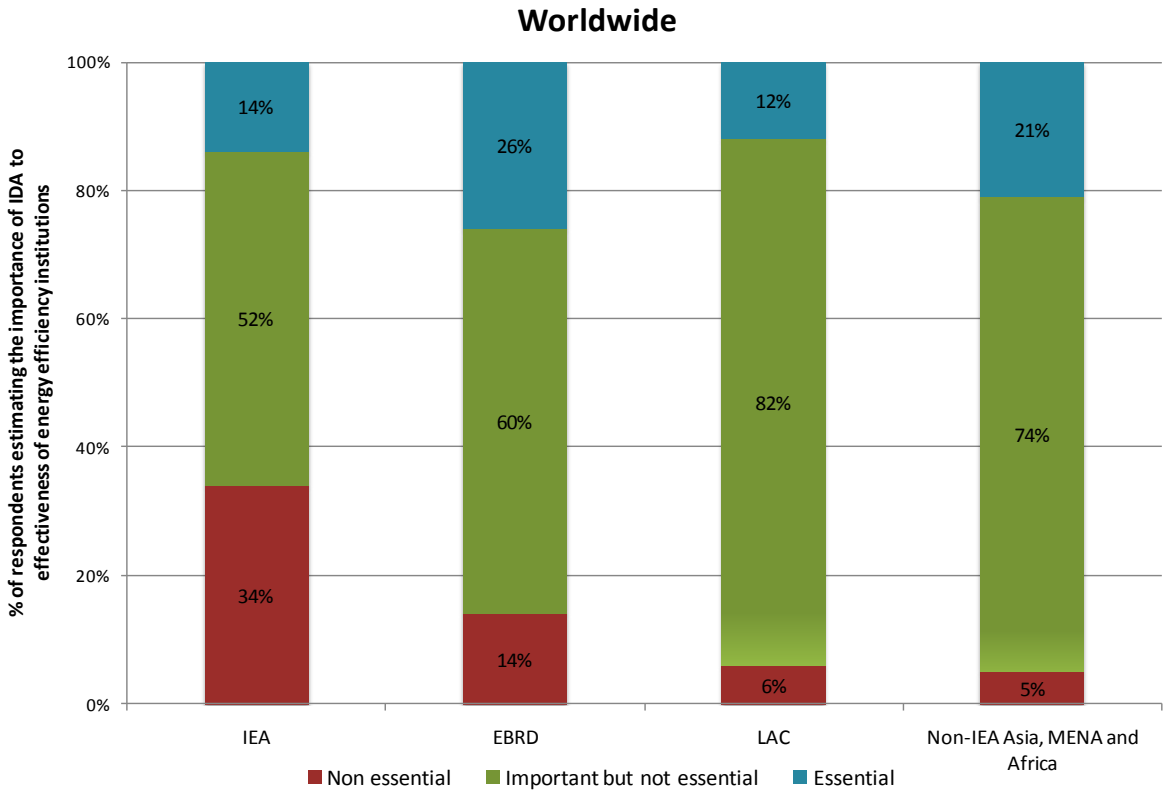
Key issues and research questions

- What role does international development assistance play in promoting energy efficiency in developing countries?
- How can international donors and development agencies engage with developing and transition-economy countries to help establish EE governance frameworks and mechanisms?

Findings and discussion

Information on the importance of IDA to EE governance is drawn from the institutional survey, interviews with EE experts and literature review. The survey results underscored the importance of such assistance for non-IEA countries. Most respondents in IEA member countries ranked IDA support for energy efficiency organisations as "important but not essential". In less-developed regions, particularly Africa, the majority of respondents (67%) ranked IDA as essential.

Figure 10.2 **Importance of IDA to effectiveness of EE institutions**



Interviewees underscored the importance of international donors and development agencies to national EE efforts, especially in the early years of institutional development. A good example of such formative assistance is the Lebanese Centre for Energy Conservation, which began as a project funded by the United Nations Development Programme (UNDP) and the Global Environment Facility (GEF). The centre has since

been absorbed by the Lebanese Ministry of Energy and Water. Although it still receives donor funding, the LCEC is now largely self-sustaining, funded through government support and user fees.

A common problem in utilizing IDA to establish EE governance frameworks is that formative efforts end as soon as donor support is withdrawn. In Pakistan, for example, USAID provided formative aid to the National Energy Conservation Centre (ENERCON). However, the institution-building program was completed in 1990, leaving the Centre significantly under-resourced. ENERCON has since lost much of the core technical personnel and knowledge base needed to develop and implement national EE policies. The Centre now operates mainly via project-based donor support (ADB, 2009).

Many donors have tried to create conditions that enable self-sustaining EE activities. For example, the Norwegian Energy Saving International (ENSI) conducted a long-term capacity-building programme in Kazakhstan, through which an Energy Efficiency and Cleaner Production Centre (EECPC) was established. The project goal was to build the EECPC into a self-financing organisation, which could continue to expand after ENSI support ended. Training and practical experience via demonstration projects proved effective in developing the professional skills needed to deliver commercial services to local industry. ENSI also helped EECP to compete for projects on barrier removal and energy saving investment potential which were sponsored by other international donors and development agencies (ENSI, 2007).

The Promotion of Electricity Energy Efficiency Project (PEEEP) in Thailand was a five-year, USD 60 million programme that created a Demand Side Management (DSM) office within the Electricity Generating Authority of Thailand (EGAT) and developed labelling and EE standards for household appliances. Supported by the World Bank and the GEF, the activities established through the PEEEP have carried on to the present through funding now provided by surcharges on gasoline consumption (World Bank, 2006a).

IDA has been vital in building the technical capacity needed to mount a national EE programme in Tunisia. Bilateral co-operation efforts with the French Environment and Energy Management Agency (ADEME) helped the Tunisian National Agency for Energy Conservation (ANME) develop an energy data collection network and establish a results monitoring system for energy efficiency. Tunisia now has a well-developed dataset on energy efficiency maintained by the National Energy Statistics Bureau.

The Vietnamese National Energy Efficiency Programme (VNEEP) is a 10-year programme, begun in 2006, which has the goal of reducing national energy consumption up to 8% by 2015 compared with a base case forecast. The Danish International Development Agency (DANIDA) is one of several donors supporting the several components of the VNEEP. DANIDA will support capacity building at the Ministry of Industry and Trade, Ministry of Science and Technology, Ministry of Construction, Ministry of Transport, and Ministry of Information Communication to implement the provisions of the recently-enacted Law on Energy Efficiency and Conservation (DANIDA, 2010; MoIT, 2010).

IDA has helped establish EE policy and legal frameworks in Eastern Europe as well. As a result of efforts by USAID, four laws were adopted that strengthened the regulatory framework for the energy sector in Croatia (GEF, 2010).

From 1998 to 2004 the UNDP supported a project to establish an EE strategy for Bulgaria, which resulted in the development of the Bulgarian Energy Efficiency Act and the Bulgarian National Energy Efficiency Programme. The legal framework, capacity building and practical demonstrations of sustainable energy projects have triggered EE programme implementation in many municipalities. The programme also established the Municipal Energy Efficiency Network (MEEN) with 39 EE Offices in MEEN member municipalities. MEEN became a legal body in 2004 and has become self-supporting through annual fees paid by subscriber municipalities (MUNEE, 2010a).

Donors often support development of specific EE governance mechanisms, such as stakeholder engagement and development of EE laws. An example of this is Armenia, where active efforts by stakeholders prompted a change in EE legislation. In 2002, the US-based NGO Alliance to Save Energy established the Armenian Energy Efficiency Council (AEEC). The Council brought together ministry officials, local NGOs, academia, energy businesses and donors for dialogue on national energy policy issues. The efforts of the Alliance in creating an Armenian coalition on energy efficiency and in providing technical assistance led to the development of the Armenian Law on Energy Saving and Renewable Energy (MUNEE, 2010b).

International NGOs such as the Alliance to Save Energy and international donors such as USAID also build EE implementation capacity at the local level. Since mid-1990, the Alliance has the USAID-supported MUNEE programme in Eastern Europe and Eurasia. This programme engages with in-country partners and municipalities to create networks for energy efficiency. The MUNEE programme works in four key directions: (i) pursuing energy policy reform; (ii) promoting residential energy efficiency and heating; (iii) providing education and running awareness campaigns on methods, financing and management of energy efficiency; and (iv) building municipal capacities and creating energy efficiency networks (MUNEE, 2010c).

Many IDA projects foster market-based approaches and public-private sector co-operation. For example, China's ESCO industry was created with support from the World Bank and GEF. In 1997, three pilot companies pioneered the ESCO business in China, adapting the energy performance-contracting concept to the Chinese market. The successful demonstration model encouraged new companies to enter the market. The ESCO industry grew rapidly with the support of the World Bank and its commercial arm, the International Finance Corporation (IFC), along with the Asian Development Bank (ADB), the United Nations and other development agencies. According to estimates by the World Bank's Asia Sustainable and Alternative Energy (ASTAE) Program, the Chinese ESCO industry now has 40 to 50 well-established ESCOs, and more than 400 companies that use the energy performance contract concept. A major contributory factor to the rapid growth of the ESCO sector in China was long-term funding from the several international donors listed above, which helped overcome the cultural and institutional barriers to the energy performance contracting concept taking root (ASTAE, 2008).

Table **10.1** provides numerous examples of international development assistance with EE governance, including several of the projects described above.

Table 10.1 **Examples of international development assistance for EE governance**

Country	Donor	Year	Reference
Slovakia	EBRD	2005-10	www.slovseff.eu
Moldova	EBRD	2009-10	www.ecb.sk/index.php?id=135&L=1#c252
India	US AID	2000-10	http://eco3.org/BEE
Lebanon	UNDP/GEF	2002-10	http://lcecp.org.lb/
Jordan	World Bank/GEF and Agence Française de Developpement (AFD)/ French Global Environmental Facility (FFEM)	2009-	www.worldenergy.org/documents/jordanie_nerc_tunisia.ppt
Thailand	World Bank/GEF	1992-2000	http://siteresources.worldbank.org/GLOBALENVIRONMENTFACILITYGEFOPERATIONS/Resources/Publications-Presentations/Thailand.pdf
Tunisia	ADEME	1980-2010	www.anme.nat.tn/index.asp?pId=148
Vietnam	Asian Development Bank, World Bank, others		www.adb.org/Documents/TARs/VIE/41077-VIE-TAR.pdf

Conclusions and guidelines

This chapter briefly presented ways in which IDA helps developing countries to establish the various elements of EE governance, including enabling frameworks, institutional arrangements, and co-ordination mechanisms. These examples of IDA in support of good energy efficiency governance suggest some guidelines for international donors to use in designing future assistance efforts.

Design assistance projects that create sustainable outcomes. A perennial challenge facing donors and recipients is the time-bound nature of assistance projects. EE governance enabling frameworks, institutional arrangements and co-ordination mechanisms often come to a halt when donor support ends, unless sustainable institutions are established or permanent frameworks and mechanisms put in place. Donors tackle this problem in various ways: by creating organizations that can sustain themselves after donor funding is withdrawn, by developing legislation that, once enacted, will create permanent governance mechanisms, and by mainstreaming EE policies and programmes within broader national development efforts, such as economic development plans and programs.

Engage local energy efficiency stakeholders. Stakeholders include all those who stand to benefit from EE policy development and implementation, as well as those who have a stake in seeing EE policies achieve their intended results. International assistance can fund stakeholder involvement and help create a

community of energy efficiency policy advocates. There are many examples of IDA support creating a critical mass for action on energy efficiency, whether it is an energy efficiency law, strategy, target, or the creation of an implementing agency.

Create demand for energy efficiency. IDA can create awareness of the benefits of energy efficiency, and stimulate demand for EE goods and services. Creation of early markets for energy efficiency through public sector procurement of energy efficiency or compulsory energy efficiency activity (*e.g.* energy audits or obligations) has proven effective in many countries. In the case of China, continuous donor support over a decade succeeded in creating a self-sustaining ESCO industry.

Seek other opportunities for international co-operation, including regional networking. Regional networking and co-operation across countries can be effective in disseminating proven EE policies and mechanisms, creating larger markets for EE goods and services, and overcoming barriers through regional action (*e.g.* harmonization of standards). Regional co-operation through organisations such as ASEAN or APEC allows the resources of individual countries to be pooled together and brought to bear on shared problems. This can also be an effective way of taking advantage of all the IDA provided throughout the region.

PART III. CO-ORDINATION MECHANISMS

11. Governmental co-ordination mechanisms

Introduction

Effective governmental co-ordination is another important element of energy efficiency (EE) governance. Governmental co-ordination mechanisms help specialised and general administrative entities at all levels to work co-operatively in achieving EE policy targets.

Successful EE implementation involves mobilising complex networks of institutions and markets, which requires a high degree of co-ordination. In fact, co-ordination can be considered as the glue that binds the many elements of EE governance together, leading to more comprehensive policies, improved implementation, implementation cost savings and increased stakeholder support.

Insufficient attention to governmental co-ordination is one reason why EE policies sometimes fall short of their goals. The most common shortfalls are associated with energy efficiency policies being developed in isolation or a lack of sufficient co-ordination across or between levels of government to support policy implementation (IEA, 2009b).

Two main types of co-ordination mechanisms are specific to governments:

- **intra-governmental (or horizontal) co-ordination** among national government ministries and agencies; and
- **inter-governmental (or vertical) co-ordination** across various levels of government (*e.g.* national, regional and local governments).

Other chapters in this study describe additional co-ordination mechanisms, including co-ordination with stakeholders (Chapter 8), public-private sector co-operation (Chapter 9) and international development assistance (Chapter 10).

Key issues and research questions

- What is the role of governmental co-ordination within EE governance?
- What co-ordination mechanisms have proven effective?
- How do intra-governmental (horizontal) co-ordination and inter-governmental (vertical) co-ordination issues and mechanisms differ?
- What guidelines can be offered for establishing effective co-ordination mechanisms?

Importance

Co-ordination of governmental energy efficiency activities will grow in importance as more countries develop and implement national EE policies. Many countries already have comprehensive national EE policies that cover several consuming sectors and require implementation activity by multiple sectoral ministries. In EU countries, national EE policies must be both integrated within the supra-national context of the EU Energy Services Directives and implemented in co-operation with regional and even municipal government entities. The need to co-ordinate energy efficiency policies with other national and international

policy contexts (climate change, energy security, etc.) adds further complexity and introduces more governmental entities.

Evidence from this study suggests that effective co-ordination within and across levels of government contributes to successful EE policy outcomes.

Intra-governmental co-ordination helps avoid overlaps and duplication, and allows informed discussions about how best to implement policies. It also helps mobilise support for comprehensive EE policies and helps build political consensus across a broad range of stakeholders. Because it is horizontal in nature, intra-governmental co-ordination mobilises topical and sectoral experts throughout government to support implementation.

Inter-governmental co-ordination can improve implementation, help identify and resolve policy gaps among international, national, regional and local strategies and policies, and encourage capacity building at all government levels. Its benefits can be both top-down and bottom-up. National or international enabling frameworks can motivate and provide support for energy efficiency policy and implementation to regional and local governments. Alternatively, such vertical co-ordination can provide opportunities for local or regional initiatives to influence national EE action, for example by supporting new ideas and programmes on a small scale, and then scaling up efforts that prove effective to regional or national level. Another advantage is that financial mechanisms implemented at the national level (such as community block grants and structural adjustment funds) can target specific industries or areas, but allow detailed implementation decisions to be taken locally, where better information is available.

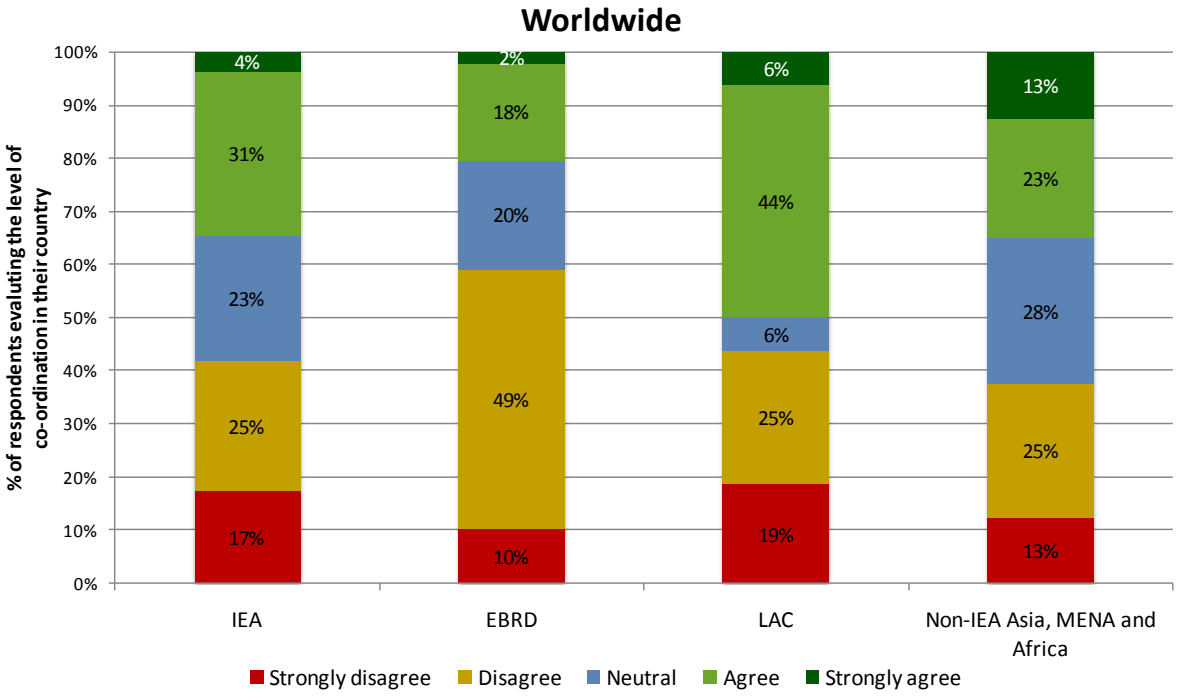
Findings and discussion

The Information on EE co-ordination mechanisms presented here is drawn from three sources: a survey of EE experts, follow-up interviews with EE experts, and a literature review including previous IEA work. The institutional survey asked respondents whether energy efficiency was well co-ordinated in their countries. Interview respondents were asked about the degree of centralisation of energy efficiency responsibility, and whether any level of government had particular advantages in implementing EE activities.

