Formal Report 331/08

An Analytical Compendium of Institutional Frameworks for Energy Efficiency Implementation

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ESMAP

Energy Sector Management Assistance Program

Energy Sector Management Assistance Program (ESMAP)

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Abbreviations and Acronyms

ADEME	Agence de l'Environnement et de la Maîtrise de l'Energie (French Environment and Energy Management Agency)
APL	adjustable program loan
ARCE	Romanian Agency for Energy Conservation
BBS	battery-based system
BDS	business development services
BEE	Bureau of Energy Efficiency (India)
CDD	community-driven development
CDM	clean development mechanism
CEA	Czech Energy Agency
CEIF	Clean Energy Investment Framework*
CHP	combined heat and power
CONAE	Comisión Nacional de Actividades Especiales (Mexico)
CRES	