Many EE experts indicated the need to improve energy efficiency co-ordination. Less than half of the EE experts in IEA member countries and in countries supported by the European Bank for Reconstruction and Development (EBRD) agreed that EE policy is well co-ordinated; the figures were even lower in non-IEA Asia, the Middle East and Africa (MENA) and Africa (Figure **11.1**).

Governmental co-ordination was perceived as a particular problem in EBRD countries. This may reflect a heightened awareness of co-ordination issues, as new EE policy implementation responsibilities are devolved onto provincial and local governments. For example, Russia's recently enacted Law on Energy Conservation and Increase of Energy Efficiency calls for local governments to take on enforcement of EE regulations, as well as evaluation and financing. In Hungary, local authorities are responsible for a range of EE implementation activities ranging from promotion and information to direct investment and enforcement. In Armenia, local and regional governments are responsible for promotion, regulation, enforcement and evaluation of energy efficiency. Experts in the Ukraine reported a wide range of responsibilities devolved onto sub-national jurisdictions, including direct investment, financing and subsidies, technology development, enforcement and technical assistance.

Figure 11.1 **Energy efficiency is well co-ordinated in my country**



Experts from the Latin America and Caribbean (LAC) region seemed mostly satisfied with energy efficiency co-ordination in their countries. This may stem from a history of stakeholder and private sector engagement in countries such as Brazil, Chile and Mexico. In Mexico, the private sector plays a major role in regulating appliance efficiency standards. In Chile and elsewhere, stakeholder engagement and inter-governmental co-ordination are strongly institutionalised. The need for effective co-ordination in LAC countries is likely to increase, as several newly established programmes will depend on local jurisdictions for implementation. An expert in Costa Rica reported that local governments have undertaken compliance enforcement of building codes and standards, while in Mexico regional and local governments will soon be providing EE financing and subsidies.

Co-ordination mechanisms

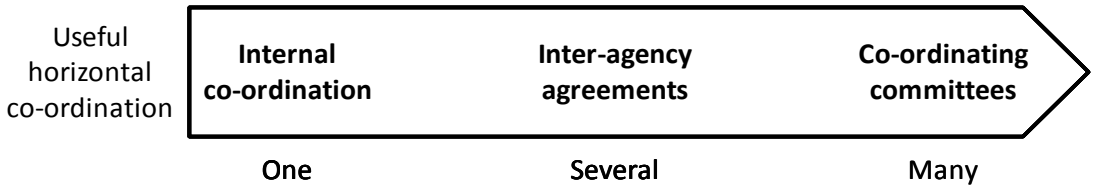
Distinct differences are evident in the mechanisms used for intra-governmental (horizontal) and inter-governmental (vertical) co-ordination. The type of co-ordination mechanism also varies according to the complexity of institutional arrangements for implementation.

Intra-governmental co-ordination mechanisms

A country with multiple national-level agencies (*e.g.* energy, transport, buildings) involved in EE policy implementation needs more co-ordination then a country with centralised EE responsibility. In fact, the choice of which co-ordination mechanisms might be most effective may depend on the degree of concentration of EE implementation responsibility (Figure **11.2**). The need for intra-governmental co-ordination is drastically reduced in countries with a centralised EE agency, as policy development and

implementation responsibilities are concentrated under a single roof. Where responsibility is shared among several agencies, a formal type of inter-agency agreement may be needed to guide co-ordination. Multiple agencies sharing EE implementation responsibility may find that co-ordinating committees provide a mechanism for assigning tasks and tracking progress.

Figure 11.2 **Intra-governmental co-ordination mechanisms**



Internal co-ordination

Inter-governmental co-ordination can also be achieved by concentrating EE responsibilities in a single government body. Many countries have such a single-purpose entity, as described in Chapter 5 (Energy Efficiency Agencies). Examples include the Danish Energy Agency, India's Bureau of Energy Efficiency, Korea's Energy Management Company (KEMCO), and New Zealand's Energy Efficiency and Conservation Authority [EECA]). Concentration of energy efficiency responsibility reduces the need for inter-governmental co-ordination, but may require a more complicated internal structure if EE policies cover multiple sectors. There are also risks to this approach, including duplication of expertise and conflicts with sectoral agencies.

Inter-agency agreements

When two or three institutions share overall energy efficiency responsibilities, an effective co-ordination approach may be memoranda of understanding (MOUs) or other bilateral intra-governmental agreements. These agreements specify responsibilities, targets, resource flows and even procedures for conflict resolution. The US Department of Energy (US DOE) and the US Department of Urban Housing and Development (US HUD) recently entered into a MOU to govern their scaled-up and shared implementation responsibilities under the American Recovery and Reinvestment Act (ARRA) stimulus bill (Gordon and Paik, 2009).

Co-ordinating committees

Committees can take various forms. A typical model is two-tiered, with sectoral EE experts organised into working groups that co-ordinate on technical issues, and then work together with one or more high-level co-ordinating committees, preferably at ministerial level.

Effective co-ordinating committees should meet regularly, be representative of the type of co-ordination desired, have a secretariat to keep track of agendas and decisions, and report to a senior political official (ministerial or even prime ministerial). Ministerial-level committees meeting regularly and chaired by senior political leaders can help resolve problems, such as insufficient resources or implementation shortfalls (APERC, 2010).

In Singapore, EE policy and implementation responsibility is allocated by energy-consuming sector. Each large ministry (Transport, National Development and Environment) has one or more energy efficiency units, which mobilise sector-specific expertise to develop and implement sectoral EE policies. The Energy Efficiency Programme Office (E2PO) within the National Environment Agency (NEA) provides overall co-ordination. A Co-ordinating Committee, co-chaired by NEA and the Energy Market Authority (EMA), ensures agencies take ownership of issues and implementation results. The Co-ordinating Committee includes representatives from the Building and Construction Authority (BCA), the Land Transport Authority (LTA), the Housing and Development Board (HDB), the Economic Development Board (EDB), the EMA and the Agency for Science, Technology and Research (ASTR). It meets bi-monthly, during which all agencies report on their progress, consider new consulting proposals and discuss issues. The E2PO reports annually to an Energy Policy Group chaired by the prime minister. There are also Inter-Ministerial Committees on Climate Change and Sustainable Development, which develop and monitor overall climate change, sustainable development and energy efficiency policies.

In Turkey, the Energy Efficiency Co-ordination Board (EECB) works to improve EE policy co-ordination across ministries and municipalities. The EECB was established by the 2007 Energy Efficiency Law, which specifies that the Board must have 17 members representing the ministries charged with EE policy and implementation (*e.g.* Interior, Treasury, the State Planning Organization (SPO), Environment and Education) as well as Turkish professional associations, chambers of commerce and the Association of Municipalities. The EECB advises on all laws and regulations dealing with energy efficiency. It meets four times per year to draft laws and regulations to be adopted by the government. The EECB is under the supervision of the Electrical Power Resources Survey and Development Administration (EIE), which has overall responsibility for energy efficiency.

In Chile, the *Programa País de Eficiencia Energética* (PPEE) was established in 2005 under the Ministry of Economy, Development and Reconstruction (MoEDR). A PPEE Commission created by presidential decree includes an Assessment Council and an Operating Committee. The Assessment Council includes ministerial representatives and advises the sectoral ministries responsible for EE policies. The Operating Committee includes government, private sector and civil society representatives, and is charged with tracking progress on EE programmes, proposing new actions, and promoting energy efficiency awareness (APERC, 2009a).

In several EU countries, the EU Energy Services Directive has stimulated inter-agency co-ordination via committees. In Finland, ministers from each agency working on energy efficiency were required to closely co-ordinate in order to prepare the EU-mandated National Energy Efficiency Action plan. This informal co-operation has been formalised through a standing energy efficiency and climate change co-operation committee. This group includes representatives from each agency working on energy efficiency; it meets regularly to discuss progress and monitor results.

Korea has a long-standing Energy Conservation Committee, chaired by the prime minister, which considers EE policies and monitors EE trends. A Presidential Committee for Green Growth was recently established and includes private sector participation. The Committee is set to be chaired by the president and is expected to meet monthly.

In Kazakhstan, the Sustainable Development Council (SDC) was established as a government co-ordinating, consultative body that deals with all aspects of EE policy. The Council monitors energy resource utilisation, and provides recommendations on energy savings and efficiency improvements to the Kazakh government (UNESCAP, 2010).

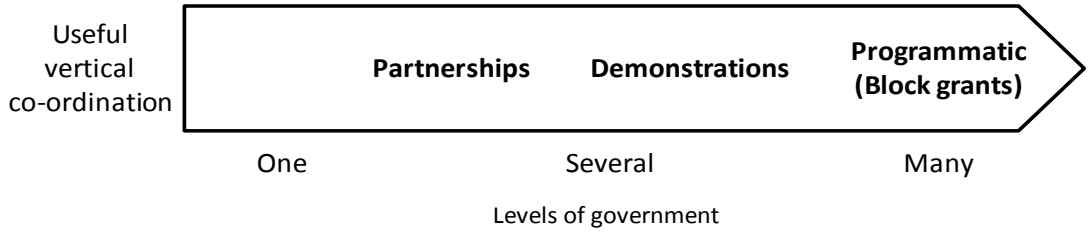
Some countries implement a combination of committees, councils and boards. For example, with respect to high-level policy co-ordination, Canada has the Council of Energy Ministers, which brings together federal, provincial and territorial energy ministers to discuss issues of mutual concern and provide a forum for

possible collaboration between jurisdictions on issues of mutual interest. The Council of Energy Ministers is supported by a network of sectoral steering committees and working groups. For example, the Standing Committee on Energy Efficiency (SCEE) is a key mechanism for federal-provincial-territorial, as well as inter-provincial-territorial co-ordination. It is assisted in its energy efficiency efforts by dedicated working groups focused on the transportation, industry, and built environment and equipment sectors. These working groups provide working-level co-ordination through an informal process, facilitating both vertical and horizontal co-ordination by Canada's energy efficiency practitioners.

Inter-governmental co-ordination mechanisms

Mechanisms also exist by which national governments can co-ordinate EE implementation with sub-national governments. These mechanisms seem to work in countries with both federal and unitary forms of government. Federal governments can use these mechanisms to influence and co-ordinate outcomes in states or provinces which have considerable autonomy. Unitary states can use these mechanisms to implement national policies in partnership with local jurisdictions. Three types of inter-governmental co-ordination mechanisms – partnerships, demonstrations, and programmatic approaches – are described below (Figure **11.3**).

Figure 11.3 **Inter-governmental co-ordination mechanisms**



Partnerships

Co-operative partnerships between national government and sub-national jurisdictions are an effective inter-governmental co-ordination mechanism in unitary states with a limited and manageable number of sub-national jurisdictions. The SwissEnergy programme in Switzerland demonstrates the advantages of such vertical co-ordination.

SwissEnergy, Switzerland

SwissEnergy is a key component of the Swiss federal government's energy and climate policy. The SwissEnergy program provides a mechanism for the federal government to work in partnership with local governments in promoting energy efficiency and renewable energy. SwissEnergy activities include voluntary agreements, promotional activities, training, research, and certification schemes. The programme also includes voluntary components that local governments can use to supplement or reinforce mandatory programmes.

The partnership approach of SwissEnergy entails co-operation and negotiation with cantons and municipalities, other federal offices, the private sector and civil society. Co-operation with cantons on energy efficiency is crucial, as the Swiss Constitution specifies that cantons have jurisdiction over regulation of

energy efficiency in buildings, while the federal government has jurisdiction over energy efficiency in vehicles and appliances.

Decision taken by SwissEnergy are made by a Strategy Group (Strategiegruppe). The Strategy Group includes representatives from the Conference of Cantonal Energy Directors, industry, trade associations and NGO, as well as Federal departments. The Federal Office of Energy within DETEC chairs the Strategy Group and manages SwissEnergy.

SwissEnergy activities are implemented by official partners and the cantons. Official partners are private entities selected by DETEC and designated to implement sectoral programmes. For instance, the official partner of SwissEnergy for Communities is a private association that manages a certification scheme (the Energiestadt label) and works with cities to improve their energy performance. Through SwissEnergy, the federal government implements a labelling system for energy efficient entities, products and services.

An external consultancy provides the federal government with a yearly impact assessment of SwissEnergy and makes recommendations on future SwissEnergy financial support for each canton's activities.

SwissEnergy's innovation lies in its partnership approach, which enables strong co-operation between the cantons and the federal government. Moreover, SwissEnergy relies extensively on public acknowledgement of partners (through certification of the official partners) and products and services (through labels).

Demonstration projects

Sub-national jurisdictions can go beyond the usual policy implementation by carrying out demonstration projects funded by national governments. These demonstration projects offer opportunities for experimentation and innovation on a small scale. Where successful, such demonstrations produce evidence to support new policies and implementation approaches. The Eco-Model Cities programme in Japan is a good example of a demonstration project approach to inter-governmental co-ordination.

Eco-Model Cities, Japan

The Eco-Model Cities (EMC) programme is an initiative of the Japanese national government that mobilises cities to achieve national greenhouse-gas (GHG) emissions reduction targets. The programme goal is to demonstrate city-level approaches to emissions reduction that can be replicated across the country. EMC invited proposals from Japanese cities; those cities selected received funding and advice from the national government.

Five criteria were used to select the Eco-Model Cities:

- amount of CO_2 reduced (potential for more than 30% reduction by 2020);
- potential to become a model for other cities;
- characteristics that respect local conditions;
- realistic goals and plans; and
- sustainability.

Selected cities prepare action plans, which are reviewed annually by the government and the EMC programme committee. Management of the EMC programme is the responsibility of the Regional Revitalisation Bureau of Cabinet Secretariat (RRBC). Replication of EMC results is facilitated by the Promotion Council of Low Carbon Cities (PCLCC), made up of 100 municipalities including 13 EMC participants.

The EMC programme facilitates co-ordination on three levels: first, it establishes a partnership between the prime minister's cabinet and the ministries; second, it fosters partnerships between the central government and cities; and lastly, it facilitates partnerships among industry, government and academia.

Programmatic approaches

Programmatic approaches are an effective vertical co-ordination mechanism in complicated federal systems with multiple sub-national jurisdictional levels. In this approach the national government takes the lead in providing guidelines, assigning tasks, and offering funding and technical assistance to sub-national governments. An example is the US Weatherization Assistance Program, which utilises community block grants to fund state and local weatherisation assistance efforts.

Weatherization Assistance Program, United States

Inter-governmental co-ordination on energy efficiency is important in the United States as federal and state agencies are responsible for different issues. A programmatic approach to coordination, such as that taken with the Weatherization Assistance Program (WAP), enables the federal government to provide resources and assistance to states in exchange for their help in implementing EE programmes.

WAP is administered by the US Department of Energy (US DOE) Energy Weatherization and Intergovernmental Program, and provides federal funding to states, US territories and Indian tribes for projects aimed at decreasing fuel poverty by improving the energy efficiency of eligible families' homes.

The US DOE awards WAP funding to state energy efficiency and housing agencies, based on grant proposals and using a block grant formula. The Department sets national guidelines for eligibility, determines the technical merit of EE measures, and provides technical training and assistance. States determine standards and eligibility, form contracts with local weatherisation agencies and monitor their work to ensure quality.

US DOE field offices monitor the use of funds by states. If a claim of misused funds (or poor service) is made, the state government has jurisdiction. The US DOE can suspend funding if a state is found not to adhere to guidelines.

State energy programmes provide rebates to consumers for home energy audits, support for renewable energy projects, promotion of ENERGY STAR products, and other efforts that help families save money on their energy bills.

WAP involves co-ordination, along with checks and balances, at several levels of government. The US Congress monitors the DOE, while the DOE monitors states, and the states monitor implementing agencies. Each level has the autonomy to make its own decisions based on its own priorities, but subject to compliance with overall federal government strategy.

Conclusions and guidelines

Co-ordination between and among levels of government is fundamental to successful EE policy implementation. Intra-governmental co-ordination is crucial to achieving economy-wide targets and goals in an efficient, effective, timely manner. Inter-governmental co-ordination provides national governments with an additional implementation mechanism, and can also create opportunities to demonstrate and refine new policy and programme ideas prior to widespread application.

Although there is no single approach to establishing or improving governmental co-ordination, policy makers should keep in mind the following guidelines.

Plan to co-ordinate. Apportioning EE implementation responsibility among government levels is driven by considerations such as technical and managerial capacity, credibility with consumers, economies of scale involved in the EE measure, and asset ownership. For example, bulk procurement schemes are better implemented at the national level, with distribution and monitoring undertaken at local levels. One respondent noted that: "local authorities' greatest strength is citizen trust, while their greatest liability is lack of technical expertise."

The relative capacity of different governmental levels should be considered as part of the EE policy implementation planning process. Core competencies and assigned responsibilities should be taken into account in this planning process as well the mechanisms for co-ordinating these governmental activities.

Build the capacity to co-ordinate. As energy efficiency policies become more comprehensive, an increasing number of government agencies will need to take on energy efficiency-related responsibilities. This implies a growing need to ensure these agencies have the capacity to fulfil their new roles.

In Korea, the growing importance of energy efficiency has been matched by considerable organisational development within government agencies. Each ministry with major energy-efficiency duties (Ministry of the Knowledge Economy [MKE]; Ministry of Land, Transport, and Maritime [MoLTM]; Ministry of Public Administration [MoPA]) now has an Energy Efficiency Cell, looking after their sectoral responsibilities. MKE is the apex agency for energy, and is responsible for co-ordinating with representatives from each of the sectoral EE Cells.

Devolving implementation responsibility without adequately building capacity can constrain implementation results. In Thailand, the Ministry of Interior (MoI) has overall responsibility for building codes, but has been unable to take on responsibility to implement the new thermal building code. As a result, the thermal building code is in place but has not yet been promulgated or enforced.

Capacity building is a prerequisite to effective co-ordination, especially when institutional partners are unaccustomed or unfamiliar with EE programmes or technologies. This is especially true when expansion of national energy efficiency efforts places new work burdens on non-energy agencies at any level of government. It is important to build capacity within partner institutions commensurate with the implementation role expected of them.

Co-ordinate among overlapping policy areas. In many countries, climate change policy is the purview of the environment ministry, while energy efficiency policy is the responsibility of an energy or natural resources ministry. These two policy areas often overlap, creating greater need for inter-governmental co-ordination. In Korea, for example, responsibility for new Low Carbon and Green Growth Policy and strategy is the responsibility of Ministry of Environment (MoEnv), whereas the Ministry of the Knowledge Economy (MKE) is in charge of energy. Co-ordination of overlapping policy areas ideally should be undertaken by very high-level co-ordinating committees chaired at the prime ministerial level.

Capitalise on the strengths of different government levels. Most EE experts expressed similar views on the appropriate roles of different levels of government in developing and implementing EE policy. Respondents felt that regulatory policies should be set at the national level, with implementation, including compliance monitoring and enforcement, taking place at the regional or municipal level.

There is a trend towards devolution of implementation responsibility, but the process can be complex. Swiss authorities at the federal, cantonal and municipal levels are engaged in an on-going discussion on EE implementation responsibilities. Cantons are now responsible for thermal regulations for buildings;

however, municipalities own 10% of the total building stock, and have expressed interest in pushing beyond the canton-level thermal building code requirements. Energy efficiency in district heating is a concern of both the federal and municipal level, but the canton level is currently excluded from this sector. Energy efficiency in electricity is shared by the federal government, which has responsibility for appliance efficiency, and the municipal governments, which manage their own municipal utilities. Such intra- and inter-governmental complexity as illustrated in the Swiss case underscores the importance of country context and government structure in assigning EE implementation responsibilities.

Until recently, energy efficiency policy in the United Kingdom was highly centralised, with the Department of Energy and Climate Change (DECC) and the Office of Gas and Electricity Markets (Ofgem) promulgating policies. Implementation was carried out by energy suppliers and the two trusts: the Energy Saving Trust and the Carbon Trust. Local councils are being given more implementation responsibility to capitalise on their understanding of local context and familiarity with community engagement requirements. Local councils are particularly engaged in two programmes (Warm Zones and the Community Energy Savings Programme) that focus on delivering weatherisation and housing rehabilitation services to vulnerable populations.

Policy makers should take advantage of the strengths of each government level and co-ordinate to ensure that these strengths are maximised to implement energy efficiency.

12. Energy efficiency targets

Introduction

Energy efficiency (EE) targets are specific policy or programme objectives that can be expressed quantitatively. As such, EE targets are frequently used in developing EE policies and programmes. Governments find targets useful as a means of helping to motivate policy implementers, tracking implementation results and identifying the need to make mid-term adjustments. Targets also provide a concrete basis for organising multi-year programmes, justifying funding and obtaining resources.

However, targets can be abused as well as used. If not carefully constructed, they can mislead or give a false impression of government action. Moreover, targets can be counter-productive if they stretch credibility or are impossible to achieve. To be useful in measuring progress, targets need to be accompanied by a strong analytic capacity, high-quality data and a transparent measurement process.

Key issues and research questions

- What role do targets play in an overall system of energy efficiency governance?
- What kinds of targets exist?
- How should targets be formulated and expressed?
- What other considerations enter into setting targets?

Importance

International dialogue on climate change mitigation has led to an upsurge in the use of targets to express objectives for energy efficiency improvements and greenhouse-gas (GHG) emission reductions. Notable examples include the UN Framework Convention on Climate Change (UNFCCC) and the European Union's Energy End-Use Efficiency and Energy Services Directive (2006/32/EC). This review found 49 countries with one or more EE targets (see Annex 3) and noted increased diversity in how targets are expressed.

Energy efficiency targets can be formulated and expressed in several ways (Table **12.1**): as a **defined improvement** (*e.g.* a specific volume of savings or a rate of energy savings or decrease in energy consumption); an **improvement in energy intensity** (*e.g.* energy consumption or emissions per unit of output or economic activity); an **expression of elasticity against another index** (*e.g.* energy demand growth/GDP growth) or as a **relative benchmark** (*e.g.* standing relative to a benchmark). Targets can also be expressed as **transactions**, such as the number of compact fluorescent light bulbs (CFLs) installed or the number of homes that are weatherised.

Two other parameters are needed to fully describe a target: level of aggregation and time frame. Targets can apply to an entire economy or to a consuming sector or sub-sector within that economy. Targets can also be expressed annually, over a period of a few years, or well into the future.

Table 12.1 **Formulating energy efficiency targets**

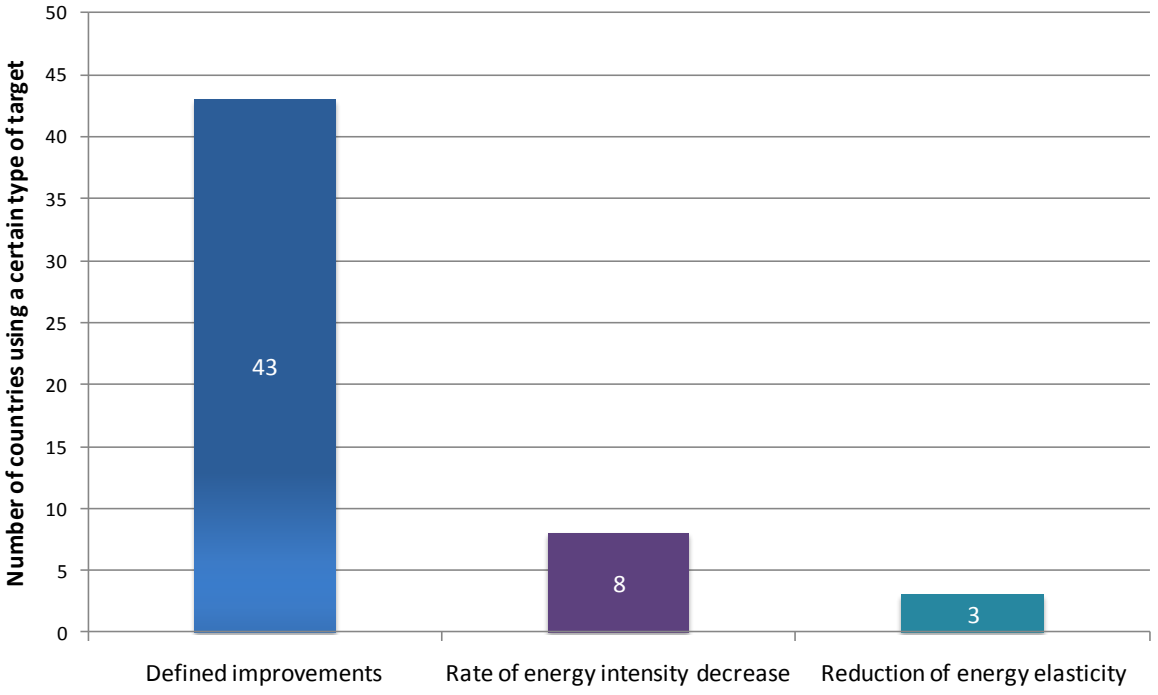
Type of target	Level of aggregation	Time frame
Defined improvement • Volumetric or percentage change in energy consumption or emissions (GWh, Mt CO_2) ***Intensity*** • Energy consumption or emissions per unit of output or economic activity ***Elasticity*** • Ratio of growth in energy consumption or emissions to growth in GDP or output ***Benchmark*** • Energy consumption or emissions relative to others ***Transactional*** • Buildings weatherised • CFLs installed • All cost-effective EE	Jurisdiction Sector Industry Enterprise Facility End-use	Short term (annually) Medium term (5-20 years) Long term (20+ years)

Defined improvement targets can be expressed volumetrically (*e.g.* energy saved or emissions reduced) or as a rate of improvement (*e.g.* percentage change against a baseline year or scenario). As long as the target is fully defined, these two expressions are equivalent and substitutable. For example, the now-binding target for EU member states under the Energy End-Use Efficiency and Energy Services Directive (2006/32/EC) is an energy saving target of 9% by 2016, measured against a 2008 baseline.

Intensity targets are expressed as a ratio of consumption or emissions against another physical quantity*, e.g.* manufacturing output or economic activity. Elasticity targets are expressed as a ratio, *e.g.* ratio of annual energy growth per unit of annual GDP growth. Benchmarking targets are expressed as comparisons within a cohort, *e.g.* top 10% of energy-efficient industries or countries. Defined improvement and transactional targets are easiest to formulate and monitor. Transactional targets are simply a numerical objective expressed as a physical quantity. Of these several formulations, defined improvement and transactional targets are the easiest to understand and monitor and are therefore the most commonly used.

More and more countries are setting binding targets for energy efficiency or greenhouse-gas (GHG) emissions reduction. A recent World Energy Council (WEC) report found that almost half of the 76 countries surveyed had some form of target for energy efficiency or GHG emissions – or for both in some cases. More than half of European and OECD countries have quantitative targets. The WEC found that most countries express their targets as a defined improvement (Figure **12**.**1**).

Figure 12.1 **Countries with quantitative EE targets and mode of expression of the target**



Source: WEC 2008.

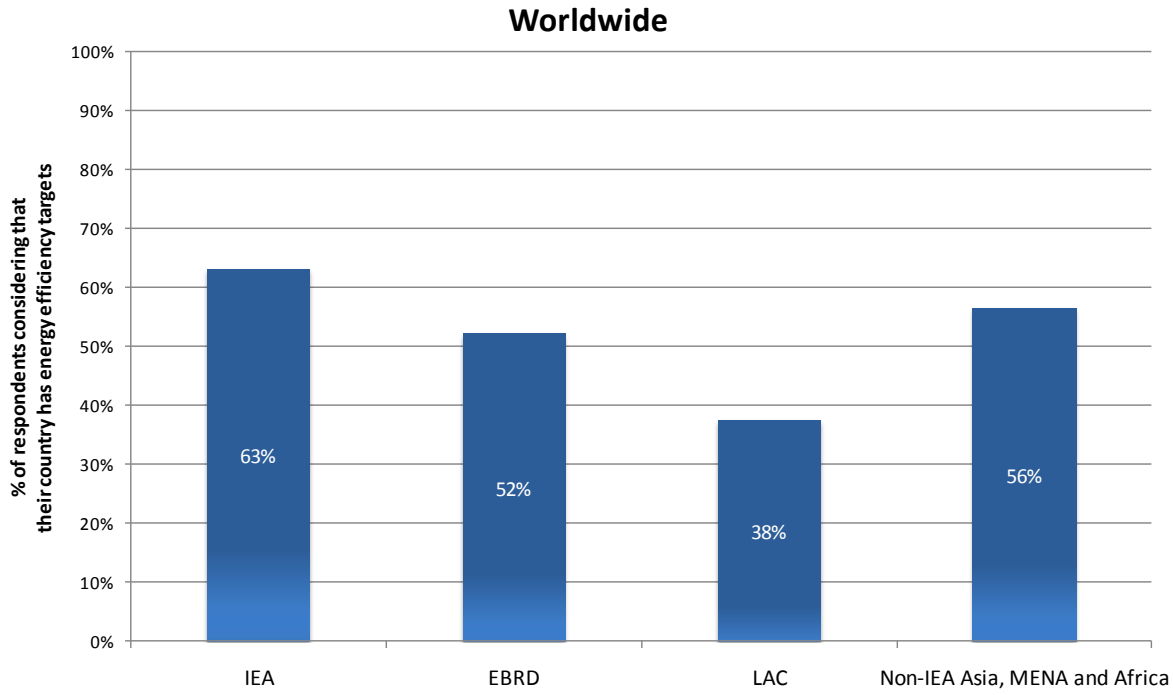
Findings

The findings presented below were derived from three sources: the institutional survey, interviews with EE experts and the literature, including a recent IEA working paper on EE target setting (IEA, 2008a).

Survey respondents were asked whether EE policy in their countries is guided by measurable EE or related targets. If so, they were asked to describe the target(s) in detail, for example, by sector, type, magnitude, baseline year, target year, scope and stringency. Interview respondents were asked to describe any energy efficiency targets in use.

Survey and interview results from the IEA research mirror the earlier work by WEC. Almost two-thirds of IEA member countries considered their EE policies to be guided by measurable targets. A majority of countries supported by the European Bank for Reconstruction and Development (EBRD) and of countries in non-IEA Asia, the Middle East and North Africa (MENA) and Africa also reported some sort of measurable target as used to guide and track their EE efforts. Only in the Latin America and Caribbean (LAC) region did a minority of respondents report numerical energy targets.

Figure 12.2 **Is EE policy in your country guided by measurable EE or related targets?**



Survey and interview results demonstrate considerable diversity in terms of how targets are formulated and expressed (Table **12.2**). Defined improvements were found to be the most common type of target, and were most often expressed as a percentage change in aggregate or sectoral consumption by a target date and measured against a baseline year. A complete list of country targets identified is provided in Annex 3.

Table 12.2 **Examples of energy savings targets**

Country	Target description*				
	Sector	Type and description	Target	Baseline year	Target year
China	Economy-wide	Reduced energy intensity relative to a baseline year	20%	2005	2010
European Union	Economy-wide	Reduced energy consumption relative to a baseline year	9%	2008	2016
Indonesia	Economy-wide	Elasticity	Less than 1.0**		2025
Mexico	Buildings Transport Appliances and lighting Industry	Reduced energy consumption relative to a baseline year	16% 26% 52% 12%	2009	2030
Russia	Economy-wide	Reduced energy intensity relative to a baseline year	40%	2007	2020
Turkey[17]	Buildings	Transactional	10 million buildings	N/A	2020
Vietnam	Economy-wide	Reduced energy consumption relative to a baseline year	5% to 8%	2011	2015

Notes: *Most of these countries have more than one target. Country names provide links to more complete information, with the exception of Turkey as this target was reported in interviews. ** An elasticity of less than 1 means that the energy demand growth rate is less than the GDP growth rate.

[17] Source: interviews.

Many countries including China, Japan, Korea, New Zealand, Singapore and Vietnam, have adopted national defined improvement targets. Other countries (Mexico) have set defined improvement targets at the sectoral level, which reflect variations in efficiency improvement potential. The target time-frame varies from 5 to 20 years, often including interim targets.

Many targets have been set within the context of international co-operation on climate change. In the run-up to the 15th Conference of the Parties to the UNFCCC (COP 15), Canada set a defined improvement target to reduce GHG emissions 17% by 2020 and 60% by 2050, relative to a baseline scenario. Although priority areas have been identified, these targets have not been allocated to the sector level. Singapore submitted a provisional target to the UNFCCC ahead of COP 15 that included a 16% reduction from a "business-as-usual" (BAU) scenario by 2030, contingent upon a global climate-change agreement. In the absence of a new climate treaty, Singapore's agreed target is an 11% reduction by 2030.

Some target-setting specifically supports national policies and action plans. Colombia developed an action plan for the period 2010-15 that included targets based on analysis of estimated market potential in the power sector by itself and for energy consumption overall. The Indonesian Master Plan on National Energy Conservation (revised in 2005 and under additional revision in 2010) will feature an economy-wide target to decrease energy-GDP elasticity to below 1.0 by 2025, and a sector-wide target to decrease energy intensity by 1% each year (on average) until 2025. Thailand also has a target to reduce the energy-GDP elasticity to below unity. Turkey's national energy efficiency strategy includes an aggregate savings target per unit GDP as well as transactional targets (*e.g.* heat conditioning 10 million buildings by 2020). Ukraine's National Agency for Energy Resources (NAER) has issued an order requiring each sector ministry to develop programmes and targets for the period 2010-15. NAER has stipulated an overall reduction of GDP intensity by 20%, but sectoral targets will vary according to improvement potential and investment requirements.

Several US states have recently set ambitious energy savings targets. In 2007, the Governor of New York endorsed the "15 by 15" policy, setting a target of 15% reduction from BAU energy use by 2015. This target was based on a detailed study of the technical and economic potential of electricity and gas EE improvements. In Massachusetts, the 2008 Green Communities Act (GCA) set a target for energy suppliers, in conjunction with the state regulator, to "implement all cost-effective energy efficiency". The GCA calls for the regulator to collaborate with suppliers and other stakeholders to determine specific energy reduction targets and investment requirements based on this qualitative target. The result was a defined improvement target to reduce electricity consumption by 2.4%, to be accomplished with a fourfold increase in energy-efficiency spending.

Discussion

The examples described above provide insight into how targets have been used to express EE and climate change mitigation aspirations and as a foundation for developing EE programmes. The following discussion describes considerations to be kept in mind when developing a specific EE target.

Political utility

Energy efficiency targets serve an important political function in addition to providing the basis on which to organise programmes and track results. Adopting a target is a statement of the importance of EE policy in relation to other government priorities; as such, it helps mobilise stakeholders, build political consensus and increase awareness. It is also useful in holding ministries and politicians accountable for implementation

progress and legitimising energy efficiency organisations or other institutions charged with reaching the target.

The value of targets relative to other aspects of EE governance should not, however, be overstated. Most experts interviewed agreed that targets are "useful", but several placed higher priority on activities such as establishing legal frameworks for EE rules and regulations, and setting oversight and reporting requirements.

Target horizon

Setting targets means balancing ambition and practicality in terms of aspirations and time frames. Targets set too far in the future risk being perceived as irrelevant and make it easy to justify slow initial progress, reasoning that delays are acceptable because progress will "ramp up" in later years. The opposite risk is that a long list of shorter-term targets often crowds-out the necessary longer-term targets.

One proven approach is combine the two: a long-term target has more urgency and practical value if it is accompanied by one or more interim targets. Poland has established a 9% energy-savings target for 2016 (in compliance with EU Directive 2006/32/EC), but has also set an intermediate target of 2% in 2010. Korea's Low Carbon Green Growth strategy includes an economy-wide target of reducing carbon intensity 40% to 45% by 2030. This long-term goal is supported by a detailed plan that will double the rate of annual improvement in GHG intensity over the next five years, thereby establishing the trajectory required to meet the long-term goal. Similarly, the Global Warming Solutions Act, recently passed by the Massachusetts State Legislature, requires the Commonwealth to reduce GHG emissions by at least 80% below 1990 levels by 2050. This extremely long-term goal is supported by mandatory interim targets for 2020, 2030 and 2040, set by the Secretary of Energy and Environmental Affairs. The target for 2020 has already been set at 20% reduction below BAU.

Economy-wide vs. sectoral targets

Many countries set goals at a macro-economic level, but this can create problems when allocating goals to the sectoral and industry level. Applying a single economy-wide goal, without considering variations in sectoral efficiency improvement potential or investment costs, may be inefficient and could be disruptive. Allocations of economy-wide targets to the sector level should consider differences in technical, economic and market potential of energy efficiency.

A sectoral approach to target-setting recognises the differences in improvement potential across sectors and can yield an economy-wide result at lower cost and with fewer disruptions. Mexico used this approach (Table **12.2**) to set aggressive targets for appliances (52% reduction in energy use) and transport (26% reduction in energy use) but more modest goals for buildings (16% reduction in energy use) and industry (12% reduction in energy use). Such sectoral goal setting requires a strong analytic basis, and should include consultations among energy efficiency experts and stakeholders from each sector.

Strong analytic basis

Targets should be set realistically, and should reflect previous progress in energy efficiency improvements, the current energy intensity of stock and infrastructure, and future improvement potential in the light of advances in technology. During interviews, several experts stated that targets are often built on incorrect or suspect data or assumptions. Others reported that targets "lack substance and are so vague they are meaningless". The best way to set a realistic goal is to conduct *ex ante* evaluations of EE improvement

potential at the end-use or sub-sectoral level. Massachusetts used this procedure to translate the obligation to "implement all cost-effective energy efficiency" into annual defined improvement targets.

Target management

The symbolic value of targets creates a tendency for them to proliferate. Over time, the policy landscape can become crowded with different targets for different physical parameters and time-frames. This tendency can be seen in several countries in which formulation of climate change policy has resulted in new targets that overlay previous EE policies and targets. This effect can be seen in Annex 3, which lists multiple GHG emissions reductions, energy savings, plus other targets for some countries.

Many experts described national EE targets as not well integrated with EE policy planning and implementation. Moreover, EE targets sometimes employed different measurements and time scales. In some cases, energy efficiency experts from one country held different views on which targets were in force. Other experts noted that targets change too frequently, making it difficult to keep track. Lack of clarity and target "churn" obviously undermine implementation efforts. Improved documentation and communication of targets is needed, with targets clearly linked to and aligned with national energy efficiency strategies and action plans.

Responsibility for results

A target by itself is of little use without a responsible agency. Many experts said that progress against targets is not adequately monitored and evaluated. One expert noted that there is "little formal enforcement or fulfilment" of mandatory targets. In some cases, responsibility for tracking progress and ensuring results is unclear, particularly when the target is set at the economy-wide level.

Korea provides an example of good practice in this regard, in that sectoral ministries are responsible for ensuring that targets are met: the Ministry of Land, Transport and Marine for transport construction; the Ministry of Knowledge Economy for industry and appliances; and the Ministry of Public Administration for the public sector. These ministries also co-ordinate to ensure that sectoral refinements are reflected in economy-wide progress (a process described further in Chapter 11). Ireland, New Zealand and Poland have also assigned responsibility for evaluating progress against targets to specific government agencies.

Conclusions and guidelines

This review of the role of targets within an energy efficiency governance system suggests some specific guidelines on target setting. Following these guidelines will help ensure that the targets adopted are useful and not abused.

Ensure targets are supported by adequate resources and enabling frameworks. Setting targets in the absence of resources and enabling frameworks undermines the credibility of energy efficiency policy and weakens organisational and stakeholder resolve.

Ensure targets have medium-term relevance and balance stringency with achievability. Targets that are too ambitious or set too far in the future lose political value and practical utility. If the target is set too high, it will be unachievable, thereby creating a disincentive to any serious attempt to meet it. Targets set too far in the future risk creating complacency rather than urgency on the part of implementing agencies. Targets that are not sufficiently stringent will invite criticism from stakeholders and risk the credibility of the EE policy.

Targets should be underpinned by analysis and consultation. This process should include consultations among sectoral EE experts and with external stakeholders. Target-setting should be undertaken with the support and commitment of agencies responsible for implementation.

Targets should be straightforward to monitor. Targets should be simply stated and straightforward to monitor. Ideally, governments should be able to monitor progress towards targets using existing data-collection infrastructure. Countries without data-collection processes in place should devote resources to building a results-monitoring capability.

Avoid overlapping and competing targets. Creating too many targets runs the risk of overwhelming implementers. Targets should be well co-ordinated, to avoid the risk of conflicts among individual targets or duplication of effort. This applies especially when targets are being used in policies which are closely-linked, such as EE policy and climate change policy.

Targets should be clearly communicated and documented. Many interviewees and survey respondents found that targets are "not widely appreciated or understood". Targets are a summary and tangible expression of energy efficiency policy, and should be clearly communicated and documented.

13. Evaluation

Introduction

Evaluation is defined as the assessment of the outcomes of a policy or measure, and of the inputs required to generate such outcomes. In the context of energy efficiency, evaluation is "the process of determining and documenting the results, benefits, and lessons learned from an energy efficiency program" (US EPA, 2007a). Widely accepted evaluation good practice includes: cost/benefit comparisons; comprehensive assessment of outcomes and inputs; and use of sound methodologies, including pre-defined evaluation criteria, development of indicators, and statistically valid data collection methods.

Evaluation is a critical part of good energy efficiency (EE) governance. Evaluation is needed to test planning assumptions, monitor overall results, compare programme performance, fine-tune implementation processes, and incorporate lessons learned into future policies and programmes. Evaluation is particularly crucial to EE programmes because energy efficiency impacts are difficult to measure – in effect, one must find ways to measure the amount of energy that was *not* used. Unlike other types of investment, energy efficiency cannot be directly measured in terms of incremental physical output; rather, it must be evaluated as a decrement (or reduction) against a baseline of consumption or expense. Energy efficiency programme managers and evaluators thus face a complex task in confirming the benefits of EE policies and programmes. The added complexity makes energy efficiency evaluation methodologically difficult and costly.

Key issues and research questions

- Is evaluation of EE policies and programmes common practice?
- How can evaluation contribute to good energy efficiency governance?
- Who should perform evaluations?
- Is there a universal standard of effective evaluation or good evaluation practice?
- How can an evaluation culture for energy efficiency be created?

Importance

Evaluation plays a role in all phases of an EE policy or programme, from early planning to completion and beyond (IEA, 2008b):

- Evaluation of the results of previous energy efficiency policies and programmes helps decision makers to determine which are the most cost-effective.
- Process and market evaluation during implementation assists EE practitioners with identifying problems and devising solutions.
- *Ex-post* impact evaluations provide detailed results on whether a policy or programme has delivered as promised. Such evaluations are vital when energy efficiency has resource value, *e.g.* is substituting for energy supply additions.
- Evaluations can be aggregated to verify whether overall targets contained in economic development, energy plans or climate commitments have been satisfied.

Three relatively recent developments have boosted the importance of evaluation: (i) governmental commitments to greenhouse gas (GHG) emissions reduction under the United Nations Framework Convention on Climate Change (UNFCCC); (ii) the use of supra-national efficiency instruments, such as the EU Energy Services Directives; and (iii) adoption of national energy efficiency policies and targets. Unfortunately, however, in many countries evaluation capacity has not kept pace with the scaling-up of EE policies and programmes.

Literature review

The literature on evaluation of EE policies and programmes includes guidance on formulating evaluation problems, as well as analytic procedures for conducting evaluations and expressing the results. An evaluation guidebook prepared under the IEA DSM Implementing Agreement framework outlined the main elements of an EE evaluation:

- **a logical framework** stating the relationship between the policy or programme intervention and the desired outcome(s);[18]
- **a specified analytic basis** for measuring the success of a programme or policy;
- **a baseline or status quo** against which results (outputs or outcomes) will be evaluated;
- **selection of an evaluation strategy**, with a level of effort commensurate to the evaluation objective;
- **results expressed** in terms of energy savings, emissions reductions and other standard measures of impact; and
- **calculation of value-for-money spent**, *e.g.* benefit-cost or cost-effectiveness analysis (IEA DSM Implementing Agreement, 2005).

A less formal but also useful approach to evaluation is to pose practical questions about an EE policy or programme. This method reflects the different types of evaluation needed (impact, process, market, technology), depending on the nature of the EE policy or programme and the audience for the evaluation.

- Impact evaluation questions:
  - What proof can be provided (to policy makers, regulators, or oversight entitles) that this activity or intervention is having the desired impact (on energy use, CO_2 emissions, customer retention, profit margins, etc.)?
  - Is there any evidence that participants trade the savings they gain from lower energy bills for other benefits, thus offsetting the desired impact?
- Market evaluation questions:
  - What proof can be provided (to policy makers, regulators or industry) that this activity is transforming the market and creating new business opportunities?
  - Are new vendors of the promoted equipment entering the market?
  - Is market share for efficient equipment increasing?
  - Is the programme still needed?
- Process evaluation questions:
  - What proof is there that programme funds are being spent effectively?

[18] The Guidebook refers to this formally as the "policy measure theory".

  - What steps can be taken to improve administrative methods, programme design processes, or implementation and delivery structure?
- Cost-effectiveness evaluation questions:
  - Do the benefits from the policy or programme deliver value that exceeds the costs?
  - How does this policy or programme compare to other interventions with similar objectives in terms of value-for-expenditure (EU SAVE, 2001)?

Evaluation consensus protocols

Consensus protocols for impact evaluation have emerged from many years of EE evaluation experience in the United States, the European Union and elsewhere. The two most well-known protocols are the International Performance Measurement and Verification Protocol (IPMVP) and the California Energy Efficiency Evaluation Protocols (CEEEP). The IPMVP is acknowledged as the benchmark for evaluation of energy efficiency and resource conservation projects (Vine and Sathaye, 1999). It has the highest level of international acceptance, due to its comprehensive coverage of key monitoring and evaluation issues, and because it affords great flexibility for measuring and verifying different types of projects. The major limitation of IPMVP is its project-level focus: it is not suitable for evaluation of higher-level EE activities, such as programmes and policies. In contrast, CEEEP includes protocols for evaluation of regulatory policies (codes and standards) and technology development programmes.[19] Another very useful guidebook for organising evaluations is the *Model Energy Efficiency Program Impact Evaluation Guide*, developed under the auspices of the US National Action Plan for Energy Efficiency (US EPA, 2007a).

Evaluation good practice

The literature recommends certain practices that contribute to the role that evaluation plays in energy efficiency governance. For example, the question of who should perform evaluations is treated at length in the *Model Energy Efficiency Program Impact Evaluation Guide*, concluding with a recommendation that a third party should conduct evaluations. Third-party outsourcing provides for a more independent perspective, especially when the evaluator is retained by an overseeing entity, such as a utility regulator (this is the model in California, South Africa and other jurisdictions). When energy suppliers deliver EE programmes, it is common for utility staff to manage studies that are completed by third-party consultants. The utility and the regulator then review the results.

The choice of approach taken depends on how the evaluation is to be used. Whenever evaluation results affect financial incentives or penalties, third-party evaluation should be required as a matter of good evaluation governance. An alternative is to allow self-evaluation by the implementer, with third-party verification. This is the practice under the European Trading System for greenhouse gases (Pew Center on Global Climate Change, 2009).

Including evaluation as a part of implementation creates a close relationship between the evaluator and the implementer. This increases the likelihood that the insights provided by evaluation will be taken on board by implementers. Yet the decision as to where to assign evaluation responsibility requires balancing the need for independence and objectivity with the desire to have the evaluator close enough to the implementation process to provide ongoing feedback.

[19] Both may be found at: http://www.cpuc.ca.gov/PUC/energy/Energy+Efficiency/EM+and+V/

Another good evaluation practice is to perform evaluations on a regular basis that is attuned to the programme planning cycle. This makes it possible to incorporate the previous year's programme results into next year's programme design. Transparency is also important to good evaluation governance and one simple way to improve transparency is to establish a website on which evaluation studies are made available to all stakeholders.

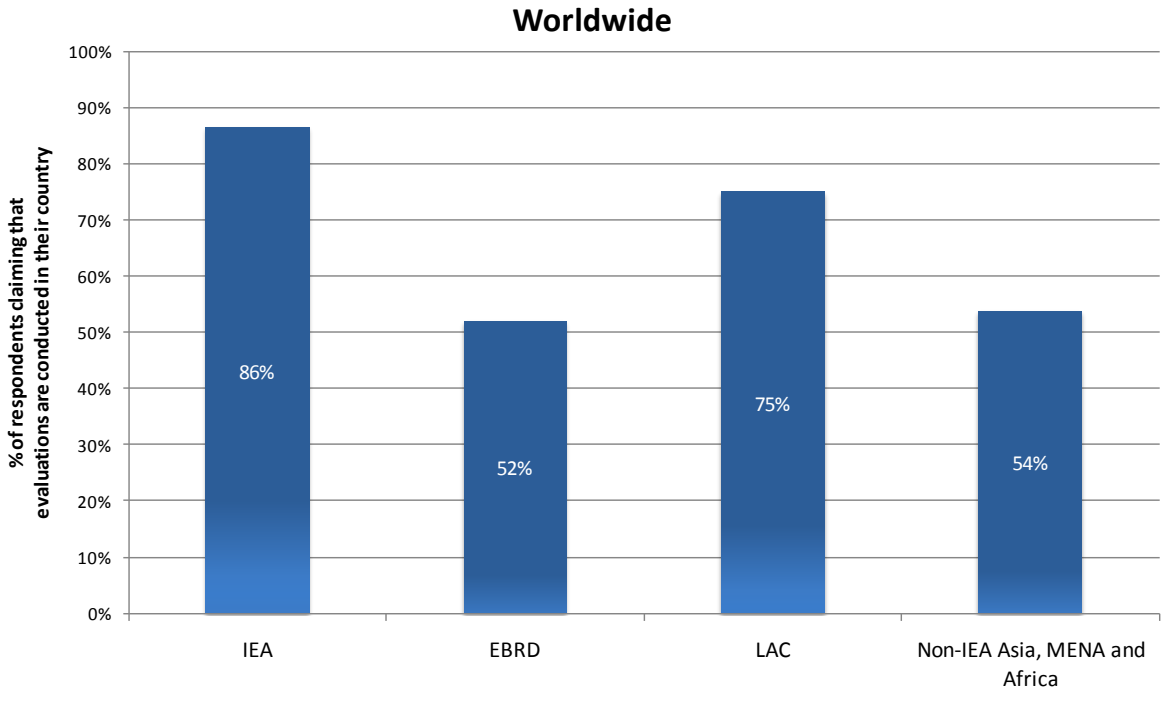
Findings

The following observations and findings on EE evaluation reflect responses of the survey and interviews, and the evaluation literature. Respondents were asked whether their country conducted evaluations of its EE programmes and, if so, who conducts these evaluations. Both survey and interview respondents confirmed shortfalls in EE evaluation.

Where is evaluation done?

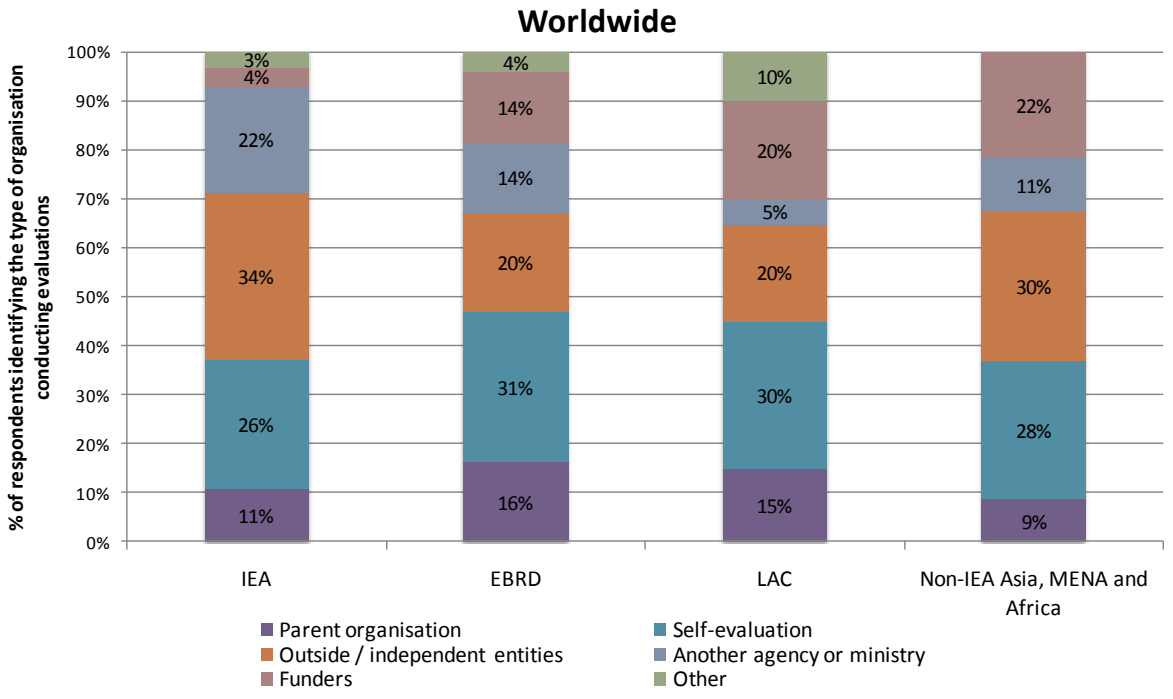
Most countries undertake some form of evaluation of their EE policies and programmes (Figure **13.1**). IEA member countries had the highest frequency of EE evaluation, with almost 9 out of 10 respondents indicating some form of evaluation. Respondents in the Latin America and Caribbean (LAC) grouping of countries also reported that evaluation was normal practice. In contrast, only about half of the respondents from countries supported by the European Bank for Reconstruction and Development (EBRD) and from non-IEA countries in Asia, Africa, and the Middle East and North Africa (MENA) reported evaluation efforts.

Figure 13.1 **Does your country evaluate EE policies and programmes?**



Respondents who reported evaluation efforts in their country were also asked who performed the work (Figure **13.2**). One-third of respondents in IEA member countries reported that evaluations are undertaken by third-party entities (*e.g.* universities or consultants), while another third identified another agency or ministry as responsible. Assigning evaluation responsibility to a parent agency or ministry to whom the EE organisation is accountable is a frequent practice. However, this makes it unlikely that policy or programme evaluations will be comprehensive, consistent or comparable across sectors. In all three non-IEA country groupings, self-evaluation was most commonly performed, with funders or donors playing a key role. Donors often create demand for evaluation by requiring that donor-supported investment or technical assistance include an evaluation of results.

Figure 13.2 **Who conducts energy efficiency evaluations?**



EE evaluation practices need strengthening in many countries

Survey and interview results show that many countries do not carry out evaluations at all, and others only superficially treat the complex interactions among policy and programme impacts, process and market variables, and costs. In some countries, evaluation is regarded as an extra expense that detracts from other programme tasks, such as performing audits or providing subsidies. Some countries do undertake evaluation, but only to the minimum level required and if funded by bi-lateral or multi-lateral donors.

Very few countries have a national protocol for EE evaluation that can be followed consistently by all EE organisations. The result is that, although many countries conduct evaluations, they are not performed in a uniform fashion for all EE policies and programmes. Experts in Costa Rica, Canada and Sweden reported that evaluations are conducted on some programmes and not on others. Experts from other countries (including Armenia, Chile, Indonesia and Mexico) stated that evaluations are conducted infrequently.

Reviews of EE policy and programme evaluations in the literature indicate uneven sectoral and spatial coverage. For example, less attention is given to evaluating public investment and research, development and demonstration (RD&D) than to evaluation of appliance standards. From a sectoral perspective, transport programmes receive less attention than most other sectors. Evaluations rarely examined high-level EE programmes, focusing instead on the performance of a single programme or policy (ECS, 2006b; IEA DSM Implementing Agreement, 2005).

Better data collection is needed for better evaluation

Lack of evaluation protocols, databases and data collection frameworks were all cited as impediments to creating effective evaluation processes. In Russia, the recently enacted Law on Energy Conservation and Increase of Energy Efficiency (Federal Law No. 261-F3) includes a list of more than 80 criteria, including evaluation protocols, for inclusion in federal, regional and municipal projects. Although the Law empowers the State Committee to collect data from large energy-consuming enterprises, the newly established Russian Energy Agency is still developing the evaluation protocols and collecting the data needed for evaluation.

In Sweden, the lack of evaluation capacity prevents policy makers and EE stakeholders from assessing the impact of existing policies before designing new ones. Respondents made suggestions to strengthen the evaluation capacity of the Swedish Energy Agency, and create a national protocol to evaluate EE policies that are not mandated by the European Union. Such a protocol would need to be developed and systematically applied by evaluators.

International conventions are spurring demand for evaluation

Experts from EU member states reported that activities in response to EU directives are more likely to be evaluated than other activities. The European Commission requires member states to report on the implementation of various energy efficiency directives, while the European Union carefully evaluates EE projects it sponsors in member states.

Experts in some countries highlighted donors and multi-lateral development banks (MDBs) as influential sponsors and also consumers of evaluation results. Many donor-supported projects require and specify impact or other evaluations. Some MDBs, including the World Bank, have disseminated guidebooks on EE policy and programme evaluation. An example is *Monitoring and Evaluation: Some Tools, Methods and Approaches* (World Bank, 2004).

One expert from Singapore listed compliance with UNFCCC former Annex 1 reporting standards as a major driver of evaluation, stating that a cross-agency EE policy group was established to monitor the programmes. This group is developing a reporting scheme that will be compliant with UNFCCC Annex 1 reporting standards.

Critical success factors for evaluation

Many interviewees suggested key criteria for building a stronger evaluation capability:

- **Common evaluation methods**. Experts in Russia, Sweden and elsewhere described efforts to develop common methodologies for evaluating energy efficiency. Such protocols help develop an evaluation culture within EE organisations.

- **Accurate statistics.** Experts in several countries, including Hungary, Russia and Tunisia, reported that accurate statistics are crucial, especially when evaluating progress towards targets. Incorporating evaluation needs into policy and programme planning will help identify data needs and collection approaches.
- **Adequate funding.** A diffuse constituency means that evaluation often comes up short during budget making. One solution is to set aside a percentage of policy or programme funds specifically for evaluation. This is the practice in many North American jurisdictions, including New York, Oregon, Ontario and California, and helps explain their strong evaluation culture. Setting aside adequate funds for evaluation early in the planning phase can help avoid situations in which EE evaluation is crowded out by other budget priorities.
- **Professionalism and calibre of staff.** Evaluation requires a rarefied skill set that include econometrics, engineering and market research. As retaining staff with these skills is often difficult, developing a cadre of highly skilled third parties should be a consideration for both energy efficiency organisations and government/regulators.

Discussion

Creating an evaluation culture

An evaluation culture is one that effectively integrates the impact, process, market and cost evaluations into the day-to-day process of EE planning, implementation and oversight. Such a culture does not emerge overnight; it takes years to develop and is generally part of an overall programmatic, institutional and regulatory structure. Finland, Canada, the United States and the United Kingdom are strong examples of countries in which an evaluation culture has flourished.

Motiva Oy in Finland has developed customised procedures and databases to standardise and speed up their evaluation efforts. Evaluators use a web-based system to collect information about savings and investments from every company they have worked with. The data are used not only to evaluate EE impacts, but also to produce models for calculating energy savings based on audit results. Auditors are trained to apply these models and report back to government on the savings achieved.

The Ontario Power Authority (OPA) in Ontario, Canada takes particular pride in its monitoring and verification (M&V) programme, and in its overall evaluation culture. Evaluators are selected from a revolving roster of third-party consultants, chosen on the basis of previous innovation in EE evaluation. All evaluations can be found on the utility's website. OPA also requires that each EE programme set aside 5% of programme funds strictly for evaluation purposes.

In the United Kingdom, several government bodies are involved in evaluation and measurement, including the Department of Environment and Climate Change (DECC), the Statistical Office and the electricity and gas regulator Ofgem. Evaluation responsibilities are not separated from implementation responsibility, based on the argument that the desire to improve should be a sufficiently powerful incentive to ensure that evaluations are well conducted. At present, many evaluations are contracted to third parties for expediency or to make up for insufficient in-house expertise.

Evaluation cultures have emerged in many EE organisations and energy utility companies in North America. The Energy Trust of Oregon (ETO) created a comprehensive evaluation framework that includes process, impact and market evaluations. The ETO has three full-time evaluators and also relies on significant outsourcing. The Trust conducts "Faster Feedback" market evaluations via panel sessions and focus groups.

Independence is assured by third-party consultancies that have the final authority on reports before they are submitted to the regulator. Although ETO manages the evaluation process, an Evaluation Committee (comprising ETO's Board of Directors) can access independent evaluation experts to conduct additional peer review. Most evaluations are posted on the ETO website for public review, reflecting the ETO's evaluation culture. The Trust also tracks cumulative energy savings; these figures form part of the performance standards measurement process that the regulator uses to grade the ETO's performance.

The New York State Energy Research and Development Authority (NYSERDA) performs programme self-evaluations under the regulatory oversight of the Public Service Commission (PSC). Out of total programme spending, 5% is set aside for both resource impact and process evaluations. An Evaluation Advisory Group is chaired by the PSC and evaluations are posted on the NYSERDA website.

The European Union is fostering an evaluation culture through the introduction of policies related to oversight and transparency. The EU Energy Service Directive, for example, requires member states to submit Energy Efficiency Action Plans to the European Commission for periodic review. Countries receiving funding for EE projects must also justify how EU funds are used. On a policy level, the European Commission requires member states to report on the implementation of various energy efficiency directives.

Establishing an evaluation culture requires concerted, long-term effort. Some common elements found among organisations that have developed such cultures include:

- high-level support;
- adequate resources;
- building evaluation into programme design;
- staff buy-in and understanding of evaluation procedures and importance;
- adequate oversight and quality assurance of evaluations; and
- transparency of evaluation process and results.

Evaluation and accountability

Evaluation plays a critical role in holding institutions that develop and implement EE policies and programmes accountable for results. Whether the institution is a regulated energy supplier or a governmental body, evaluation allows outcomes to be measured against expectations.

For chartered organisations or statutory companies, such as OPA or ETO, evaluation helps demonstrate whether the charter or statutory responsibility is being upheld. In Ontario, under the recently enacted Green Energy Act, local distribution companies (LDCs) are responsible for delivering conservation programmes as part of the provincial Power Systems Development Program. Each LDC is allocated a share of the 6 300 MW energy efficiency goal, and is accountable to the regulator under the terms of its operating license. An evaluation regime managed by OPA and the regulator determines whether the LDCs are meeting their obligations. In Oregon, state legislation gave the regulator, the Oregon Public Utilities Commission (OPUC), the authority to create a new organisation to oversee energy efficiency policies and programmes. OPUC specifically chartered ETO to be independent of government, but accountable to the regulator. Its charter includes minimum performance standards that the ETO Administrator must meet for their charter to remain in effect.

Evaluation is also vital to tracking progress towards targets and goals. In China, passage of the Energy Conservation Law (ECL), together with the 11th Five-Year Economic Plan, brought a new imperative to EE implementation at sub-national levels. The National Development and Reform Commission (NDRC) and the

National Statistical Bureau worked together to create the capacity to process all the energy and production statistics needed to track progress towards sectoral and provincial energy intensity targets. Energy efficiency implementation in China is strongly decentralised and local political leaders are accountable for meeting targets under the ECL and the 11th Five-Year Economic Plan. Each year, the central government evaluates the provinces on their performance using annual indicators, such as energy efficiency progress and administrative performance. In 2008, seven provinces did not meet their respective thresholds, which led to political repercussions for the provincial leadership.

Budgeting for evaluation

Evaluation costs vary widely according to the specifics of the measure being evaluated, the evaluation framework, the need for precision, the scale of the intervention and many other variables. Some experts recommend establishing clear evaluation budgets based on historical evaluation costs, and specifying an evaluation set-aside in all programme budgets. The 2008 edition of an annual compilation of energy utility-delivered EE programmes in North America calculated the average reported programme evaluation cost at 3% (Nevius, Eldridge and Krouk, 2009). Some agencies, such as NYSERDA and OPA, allocate up to 5% of programme budgets for evaluation.

Conclusions and guidelines

Based on the insights that emerged during the survey and interview, as well as the considerable literature on evaluation, it is possible to offer a few conclusions and suggest a path towards developing evaluation guidelines for EE organisations.

Integrate evaluation into good energy efficiency governance. Although perspectives on the role of evaluation differ between North America, the European Union and other regions, the importance of some form of evaluation is recognised almost everywhere. The information and insights gained from good evaluation are vital for improving policies and programme activities, and for communicating the results of EE efforts to policy makers and stakeholders. Evaluation results increase credibility, foster innovation and help build consensus on future energy efficiency efforts.

Tailor evaluation approach to programme design and objectives. Care must be taken when formulating evaluation objectives and evaluation needs should be considered early on in the policy or programme development process. An effective and efficient *ex-post* programme evaluation should be laid out well in advance of programme implementation. The evaluation plan should be a collaborative effort between programme designers, implementers and the evaluation community. The evaluation plan itself should reflect value-for-money and have a budget well within the guidelines for evaluation efforts (up to 5% of the programme budget).

Build ancillary capacity for evaluation. A strong evaluation framework relies on access to transparent, well-documented, accurate databases that are periodically reviewed for quality and consistency. These databases, depending on the type of energy efficiency scheme, can include energy and peak savings data, persistence data, product and market data, and consumer information.

Establish evaluation protocols. Governments must invest in developing an evaluation protocol that reflects country context and establishes broad guidance and standard usage. Such protocols are an invaluable tool for evaluators and EE practitioners; they also form the basis for training new programme evaluators and provide an as-needed resource for implementers, administrators, regulators and policy makers. Minimum content for a protocol should include: evaluation guidelines with a common set of evaluation definitions;

guidance on methodology and analysis tools; criteria for analysis rigour and dealing with uncertainty; conventions for calculating avoided resource impacts, avoided emissions and other key physical outputs; definitions of terms and a basis for cost-effectiveness analysis; allowance for non-energy co-benefits; and guidelines for budgeting evaluations and evaluation databases.

Adopt good governance rules. There are three main issues to remember when establishing good governance rules for the evaluation process: data credibility, independence and objectivity of analysis, and transparency of results. Addressing these issues can help to embed evaluation in the policy culture. In turn, this can lead to more effective energy efficiency policies.

Conclusions

Mobilising energy efficiency improvements is a key component of meeting the 450 Scenario proposed by the IEA to limit the extent of climate change. Improving energy efficiency will require deploying new technologies, market mechanisms and investment approaches on an unprecedented scale. Governments, stakeholders, and energy consumers and producers must co-operate and co-ordinate effectively to achieve the required scale and timing of EE improvements.

Achieving this level of collective action will be possible only through effective schemes of what this report refers to as energy efficiency governance – *i.e.* the combination of legislative frameworks and funding mechanisms, institutional arrangements and co-ordination mechanisms that underpin the implementation of energy efficiency strategies, policies and programmes. Experience from around the globe shows that attention to governance arrangements is a necessary condition for effectively meeting energy efficiency goals.

Despite uncovering a broad agreement on the importance of energy efficiency governance, this study shows a relatively low level of understanding of the role and core elements of an energy efficiency governance framework. To a certain degree, policy makers and stakeholders have essentially been driving energy efficiency governance "in the dark". This study set out to shed light on the road to effective energy efficiency governance, and was able to identify several elements of the governance framework that all governments should consider in their delivery of energy efficiency policies and programmes. **Enabling frameworks**, **institutional arrangements** and **co-ordination mechanisms** form the core elements of good EE governance; each can be further specific sub-areas (12 in total) that capture much of what the IEA has observed to comprise EE governance best practice.

What is good EE governance? Defining what comprises good EE governance is difficult, not least because there is so much variety in country context and government structure. An EE governance scheme that is effective in one country may fail in another. The most straightforward way to gauge the effectiveness of an EE governance scheme is to examine outcomes or results, rather than the scheme itself. Considering the literature and the results of this study, several outcomes stand out as being fundamental to an effective EE governance scheme. In this regard, the IEA recommends that governments implementing EE governance should at minimum undertake to:

- Confer sufficient authority to implement EE policies and programmes;
- Build political consensus on EE goals and strategy;
- Create effective partnerships for policy development and implementation;
- Assign responsibility and create accountability;
- Mobilise resources needed for EE policy implementation; and
- Establish a means to oversee results.

Alternative governance mechanisms can achieve similar results. Some governance mechanisms described in this study work extremely well in the country profiled, but may not work in a different country context. It is also the case that some activities will raise particular challenges in one case but not another: enacting EE legislation may be difficult in some situations, while mobilising the private sector may be difficult elsewhere. Fortunately, this study found that alternative governance mechanisms can sometimes achieve the same result, through different means. For example, if an EE law is difficult to enact, it might be possible to adopt a strategy or action plan that will have the same result of conferring the authority needed to implement EE policies (Table **ii**).

Table ii **Gauging the effectiveness of an EE governance scheme**

EE Governance Mechanisms	EE Governance Outcome Objectives					
	Confer authority	Build consensus	Establish partnerships	Assign responsibility and create accountability	Mobilise resources	Establish oversight of results
Laws and decrees	✓			✓	✓	✓
Strategies and action plans	✓	✓	✓	✓		
Funding mechanisms					✓	
Implementing agencies				✓	✓	✓
Resourcing					✓	
Role of energy providers	✓		✓	✓		
Stakeholder engagement		✓	✓		✓	
Public-private sector co-operation	✓	✓	✓		✓	
International assistance		✓	✓		✓	
Governmental co-ordination	✓	✓				✓
Targets		✓		✓		✓
Evaluation		✓				✓

Some governance mechanisms can deliver multiple results. Table 1 illustrates how several outcomes can be served by a single governance mechanism. Laws and decrees, strategies and action plans, public-private sector co-operation all have the capacity to deliver multiple good-governance results.

Linking governance mechanisms reinforces their effectiveness. The IEA study found many examples in which different governance mechanisms have been inter-linked in ways that multiply their effectiveness. Laws and decrees are the most common example, as an EE law provides a vehicle to establish multiple interrelated governance mechanisms. The New Zealand energy efficiency law, for example, not only created an implementing agency but charged this agency with the responsibility to develop a national EE strategy and to do so in a way that ensured engagement of certain stakeholders).[20] Thus the EE law established a network of reinforcing EE governance mechanisms.

[20] www.legislation.govt.nz/act/public/2000/0014/latest/DLM54948.html

Call to action

This report aims to help EE practitioners, government officials and stakeholders to establish the most effective EE governance structures, given their country context. It also provides readers with relevant and accessible information to support development of comprehensive and effective governance mechanisms. The IEA produced this document so that governments and stakeholders working on energy efficiency around the globe can learn from one another's experience – thereby being able to improve their governance of energy efficiency policies and programmes.

Ultimately, the IEA aim is to facilitate adoption of good EE governance on the global scale required to ensure the achievement of the energy efficiency targets set out in the 450 Scenario. As IEA analysis shows, reducing energy consumption through efficiency measures is the most cost-effective way to jump-start the much-needed energy revolution.

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Annex 1. List of energy efficiency laws

Country	Law title	Coverage (sector, end-users)	Enactment date	Key (or major) provisions	Reference
Albania	Energy Efficiency Law (2005)	Appliances Buildings Industry	2005	Authorised programmes to label electrical appliances and provide energy audits. Created an Energy Efficiency Fund.	www.unece.org/energy/se/pdfs/gee21/gee21_pub/GEE21_GlobalClimateChangeMitigation_ESE37.pdf
Armenia	Law on Energy Saving and Renewable Energy	Framework Industry	2007	Declarative law stating that energy efficiency is an objective of government policy.	www.munee.org/files/Eng_ES&RE_Law_041204.doc
Australia	Energy Efficiency Opportunities Act (EEO)	Industry Commercial Transport	2006	Compulsory energy audit, reporting and investment requirements for any organisation consuming more than 0.5 PJ/yr.	APERC (2010) www.ieej.or.jp/aperc/CEEP.html
Brazil	Law 10.295 on Energy Efficiency	Framework Labelling	2001	Sets out the National Policy for Conservation and Rational Use of Energy.	UNECE (2010) www.unece.org/energy/se/pdfs/gee21/gee21_pub/GEE21_GlobalClimateChangeMitigation_ESE37.pdf
Brazil	Law 9.991	Utilities	2000	Establishes a public benefit charge (PBC) whereby a percentage (0.5%) of the utility's revenues is earmarked for energy efficiency activities.	UNECE (2010)

Country	Law title	Coverage (sector, end-users)	Enactment date	Key (or major) provisions	Reference
Canada	Energy Efficiency Act	Appliances	1992	Authorised the federal government to set minimum energy performance standards and require efficiency-labelling schemes for energy-using equipment manufactured in one province, but sold in others.[21]	http://laws.justice.gc.ca/en/E-6.4/text.html
Ontario, Canada	Electricity Restructuring Act	Directive	2004	Established and empowered the Ontario Power Authority (OPA), which is charged with developing an integrated power system plan. Created a Conservation Bureau to provide leadership in planning and co-ordination of electricity conservation and demand management. Authorised government to set targets for conservation and renewable energy and set guidelines for the diversity of supply, with OPA charged with achieving these targets.	www.oeb.gov.on.ca/OEB/Industry/About+the+OEB/Legislation/History+of+the+OEB/Electricity+Restructuring+Act+2004

[21] This was one of the few things that the federal government could regulate, as the Constitution Act limits federal regulatory powers to inter-provincial commerce.

Country	Law title	Coverage (sector, end-users)	Enactment date	Key (or major) provisions	Reference
China	Energy Conservation Law	All but households	Revised 2007	Requires very large users to appoint energy managers, submit annual energy consumption reports and implement economical EE measures. Requires new buildings to comply with building thermal codes. Requires local governments to optimise, improve and encourage the use of transportation systems. Requires that appliances adhere to compulsory equipment standards and labelling requirements. Establishes preferential taxes for energy efficiency. Provides financial subsidies for EE lighting and other products.	http://china.lbl.gov/sites/china.lbl.gov/files/Overview.Energy_Policy_November2010.pdf
Costa Rica	Law 7447 Decree 25.584	Cross-sectoral	1996	Mandates the electric utility and the Ministry of Energy and Environment (MINAE) to execute rational energy programmes in companies with high-energy consumption levels. The law was passed to support the newly formed National Commission of Energy Efficiency, which was established by Executive Decree under MINAE and mandated to prepare and execute a national programme of energy efficiency.	www.bioenergywiki.net/images/f/f0/Alternative_Energy_in_Costa_Rica-_Opportunies_and_Barriers.doc
Czech Republic	Energy Efficiency Act		Number 406 (2000)	Delegated responsibility for energy planning to municipalities.	www.munee.org/files/406%20law%20in%20english_74.doc

Country	Law title	Coverage (sector, end-users)	Enactment date	Key (or major) provisions	Reference
Denmark	Energy Package	Industry Commercial	1995	A package of laws designed to yield a 20% reduction in CO_2 emissions over 10 years. Included are energy, CO_2 and SO_2 taxes on energy consumption, subsidies for energy efficiency measures, entry into agreements for energy-intensive companies, reduction in taxation of labour, and subsidies to the self-employed.	http://193.88.185.141/Graphics/Publikationer/Energibesparelser_UK/Green-tax-uk-rap.PDF
Ecuador	Executive Decree 1681	Public sector	2009	All government institutions must establish an Energy Efficiency Committee to introduce energy-saving measures.	UNECE (2010)
European Union	Directive 2002/91/EC	Thermal Buildings Codes	2010 Formal adoption of recast directive	Main legislative instrument at EU level to achieve energy performance in buildings. Under this directive, member states must apply minimum requirements as regards the energy performance of new and existing buildings, ensure the certification of building energy performance, and require the regular inspection of boilers and air-conditioning systems in buildings.	www.managenergy.net/products/R210.htm
European Union	Directive 92/75/EEC	Framework appliance-labelling directive	1992	Umbrella legislative instrument at EU level promulgating energy-efficiency labelling requirements on appliances.	http://ec.europa.eu/enterprise/sectors/electrical/documents/additional-legislation/index_en.htm

Country	Law title	Coverage (sector, end-users)	Enactment date	Key (or major) provisions	Reference
India	Energy Conservation Act	All sectors	2001	Provides legal frameworks, institutional arrangements and regulatory mechanisms at national and state levels to support EE. Various measures target different sectors. Creates a Bureau of Energy Efficiency charged with introducing stringent energy conservation norms. Requires that large energy users appoint energy managers, carry out energy audits, submit reports on annual energy use and comply with industrial energy norms. Requires that new buildings comply with building thermal codes. Establishes efficiency standards and labelling requirements for appliances and equipment.	www.powermin.nic.in/acts_notification/energy_conservation_act/index.htm
Indonesia	Regulation 70	Industry Buildings Appliances	2009	Designated enterprises required to hire an energy manager and undertake prescribed activities Authorisation for a compulsory appliance-labelling programme.	Interview with DGEEEU of MEMR
Japan	Rational Use of Energy Law	Factories Industry Transport Buildings Appliances	last revised 2002	This law imposes measures for factories and buildings, a designated examination body and machinery improvement.	www.enecho.meti.go.jp www.eccj.or.jp/law/rational_use_of_energy02.html#4

Country	Law title	Coverage (sector, end-users)	Enactment date	Key (or major) provisions	Reference
Jordan	Renewable Energy and Energy Efficiency Law (REEL)	Industry Commercial Household	2010	A bylaw of the REEL requires that large industrial consumers designate energy managers. L aw provides funding in the form of the Jordan Renewable Energy and Energy Efficiency Fund (JREEEF) and also creates a Rural Electrification Fund, both of which are financed through a public benefit charge that raises JOD 30 million (USD 42 million) annually.	www.energyboom.com/policy/jordan-passes-new-legislation-light-up-renewable-energy-growth
Kazakhstan	New Law on Energy Saving	Industry Housing All large energy users	2010	This law imposes regulation of the monitoring of governing bodies and introduces the State Energy Register. It presents the adoption of industry energy standards and the examination of construction projects/facilities and equipment.	UNESCAP (2010)
Korea	Energy Basic Law	Transport Household appliances	Enforcement in 2006	This law establishes the basic principles of energy policy and a national energy committee. It formulates a national basic energy plan and a plan for energy technology development. The law aims to assist consumers in choosing and purchasing more energy-efficient products.	www.asiaeec-col.eccj.or.jp/st-takes/pdf/kor/korea.pdf

Country	Law title	Coverage (sector, end-users)	Enactment date	Key (or major) provisions	Reference
Korea	Rational Energy Utilisation Act	Industry Buildings Equipment	1999 (amended)	Provides for the Ministry of Trade, Industry and Energy (MOTIE) to designate that large users must report annually on their production, energy facilities, equipment and energy use, and submit a corporate energy conservation plan. Creates a voluntary co-operation plan for the 200 largest energy users and provides for the Korea Energy Management Company (KEMCO) to assist them in meeting energy intensity goals. Creates a standards and labelling programme and a rating programme for electrical appliances and equipment. Long-term and low-interest rate loans from the Fund for Rational Use of Energy may be provided on request to install or retrofit energy efficiency on buildings or facilities.	www.unescap.org/esd/energy/publications/compend/ceccpart4chapter8.htm
Korea	Low Carbon and Green Growth Basic Law	All	2009	This law will enable government ministries to place compulsory requirements on industry and buildings. Also creates a Green Growth Committee to co-ordinate government activities and establishes a Green Certificates programme and compulsory negotiated agreements for all large users.	www.tradingmarkets.com/news/stock-alert/cgni_south-korea-enacts-low-carbon-green-growth-law-699595.html
Mexico	Sustainable Use/Energy Efficiency Law	Residential Commercial Industrial	November 2008	Provides the legal framework for the development and implementation of strategies, policies and programmes.	http://en.wikipedia.org/wiki/Electricity_sector_in_Mexico#Energy_Efficiency_Law

Country	Law title	Coverage (sector, end-users)	Enactment date	Key (or major) provisions	Reference
New Zealand	Energy Efficiency and Conservation Act	All sectors Appliances Labelling	2005	The Act is the legislative basis for promoting energy efficiency, energy conservation and renewable energy. It established the Energy Efficiency and Conservation Authority (EECA) as a stand-alone Crown entity with an enduring role to promote these aims across all sectors of the economy. It empowers the preparation of regulations to implement product energy efficiency standards and labelling, as well as disclosure of information to compile statistics on energy efficiency, energy conservation and renewable energy. The Act provides the enabling legislation for the New Zealand Energy Efficiency and Conservation Strategy (NZEECS).	www.legislation.govt.nz/act/public/2000/0014/latest/whole.html#dlm54948
Norway	White Paper on Energy	Cross-sectoral	March 1999	Objectives: • Limit energy use considerably more than would be the case if developments were allowed to continue unchecked. • Increase (by 4 TWh by 2010) annual use of central heating based on new renewable energy sources, heat pumps and waste heat. • Construct wind generators with a production capacity of 3 TWh/year by 2010. • Increase the land-based use of natural gas.	www.iea.org/textbase/pm/?mode=weo&id=148&action=detail

Country	Law title	Coverage (sector, end-users)	Enactment date	Key (or major) provisions	Reference
Pakistan	Energy Conservation Act	Industry	2008	The National Energy Conservation Centre (ENERCON) has forwarded the Pakistan Energy Conservation Bill 2009 to the Ministry of Law and Justice in order to trigger energy conservation and energy efficiency culture in Pakistan. When enacted by the government/parliament, it will reinforce ENERCON's programmes and policies on energy conservation. At the moment Pakistan has no law as such with respect to energy conservation and efficiency enhancement.	www.enercon.gov.pk www.encyclopedia.com/doc/1G1-204228709.html
Peru	Law 27 345 (Promotion of Efficient Use of Energy)	Cross-sectoral	2000 (Revised 2008)	This law assigns the Ministry of Energy and Mines (MINEM) as the competent authority to promote the efficient use of energy by creating a culture for the rational use of energy, the elaboration and implementation of sectoral energy efficiency programmes, and the promotion of energy efficiency consultancy services and ESCOs. In addition, through Supreme Decree No. 034-2008-EM of 19 June 2008, MINEM intends to develop and implement energy efficiency standards and labelling for a wider range of end-use appliances, and to develop and implement a comprehensive market transformation strategy.	www.ieej.or.jp/aperc/CEEP/Peru.pdf

Country	Law title	Coverage (sector, end-users)	Enactment date	Key (or major) provisions	Reference
Romania	Law Concerning the Effective Use of Energy	Framework	2000	This law aims to create a legal framework to set up and enforce national policy for energy efficiency.	www.munee.org/files/Romania%20Energy%20Efficiency%20Law.doc
Russian Federation	On Energy Conservation and Increase of Energy Efficiency (Federal law No. 261-F3)	All large energy users	2009	This law provides government regulations in the area of energy conservation and energy efficiency, including requirements for: • energy efficiency labelling of goods and commercial inventory of energy resources; • energy efficiency of buildings and installations in the residential and commercial sectors; • mandatory energy efficiency audit, inspection and monitoring (including requirements for data collections and analysis of the energy passports); • information dissemination and campaigns for awareness raising. • energy conservation and energy efficiency in the budget/governmental sector; • government support and stimulation of energy conservation and energy efficiency; and • enforcement of compliance.	www.ieej.or.jp/aperc/CEEP/Russia.pdf

Country	Law title	Coverage (sector, end-users)	Enactment date	Key (or major) provisions	Reference
Singapore	Vehicle Quota System Act	Transport	1990	This legislation limits car ownership in Singapore and thereby limits the number of cars allowed on the road. Ownership requires a certificate of entitlement (valid for 10 years); the quota system is based on categories of vehicles differentiated by engine size.	http://projects.wri.org/sd-pams-database/singapore/vehicle-quota-system
Singapore	Building Control Act	Buildings	1999 (Revised)	The Building Control Act gives BCA jurisdiction and responsibility to develop and enforce building codes, which specify a minimum thermal performance level of 50 w/m^2 for the envelope. The Act was recently amended to require that any new building larger than 200 m^2 must be Green Mark Certified/Basic Minimum, now a *de facto* building MEPS. All government buildings over 5 000 m^2 must meet the highest Green Mark standard: platinum. Incentives are provided to encourage private sector developers to attain the higher Green Marks: a 2% relaxation of gross floor areas (GFA) limitations.	www.bca.gov.sg/BuildingControlAct/building_control_act.html

Country	Law title	Coverage (sector, end-users)	Enactment date	Key (or major) provisions	Reference
Singapore	Environmental Protection and Management Act	Cross-sectoral	2002	Part 10A of this law focuses on Energy Conservation and imposes rules concerning: • registration of suppliers (Director-General should be notified of change in particulars); • modification of registered goods; • maintenance of records; and • display and affixing of energy label.	http://statutes.agc.gov.sg/non_version/cgi-bin/cgi_getdata.pl?actno=2002-REVED-94A&doctitle=ENVIRONMENTAL%20PROTECTION%20AND%20MANAGEMENT%20ACT%0a&date=latest&method=part&sl=1&segid=978072606-000004
Sweden	Programme for Improving Energy Efficiency Act (2004:1196)	Industry	2005	The programme aims to increase energy efficiency and create opportunities for tax exemption. The Directive gives energy-intensive companies in manufacturing industry, which are subject to the tax, the opportunity of being granted tax exemption on their electricity consumption, if they take action to improve their energy efficiency. The government has adopted a programme of improving energy efficiency in energy-intensive companies with the carrot of reduced taxation. Participation in the programme is voluntary, and is open to energy-intensive manufacturing companies that meet certain criteria.	Energy Charter Secretariat Energy Efficiency Working party Annex 2, p. 180

Country	Law title	Coverage (sector, end-users)	Enactment date	Key (or major) provisions	Reference
Sweden	The 1997 Bill on Sustainable Energy Supply			The bill places strong emphasis on energy efficiency, and also reinforces and concentrates government efforts to promote energy technology development. The 1997 energy policy decision established two programmes: a short-term programme (1998-2002) focusing on ways to increase the supply of renewable electricity and reduce electricity consumption; and a long-term (1998-2004) programme focusing on energy research, development and demonstration (RD&D).	http://iea.org/textbase/nppdf/free/2004/sweden.pdf
Switzerland	Mustervorschriften der Kantone im Energiebereich (MuKEn) model building regulations	Buildings	2000	A municipal law on energy efficiency in buildings that instituted seven milestones for the sector, and made the existing voluntary building codes into compulsory codes.	www.iea.org/textbase/pm/?mode=pm&id=3978&action=detail www.bfe.admin.ch/energie/00567/index.html?lang=en
Syria	Energy Conservation Law 3	All large energy users	2009	The law aims to maximise the lifespan of fossil fuel reserves, minimise negative environmental impacts and contribute to fulfilling sustainable development requirements, with a focus on energy conservation in the industrial, household, commercial, service, transport and agricultural sectors.	www.worldenergy.org/documents/syria.ppt

Country	Law title	Coverage (sector, end-users)	Enactment date	Key (or major) provisions	Reference
Chinese Taipei	Energy Management Law (EML)	All large energy users (mainly industry, transport, commercial)	2005	The EML is designed to govern the energy efficiency of energy-consuming devices. Energy utilisation facilities/equipment and vehicles must conform to established standards of energy consumption.	www.ieej.or.jp/aperc/CEEP/Chinese%20Taipei.pdf p. 3 www.moeaboe.gov.tw/English/laws/EnLMain.aspx?PageId=laws_02
Thailand	Energy Conservation and Promotion Act (No. 2)	All but transport	2007	This act imposes the following requirements: • Financial support for factories that produce EE products or are energy efficient (applies only to designated factories). • Appointment of an energy manager and reporting on energy production, use and energy efficiency. • Maintenance of records of energy use and equipment changes that affect energy use. • Setting of targets and plans for energy efficiency. • Appointment of registered auditor to conduct audits. • Compliance with EE standards, criteria and procedures in subsequent regulations, which require cost-effective EE audit measures to be implemented. • Designation of machinery and equipment as high efficiency, and support for producers and distributors of EE machinery and equipment.	www.eppo.go.th/admin/cab/law/2-1-E.pdf http://projects.wri.org/sd-pams-database/thailand/energy-conservation-and-promotion-act

Country	Law title	Coverage (sector, end-users)	Enactment date	Key (or major) provisions	Reference
				• Working capital, grants and subsidies for EE investments for public, state-owned and private consumers; grants for EE programmes. • ENCON fund provided for by a tax on gasoline (USD 0. 01/L).	
Tunisia	Energy Savings Law 2004-72	Framework	2004	This law aims to consolidate promotional texts, clarify the energy savings concept, increase the responsibilities of the National Energy Savings Agency (ANME) and increase financial support toenergy efficiency initiatives.	www.planbleu.org/publications/atelier_energie/TN_Summary.pdf pp. 2-3
Turkey	Energy Efficiency Law	All	2007	The law is the key enabling framework for energy efficiency. It gives the Electrical Power Resources Survey and Development Administration (EIE) broad responsibility to undertake a variety of activities including regulation of ESCOs, implementation of EE regulation on large consumers, training and awareness raising.	www.planbleu.org/actualite/energaia08/Sess3_4_Intervention_Tulin_Keskin.pdf www.iea.org/textbase/pm/?mode=pm&id=2457&action=detail

Country	Law title	Coverage (sector, end-users)	Enactment date	Key (or major) provisions	Reference
Ukraine	Law on Energy Conservation	Utilities	2005	This law defines the institutional, regulatory and economic mechanisms for energy conservation. The main energy conservation act, the Law on Energy Saving, offers tax incentives to enterprises that use equipment based on alternative sources of energy, as well as to producers of energy-saving equipment. The law provides that fixed assets which are considered energy saving are subject to higher depreciation rates.	Energy Charter Sec. EE Working Party www.evatassurance.com/NR/rdonlyres/eczjvtnwzbz2lh24qtfjndtcgqwv5tbahnqbe4q2wfqr4w3gvadjb2mdrcvazqfakk66n5u4yqpwsfjv6a7ha3pdcbd/ITSintheNews_24_US_Energy_Ukraine.pdf
UK	Climate Change Levy in the Finance Act (2000)	All but domestic and transport	2009 (Amended)	The Climate Change Levy (CCL) is a tax on energy delivered to non-domestic users in the United Kingdom. Its aim is to provide an incentive to increase energy efficiency and to reduce carbon emissions, however there have been ongoing calls to replace it with a proper carbon tax. Introduced on 1 April 2001 under the Finance Act 2000, it was forecast to cut annual emissions by 2.5 Mt by 2010, and forms part of the UK's Climate Change Programme. The levy applies to most energy users, with the notable exceptions of those in the domestic and transport sectors. Electricity generated from new renewables and approved co-generation schemes is not taxed. Electricity from nuclear is taxed even though it causes no direct carbon emissions.	www.opsi.gov.uk/acts/acts2000/ukpga_20000017_en_4#pt2 http://en.wikipedia.org/wiki/Climate_Change_Levy

Country	Law title	Coverage (sector, end-users)	Enactment date	Key (or major) provisions	Reference
United States	Energy Policy and Conservation Act		1975 (amended)	The primary statute covering US energy efficiency policies is the Energy Policy and Conservation Act (originally enacted in the mid-1970s, but subsequently amended by other legislation enacted in the 1980s, 1990s and 2000s [including EPACT 2005 and EISA 2007])	http://frwebgate.access.gpo.gov/cgi-bin/usc.cgi?ACTION=BROWSE&TITLE=42USCC77&PDFS=YES
United States	Energy Policy Act (EPACT)	Residential appliances Commercial	2005	The Department of Energy (US DOE) Appliance Standards programme develops, promulgates and enforces test procedures and energy conservation standards for residential appliances and certain commercial equipment. The US DOE has energy efficiency standards in place for most major types of energy-using appliances, including air conditioners, clothes washers and dryers, space and water heaters, kitchen ranges and ovens, refrigerators and freezers and lighting. Section 135 of EPAct 2005 establishes new or revised energy conservation standards for a number of products.	http://en.wikipedia.org/wiki/Energy_Policy_Act_of_2005

Country	Law title	Coverage (sector, end-users)	Enactment date	Key (or major) provisions	Reference
United States	Energy Independence and Security Act	Equipment Buildings Transport	2007	The stated purpose of the act is "to move the United States toward greater energy independence and security, to increase the production of clean renewable fuels, to protect consumers, to increase the efficiency of products, buildings, and vehicles, to promote research on and deploy greenhouse gas capture and storage options, and to improve the energy performance of the Federal Government, and for other purposes."[22] The bill originally sought to cut subsidies to the petroleum industry in order to promote petroleum independence and different forms of alternative energy. These tax changes were ultimately dropped after opposition in the Senate, and the final bill focused on automobile fuel economy, development of biofuels, and energy efficiency in public buildings and lighting.	http://en.wikipedia.org/wiki/Energy_Independence_and_Security_Act_of_2007
United States, California	Title 24	Energy Buildings Codes	2007	CCR Title 24 is reserved for state regulations that govern the design and construction of buildings, associated facilities and equipment. These regulations are also known as building standards.	www.energy.ca.gov/2007publications/CEC-400-2007-017/CEC-400-2007-017-45DAY.PDF www.bsc.ca.gov/title_24/default.htm

[22] N. Rahall. 2007. "H.R. 6". THOMAS. Library of Congress. http://thomas.loc.gov/cgi-bin/bdquery/z?d110:h6 (Retrieved 5 December 2007).

Country	Law title	Coverage (sector, end-users)	Enactment date	Key (or major) provisions	Reference
United States, Massachusetts	Green Communities Act	Utilities	2008 (amended 2010)	The Department of Public Utilities (DPU) issued an order and emergency regulations on 9 June in DPU 10-58 that eliminated the geographic limitation on the requirement that electric distribution companies solicit proposals and sign long-term contracts to facilitate renewable energy generation within the state borders. The in-state limitation originated in section 83 of the Green Communities Act, which was passed by the Massachusetts Legislature in July 2008. The Act requires each distribution company to solicit proposals twice over a five-year period and then enter into cost-effective long-term contracts to facilitate the financing of renewable energy generation within the state borders, including state waters or adjacent federal waters. DPU and the Department of Energy Resources (DOER) issued regulations consistent with the Act at 220 CMR 17.00 and 225 CMR 18.00, respectively.	www.mondaq.com/unitedstates/article.asp?articleid=103288

Country	Law title	Coverage (sector, end-users)	Enactment date	Key (or major) provisions	Reference
United States, Oregon	SB 1149	Cross-sectoral	1999	SB 1149 was the Oregon state legislation that laid the groundwork for the Energy Trust of Oregon (ETO). This was omnibus restructuring legislation reflecting a compromise among parties. The utilities wanted to leave the demand-side management (DSM) business, so the basis for a new DSM/EE organisation was included. Industrial customers got the opportunity for direct access and wholesale competition. Residential and commercial customers got a rate freeze and protection from deregulation. Environmental groups got an agreed public benefit charge to finance energy efficiency.	http://energytrust.org/About/PDF/sb1149.pdf
United States, Vermont	30VSA Section 209d2.	Public sector	2000	State legislation that enabled creation of Efficiency Vermont, a state-wide energy efficiency utility established in 1999.	www.leg.state.vt.us/statutes/fullsection.cfm?Title=30&Chapter=005&Section=00255

Country	Law title	Coverage (sector, end-users)	Enactment date	Key (or major) provisions	Reference
Vietnam	Energy Conservation and Efficient Use Law	Cross-sectoral	2010 (pending)	This law provides for control of intensive energy consumers (including industrial establishments, public constructions, and transportation establishments) under clear regulations and specific award/punishment procedures. Households and small-medium sized businesses are encouraged rather than forced to observe the law.	www.ieej.or.jp/aperc/PREE/PREE_Vietnam.pdf http://tietkiemnangluong.com.vn/en/activity-news/law-on-energy-efficiency-and-conservation-needs-strict-cooperation-from-related-departments-31003-8431.html

Annex 2. Institutional maps for selected countries

Country	Apex agency	Energy efficiency agency or responsible department	Regulator	Other implementing organisations
Armenia	Ministry of Energy and Natural Resources		Public Service Regulatory Commission	Armenian Renewable Resource and Energy Efficiency Fund; Alliance to Save Energy (ASE); International Finance Corporation (IFC); Energy Strategy Centre, a branch of the Armenian Scientific Research Institute of Energy (SRIE); UNDP-GEF
Brazil	Ministry of Mines and Energy	National electrical conservation programme (PROCEL), CONPET	ANEEL	Electric utilities, International Copper Association, Universidade Estadual de Campinas
Canada, Ontario	Ministry of Energy and Infrastructure, Ontario Provincial Government			Ontario Power Authority, LDCs
Canada, Federal	Natural Resources Canada	Office of Energy Efficiency		Transport Canada, Environment Canada

Country	Apex agency	Energy efficiency agency or responsible department	Regulator	Other implementing organisations
Chile	Ministry of Energy	Programa País de Eficiencia Energética (PPEE)	National Energy Commission	Chilean Energy Efficiency Agency (*Agencia Chilena de Eficiencia Energética* [ACHEE]), Regional Working Tables, *Empresas Electricas, Sustentank, Universidad de Chile,* Ministry of Mining, and Ministry of Economy, Development and Reconstruction
China	NDRC	Energy Efficiency Centre		SEC, Energy bureau, MIIT
Hong Kong, China	Environment Bureau (ENB)	Energy Efficiency Office (EEO) of Electrical and Mechanical Services Department	Energy Efficiency Office (EEO) of Electrical and Mechanical Services Department	
Costa Rica	Ministry of Environment, Energy and Tourism (MINAET)	Energy Sector Directorate (*Dirección Sectorial de Energía* [DSE])	ARESEP	ICE; CNFL; BUN-Cam; *Instituto de Normas Técnicas de Costa Rica* (INTECO); INCAE Business School, *Centro Nacional de Producción Más Limpia*; NGOs (CEGIST); industrial chambers
Czech Republic	Ministry of Industry and Trade (MOIT)	The Czech Energy Agency was dissolved. The responsible department is now the Renewable Energy Department of MOIT.		EkoWatt; Renewable Energy and Energy Efficiency Centre; ENVIROS; State Fund of Green Investment
Finland	Ministry of Employment and the Economy	Motiva Oy		Finnish Energy Industry

Country	Apex agency	Energy efficiency agency or responsible department	Regulator	Other implementing organisations
Hungary	Ministry of National Development	Hungarian Energy Centre	Hungarian Energy Office	Ministry of Environment and Water; Department of Environmental Development; Energy Efficiency Agency; Office of Parliamentary Commission for Future Generations
Indonesia	Ministry of Energy and Mineral Resources	DGEEU		Directorate of New Renewable Energy and Energy Conservation; and the Sub-Directorate of Energy Conservation; PT PLN; Energy Efficiency in Industrial, Commercial and Public Sector (DANIDA project); USAID Jakarta
Korea	Ministry of Knowledge Economy (MKE)	Korea Energy Management Corporation	MKE	Ministry of Land, Transport and Marine (MLTM); Korean Electrical Power Corporation (KEPCO); Consumers Korea; Honeywell Korea; Korea Energy Economics Institute (KEEI); Korea Electrotechnology Research institute; Korea Institute of Energy Technology Evaluation and Planning (KETEP); Korea Inst. Of Construction Technology (KICT); POSCO Environment and Energy Dept.

Country	Apex agency	Energy efficiency agency or responsible department	Regulator	Other implementing organisations
Lebanon	Ministry of Energy and Water	Lebanese Centre for Energy Conservation (LCEC)		
Mexico	Ministry of Energy (SENER)	*Comisión Nacional para el Uso Eficiente de Energía* (CONUEE)		Private organisations (ANFAD, AEAEE); standards and certification organisations (ANCE, ONCEE); public housing organisations (CONAVI and INFONAVIT); FIDE; ALESCO Consultores; PEMEX
New Zealand	Ministry of Economic Development (MED)	Energy Efficiency and Conservation Authority (ECCA)	Electricity Commission	Ministry of Agriculture and Forestry (renewable fuels, industry); Department of Building and Housing (Building Code); Ministry for the Environment (clean heat grants to improve air quality); Ministry of Health (ENERGYWISE™ homes); Housing New Zealand Corporation (state housing improvement programmes); Standards New Zealand (for energy efficiency in products/equipment); and the Ministry of Foreign Affairs and Trade (WTO, mutual recognition arrangements, APEC forums, etc.)
Norway	Norwegian Ministry of Petroleum and Energy	ENOVA SF		

Country	Apex agency	Energy efficiency agency or responsible department	Regulator	Other implementing organisations
Romania	Ministry of Economy and Commerce	Romanian Agency for Energy Conservation (ARCE), Inter-Ministry Working Group	Romanian Electricity and Heat Regulatory Authority (ANRE); National Gas Regulatory Authority (ANRGN); National Regulatory Authority for Municipal Public Services and Communal Development (ANRSC); National Institute of Statistics (INS)	CNR-CME; APER; OER; ENERO; SOCER; IRE; ANPC; Romanian Federation of Local Authorities
Russian Federation	Ministry of Energy			Ministry of Regional Development; Ministry of Natural Resources and Ecology; Ministry of Finance; Ministry of Agriculture; State Atomic Energy Corporation (Rosatom); Federal Tariff Service; Centre for Energy Efficiency (CENEF); Centre for Energy Policy; *AcademEnergoServis*; Institute for Energy Policy; RusDem; ESCO Negawatt; Rus Esco; 3E; Energo Servis; Russian Sustainable Energy Finance Programme; International Finance Corporation (IFC)

Country	Apex agency	Energy efficiency agency or responsible department	Regulator	Other implementing organisations
Thailand	Ministry of Energy	Energy Policy and Planning Office (EPPO)	Bureau of Energy Regulation and Conservation at the Department of Alternative Energy Development and Efficiency (DAEDE)	Electricity Generating Authority of Thailand (EGAT); EGAT DSMO; Energy Conservation Centre Thailand (ECCT); USAID ECO-Asia Programme; MEA; PEA; PTT; Public Company Limited (PTT); IIEC Asia Regional Office
Tunisia	National Agency for Energy Management (ANME)			
Turkey	Ministry of Energy	General Directorate of Electrical Power, Resources Survey and Development Administration (EIE), National Energy Conservation Centre		State Planning Organisation (SPO); Industrial Development Bank of Turkey (TSKB); Turkish National Committee of the World Energy Council; Union of Municipalities; Istanbul Municipality; Chamber of Industry; Chamber of Commerce; Engineering Chambers
Ukraine	Ministry of Fuel and Energy of Ukraine	Energy Efficiency Agency (NAER)		Ministry of Coal Industry; National Agency on Effective Use of Energy Resources; Training Centre for Energy Management; Agency for Rational Energy Use and Ecology (ARENA)
United States	Department of Energy (DOE)	Office of Energy Efficiency and Renewable Energy (EERE)	FERC	Environmental Protection Agency (US EPA)

Country	Apex agency	Energy efficiency agency or responsible department	Regulator	Other implementing organisations
United States, Oregon	Energy Trust of Oregon			Energy distributors (PacificCorp, PGE, gas companies); regional G&T entity (BPA); regional planning agency (NW Power Planning Council); and a regional market transformation entity (NW Energy Efficiency Alliance)
United States, Massachusetts	State of Massachusetts Dept. of Energy Resources			Western Mass. Electric; Cape Light Compact

Annex 3. Energy efficiency targets[23]

Country	Target	Notes	Association with intl. agreement
Albania	Annual energy savings target of 160 Ktoe for 2016 (9%) and 26 Ktoe for 2011.	Although Albania is not part of the European Union, it signed a Stabilisation and Association Agreement with the European Union that guides its energy policies.	EU Directive2006/32/EC
Australia	Reduce CO_2 emissions by 5% to 15% below 2000 levels by 2020.		Copenhagen Accord
Austria	Economy-wide mandatory energy savings of 9% by 2016 (compared to a 2006 baseline)		EU Directive2006/32/EC, Copenhagen Accord
Belarus	Reduce GHG emission by at least 5% from 1990 levels in the commitment period 2008-12. Reduce GDP energy intensity from 26.1% to 30.4% by 2010 compared to 2005.		Kyoto Protocol, www.un.org/webcast/climatechange/highlevel/2007/pdfs/belarus-eng.pdf
Brazil	Decrease CO_2 by 12 Mt to 15 Mt by 2020	Actions voluntary, use of CDM not excluded, actions expected to result in reduction of 36.1% to 38.9% from BAU projected emissions by 2020.	Copenhagen Accord
Bulgaria	Achieve a minimum annual energy savings target of 9% with 3% increment every three years: 3% by 2010, 6% by 2013 and 9% by 2016.		EU Directive2006/32/EC, Copenhagen Accord

[23] This list is not comprehensive. Not all countries are included, and not all targets in each country are listed.

Country	Target	Notes	Association with intl. agreement
Canada	Reduce CO_2 emissions by 17% by 2020 and by 60% by 2050 compared with 2005 level.	Provinces have often set targets. For example, Ontario set a target to lower CO_2 emissions by 80% from 1995 levels by 2050 and by 20% by 2020.	Copenhagen Accord
China	Reduce CO_2 emissions per unit of GDP by 40% to 45% by 2020 compared with 2005 level.	Voluntary	Copenhagen Accord
Costa Rica	Energy conservation goal of 15% to 18% by 2021.	Part of the energy conservation strategy.	Actions outlined in Copenhagen Accord
Croatia	Reduce emissions by 5% by 2020 compared with 1990 levels.	This is a temporary target that will change upon accession to the European Union.	
Czech-Republic	Achieve a minimum annual energy savings target of 9% by ninth year of the period 2008-16.		EU Directive2006/32/EC, Copenhagen Accord
Denmark	Annual energy savings target is set at an average of 7.5 PJ during the period 2006-13.		EU Directive2006/32/EC, Copenhagen Accord
European Union	Reduce CO_2 emissions by 20% by 2020 compared to 1990 levels. Achieve a minimum annual energy savings target of 9% by ninth year of the period 2008-16.		EU Directive2006/32/EC, Copenhagen Accord
Finland	EU climate target. Achieve an additional 5% energy savings by 2015.		Copenhagen Accord
France	Reduce CO_2 emissions by 20% by 2020 compared to 1990 levels. Achieve a minimum annual energy savings target of 9% by ninth year of the period 2008-16.		EU Directive2006/32/EC, Copenhagen Accord

Country	Target	Notes	Association with intl. agreement
Germany	Reduce CO_2 emissions by 20% by 2020 compared to 1990 levels. Achieve a minimum annual energy savings target of 9% by ninth year of the period 2008-16.		EU Directive2006/32/EC, Copenhagen Accord
Greece	Reduce CO_2 emissions by 20% by 2020 compared to 1990 levels. Achieve a minimum annual energy savings target of 9% by ninth year of the period 2008-16.		EU Directive2006/32/EC, Copenhagen Accord
Hungary	Reduce CO_2 emissions by 20% by 2020 compared to 1990 levels. Achieve a minimum annual energy savings target of 9% by ninth year of the period 2008-16.		EU Directive2006/32/EC, Copenhagen Accord
India	Reduce emissions intensity of GDP by 20% to 25% by 2020 compared with 2005 level.	Actions voluntary and not legally binding.	
Indonesia	Decrease energy intensity by 1% each year until 2025. Decrease energy-GDP elasticity to below 1% by 2025.		
Ireland	Reduce CO_2 emissions by 20% by 2020 compared to 1990 levels. Achieve a minimum annual energy savings target of 9% by ninth year of the period 2008-16.		EU Directive2006/32/EC, Copenhagen Accord
Israel	Reduce GHG emissions by 20% below BAU levels by 2020. 20% reduction of electricity consumption by 2020.		
Italy	Reduce CO_2 emissions by 20% by 2020 compared to 1990 levels. Achieve a minimum annual energy savings target of 9% by ninth year of the period 2008-16.		EU Directive2006/32/EC, Copenhagen Accord
Korea	11.3% improvement in energy efficiency by 2012, compared with 2007. Reduce CO_2 emissions by 30% from BAU emissions by 2020. Reduce consumption of energy in existing buildings by 30% to 40% by 2020.		Copenhagen Accord

Country	Target	Notes	Association with intl. agreement
Latvia	Reduce CO_2 emissions by 20% by 2020 compared to 1990 levels. Achieve a minimum annual energy savings target of 9% by ninth year of the period 2008-16.		EU Directive2006/32/EC, Copenhagen Accord
Lithuania	Reduce CO_2 emissions by 20% by 2020 compared to 1990 levels. Achieve a minimum annual energy savings target of 9% by ninth year of the period 2008-16.		EU Directive2006/32/EC, Copenhagen Accord
Mexico	Reduce CO_2 emissions up to 30% below the BAU scenario in 2020. Reduce total annual CO_2 emissions to 51 Mt by 2012.		
Netherlands	Voluntary target to reduce CO_2 emissions by 20% by 2020 compared to 1990 levels. Mandatory target under EU requirements to achieve a 9% energy savings target by 2016 (compared to a 2006 baseline).		
New Zealand	Reduce emissions by 10% to 20% by 2020 compared with 1990 levels.		
Norway	Reduce emissions by 30% by 2020 compared with 1990 levels.		
Peru	15% energy savings among the residential, industry (productive and services), public and transport sectors; base year 2005, goal year 2018.		
Poland	Reduce CO_2 emissions by 20% by 2020 compared to 1990 levels. Achieve a minimum annual energy savings target of 9% by ninth year of the period 2008-16.		EU Directive2006/32/EC, Copenhagen Accord
Portugal	Reduce CO_2 emissions by 20% by 2020 compared to 1990 levels. Achieve a minimum annual energy savings target of 9% by ninth year of the period 2008-16.		EU Directive2006/32/EC, Copenhagen Accord

Country	Target	Notes	Association with intl. agreement
Romania	Reduce CO_2 emissions by 20% by 2020 compared to 1990 levels. Achieve a minimum annual energy savings target of 9% by ninth year of the period 2008-16.		EU Directive2006/32/EC, Copenhagen Accord
Serbia	6% adopted energy saving target in 2016; 1% adopted intermediate target in 2011.		
Singapore	Reduce CO_2 emissions by 16% from BAU emission levels in 2020 (contingent on global climate change agreement); post-Kyoto goal was 11% reduction by 2030; economy-wide goal to reduce energy consumption by 35% by 2030.		Copenhagen Accord
Slovak-Republic	Reduce CO_2 emissions by 20% by 2020 compared to 1990 levels. Achieve a minimum annual energy savings target of 9% by ninth year of the period 2008-16.		EU Directive2006/32/EC, Copenhagen Accord
Slovenia	Reduce CO_2 emissions by 20% by 2020 compared to 1990 levels. Achieve a minimum annual energy savings target of 9% by ninth year of the period 2008-16.		EU Directive2006/32/EC, Copenhagen Accord
South Africa	Reduce CO_2 emissions by 34% below BAU emissions by 2020 and by 42% by 2025.		Copenhagen Accord
Spain	Reduce CO_2 emissions by 20% by 2020 compared to 1990 levels. Achieve a minimum annual energy savings target of 9% by ninth year of the period 2008-16.		EU Directive2006/32/EC, Copenhagen Accord
Sri Lanka	10% of total power from non-conventional renewable energy by 2016.		www.worldfuturecouncil.org/fileadmin/user_upload/PACT/Laws/Sri_Lanka_Energy_Policy_2006.pdf
Sweden	Reduce CO_2 emissions by 20% by 2020 compared to 1990 levels. Achieve a minimum annual energy savings target of 9% by ninth year of the period 2008-16.		EU Directive2006/32/EC, Copenhagen Accord

Country	Target	Notes	Association with intl. agreement
Switzerland	Reduce CO_2 emissions by 20% by 2020 compared with 1990 levels.		
Thailand	Quadrennial plan will include targets for energy savings.		
Ukraine	Reduce energy consumption by 51.3% by 2030 compared with 2005 levels.		www.esbs.kiev.ua/en/energy-sector-cooperation-and-reforms/ukraine-s-energy-strategy-to-2030
United Kingdom	Mandatory, economy-wide target to reduce CO_2 emissions by 34% in 2020 compared to a 1990 baseline Mandatory target to reduce CO_2 emissions in the buildings sector by 3.5 Mt in 2010 Mandatory target to save 20% in the Buildings energy use by 2010 compared to a 2000 baseline Mandatory, economy-wide target to save 9% in energy use by 2016 compared to a 2006 baseline		EU Directive2006/32/EC, Copenhagen Accord
United States	Reduce CO_2 emissions by 17% by 2020 compared with 2005 levels.	Many sector-specific national, state and local mandatory and voluntary targets exist.	
Viet Nam	5% reduction in energy consumption for 2006 to 2010 and 5% to 8% for 2011 to 2015.	Outlined in the 14 April 2006 Decision on Approval of the National Programme on Energy Efficiency and Conservation.	

Annex 4. List of Energy efficiency strategies and action plans

Country	Strategy	Year
Albania	National Energy Efficiency Action Plan (NSEE)	2010
Armenia	National Energy Strategy	Draft
Australia	National Strategy on Energy Efficiency	2008
Austria	Energy Efficiency Action Plan	2007
Belarus	National Energy Conservation Programme, 2006-10	2005
Belgium	National Action Plan on Energy Efficiency	2008
Brazil	Brazil National Climate Change Plan	2008
Bulgaria	First National Energy Efficiency Action Plan, 2008-10	2007
Canada	EcoENERGY Efficiency Initiative	
Chile	Draft Action Plan	
China	Work plan of energy conservation and emission reduction	2007
Costa Rica	*Programma Nacional de Conservacion de Energia*	
Croatia	Croatia Regular Review of Energy Efficiency Policies	2010
Czech-Rep.	National Energy Efficiency Action Plan	2007
Denmark	Energy Efficiency Action Plan	2007
Egypt	Energy Efficiency Strategy	2000
European Union	Energy Efficiency Action Plan	2000
Finland	National Energy Efficiency Action Plan	2007
France	National Energy Efficiency Action Plan	2008
Gambia	National Energy Policy, 2005	2005
Germany	Energy Efficiency Action Plan	2007
Greece	National Energy Efficiency Action Plan	2007
Hungary	Energy Efficiency Action Plan	2008
India	National Mission on Enhanced Energy Efficiency	2010
Indonesia	Master Plan on National Energy Conservation	2010
Ireland	National Energy Efficiency Action Plan, 2009-20	2009
Italy	National Energy Efficiency Action Plan	2007
Japan	New National Energy Strategy	2006
Jordan	National Energy Efficiency Strategy	2005
Korea	4th Rational Energy Utilisation Basic Plan, 2008-12	

Country	Strategy	Year
Kosovo	Kosovo Environmental Action Plan, 2006-10	
Latvia	Latvia's First Energy Efficiency Action Plan, 2008-10	
Lithuania	Energy Efficiency Action Plan	2007
Mexico	Energy Efficiency, Renewable Energies and Biofuels	
Netherlands	Energy Efficiency Action Plan	2007
New Zealand	NZ Energy Efficiency and Conservation Strategy	2009
Nigeria	National Energy Policy	2003
Pakistan	National Environmental Policy	2005
Peru	Reference Plan for Efficient Use of Energy 2009-2018	
Poland	National Energy Efficiency Action Plan	2007
Portugal	NEEAP: Portugal Efficiency 2015	2008
Romania	NEEAP 2008-2010	
Russian Federation	Programme for an Energy Efficient Economy	2001
Saudi Arabia	The National Energy Efficiency Programme (NEEP)	
Serbia	National Energy Efficiency Action Plan	2004
Singapore	Singapore Energy Efficiency Master Plan	
Slovak-Rep.	Energy Efficiency Action Plan for years 2008-2010	2007
Slovenia	National Action Plan Energy Efficiency 2008-2016	2008
South Africa	Energy Efficiency Strategy	2005
Spain	Energy Efficiency Action Plan 2008-2012	2008
Sri Lanka	National Energy Policy and Strategies of Sri Lanka	2006
Sweden	National Energy Efficiency Action Plan	2008
Switzerland	Energy Efficiency Action Plan	2008
Thailand	National Strategy for Energy Efficiency	2003
Tunisia	Quadrennial Plan (2008-2011) (under development)	
Turkey	Energy Efficiency Strategy	2004
Ukraine	Ukraine’s Energy Strategy to 2030	2009
United Kingdom	Energy Efficiency Action Plan	2007
United States	National Action Plan for Energy Efficiency (NAPEE)	2006
Vietnam	Vietnam National Energy Efficiency Programme (VNEEP)	2006

Annex 5. Institutions survey template

Dear energy efficiency expert,

This survey is part of the Energy Efficiency Governance (EEG) project sponsored by the European Bank for Reconstruction and Development (EBRD), the International Energy Agency (IEA) and the Inter-American Development Bank (IADB). The goal of the EEG project is to help governments put in place effective energy efficiency[1] institutions[2]. The purpose of this survey is to gather preliminary information on:

- the energy efficiency institution(s) in your country and their functions;
- the structure of your country's energy efficiency institution(s);
- your thoughts on best practice for the establishment, structure and operations of energy efficiency institution(s).

Who should fill out this survey?

We welcome responses from government and non-government officials working on energy efficiency issues.

If you work for an international institution, you may skip questions that refer to country context (i.e. question 4.3.1 and all of sections 2 and 4.5).

What is covered in the survey?

This survey covers four topics: 1) your background, 2) energy efficiency institutions in your country, 3) your institution and 4) key characteristics of energy efficiency institutions.

How long will it take to fill out?

The survey should take about thirty minutes to complete.

Where should I send the completed survey?

Please send your completed survey to eeg@iea.org no later than Friday 7 May 2010.

How will the results be used?

The results will be incorporated into an IEA/EBRD/IADB best practice guidebook for creating effective energy efficiency institutions. Your completed survey will be treated as confidential. Survey forms will be stored by the IEA in a secure location for 24 months and then destroyed. The results of any analysis will not be linked to individual responses or specific institutions.

We appreciate your time and participation,

Nigel Jollands

Head, Energy Efficiency Unit, International Energy Agency

1 This survey only refers to institutions working on demand side (end-use) energy efficiency, including solar thermal and combined heat and power.

2 Institutions, in this survey, refer to government-owned, partially government-owned, non-governmental and not-for profit organisations.

Energy Efficiency Governance:
a survey of energy efficiency institutions

Understanding and communicating the key factors for ensuring optimal energy efficiency governance

Background

The IEA seeks to produce a set of pragmatic guidelines to help governments to identify priorities for enhanced energy efficiency governance. This survey is one of the tools we will use to capture lessons learned by experts working for and with energy efficiency institutions. Your participation is greatly appreciated. Please fill in the survey below and return it to eeg@iea.org by Friday 7 May 2010. It should take you approximately 30 minutes to complete.

Contact information

Country name: _____
Contact person: _____
Job title: _____
Institution: _____
Department and unit: _____
Phone number: _____
Email address:
Date: _____

1 About you

1.1 What is your main area of professional expertise (please check only one)?

☐ Engineering ☐ Economics ☐ Policy ☐ Business ☐ Other

If you checked other, please provide details in the box below.

1.2 How long have you been working on energy efficiency?

☐ < three years ☐ 3-7 years ☐ 8-15 years ☐ 16 +

2 Country context

In this section, we want to find out about energy efficiency institution(s) in your country.

2.1 Which best describes the legal framework promoting energy efficiency in your country at a national level (more than one answer is possible)?

☐ A specific law focuses on energy efficiency ☐ Energy-sector laws include energy efficiency ☐ Energy efficiency included within the laws of other sectors
☐ No legal framework ☐ Tax legislation ☐ Other

If you checked other, please provide details in the box below.

2.2 In your opinion, what are the five most important institutions[3] that promote energy efficiency in your country? Please list the institutions below and indicate in which energy efficiency activities they are involved.

Institutions	General, including policy development[4]	Direct investment[5]	Subsidies, incentives and provision of financing[6]	Technological development[7]	Promotion and information[8]	Labelling, certification and accreditation[9]	Regulation[10]	Enforcement[11]	Evaluation[12]	Technical assistance[13]	Other
(1)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
(2)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
(3)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
(4)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
(5)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

If you checked other, please provide details in the box below.

[3] This can include energy efficiency institutions at all levels of the government. It can also include non-governmental energy efficiency institutions.
[4] The institution focuses on designing, developing and implementing energy efficiency policies and programmes. This includes national planning, targets setting, and data collection and modelling.
[5] The institution improves the energy efficiency of the public infrastructure. Examples include public building efficiency.
[6] The institution funds energy efficiency programmes through the use of loans, subsidies, trading and/or tax rebates.
[7] The institution researches technologies that improve the efficiency of energy use in one or more sectors.
[8] The institution initiates public awareness campaigns.
[9] The institution awards labels certifying the energy efficiency of a product or a company.
[10] The institution is responsible for developing and overseeing the implementation of energy efficiency laws and regulations.
[11] The institution ensures compliance with existing energy efficiency requirements, and takes sanctions when appropriate.
[12] The institution evaluates its own activities and those of others, including existing policies.
[13] The institution provides technical assistance and capacity building to public and/or private stakeholders.

2.3 In which sector(s) do the institutions listed above promote energy efficiency? Select as many as appropriate.

	Cross sectoral	Buildings	Appliances/lighting	Transport	Industry	Utilities
(1)	☐	☐	☐	☐	☐	☐
(2)	☐	☐	☐	☐	☐	☐
(3)	☐	☐	☐	☐	☐	☐
(4)	☐	☐	☐	☐	☐	☐
(5)	☐	☐	☐	☐	☐	☐

2.4 What role(s) do utilities play in promoting energy efficiency in your country? Select as many as appropriate.

☐ Setting public policy
☐ Delivery of energy efficiency services under a mandate from the government
☐ Voluntary delivery of energy efficiency services in response to the market
☐ Provision of information
☐ Feedback on energy use
☐ No role
☐ Don't know
☐ Funding energy efficiency programs
☐ Other

If you checked other, please provide details in the box below.

Do you agree with the following sentences?

2.5 My country has an effective energy efficiency institutional structure.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

If needed, please explain.

2.6 Energy efficiency is high on the political agenda in my country.

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

If needed, please explain.

2.7 In my country, energy efficiency is well coordinated across different policy domains (e.g. buildings, transport, environment, industry, etc.)

☐ Strongly agree ☐ Agree ☐ Neutral ☐ Disagree ☐ Strongly disagree

If needed, please explain.

3 The energy efficiency institution you work for

3.1 What best describes the institution you currently work for?

☐ Central/federal government entity ☐ Regional/state government entity ☐ Local government entity

☐ University/research centre ☐ International inter-governmental organisation ☐ Public-private partnership

☐ NGO ☐ Private company

3.2 Which best describes the authority under which your institution was originally established?

☐ National law ☐ International agreement ☐ Established by NGO or university

☐ Decree or executive order of a government minister/secretary ☐ Budget allocation decision within a government department ☐ Other

If you checked other, please provide details in the box below.

4 Energy efficiency institutions, key characteristics

4.1 The process of establishing an energy efficiency institution

We would like to benefit from your knowledge of lessons learned from the establishment of energy efficiency institutions.

4.1.1 Have you been directly involved in the establishment of an energy efficiency institution?

☐ Yes ☐ Not directly, but I am familiar with the process. ☐ No

If you answered no, go directly to question Section 4.2. If you answered yes or not directly, please proceed to question 4.1.2.

4.1.2 Which energy efficiency institution(s) were you involved in establishing, or familiar with?

In your experience:

4.1.3 Please rank the following stakeholders according to importance of involving them in the process of establishing an energy efficiency institution (with one being the most important and eleven being the least important).

Central/Federal government	Regional/State government	Local government
Public university/research centre	Inter-governmental organisation	NGO
Private company	Private university/research centre	Utility
Civil society	International development bank	

4.2 Mandate

Based on your experience, please answer the following questions relating to the mandate of an energy efficiency institution:

4.2.1 Please rank the key drivers of energy efficiency policy in your country (1=most important; 5[14] = least important)

Energy security | Economic development[15] | Climate change | Economic competiveness | Public health

Other

If you selected "other", please provide details in the box below.

4.2.2 In your experience, which of the following are essential for an energy efficiency institution to be effective?

	Essential	Important but not essential	Non essential
Legislative mandate establishing the institution	☐	☐	☐
Strong political support	☐	☐	☐
Authority to regulate energy efficiency	☐	☐	☐
International support	☐	☐	☐
Ongoing engagement with energy efficiency stakeholders	☐	☐	☐
Credible results monitoring framework	☐	☐	☐
Dedicated/individual funding source	☐	☐	☐
Other (please write in):	☐	☐	☐

4.3 Targets and goals

Based on your experience:

4.3.1 Is energy efficiency policy in your country guided by measurable energy efficiency or related targets?

☐ Yes ☐ No

If needed, please provide details in the box below.

If you answered yes to 4.3.1, please proceed to question 4.3.2. If you answered no, please proceed to 4.4.

[14] If you would like to add a driver not listed, please select "other" and provide comments in the box provided. Should you select "other" the numbering scale will go from 1 to 6.

[15] Including fuel poverty.

4.3.2 Please describe your target(s) by clicking on the drop-down menus provided in table below.

Sector	Type	Magnitude	Baseline year	Target year	Scope	Stringency
e.g Economy-wide	*Energy savings*	*17%*	*2005*	*2020*	*International*	*Mandatory*
Select...	Select...				Select...	Select...
Select...	Select...				Select...	Select...
Select...	Select...				Select...	Select...
Select...	Select...				Select...	Select...
Select...	Select...				Select...	Select...
Select...	Select...				Select...	Select...

If needed, please provide details in the box below.

4.4 Internal organisation

4.4.1 In your opinion, please assess whether the following skill sets within an energy efficiency institution are important for promoting energy efficiency.

Skill set:	Essential	Important	Not important
Technical energy efficiency expertise[16]	☐	☐	☐
Legal expertise for the development of regulations	☐	☐	☐
Research and technology development capability	☐	☐	☐
Statistics collection and analysis capability	☐	☐	☐
Economic analysis capability	☐	☐	☐
Behavioural analysis capability	☐	☐	☐
Knowledge of the market and private-sector practices	☐	☐	☐
Marketing and communication expertise	☐	☐	☐
Expertise in training and education	☐	☐	☐
Rural energy expertise	☐	☐	☐
Carbon market expertise	☐	☐	☐
Energy efficiency financing expertise	☐	☐	☐

[16] For example, people with practical expertise in energy efficiency technology (i.e. installation, construction, engineering, energy auditing, etc.)

4.5 Accountability and evaluation

4.5.1 Does your country conduct evaluations of its energy efficiency programmes?

☐ Yes ☐ No

4.5.2 If you answered yes in 4.5.1, please select who conducts the evaluations (more than one answer is possible).

☐ Parent organisation ☐ Self-evaluation ☐ Outside/independent entities (universities, consultants, etc.)

☐ Another agency or ministry ☐ Funders ☐ Other

If other, please provide details in the box below.

4.6 Additional comments

4.6.1 Please add any further information in the box below.

Thank you for taking the time to complete this survey. Please send the completed survey to eeg@iea.org .

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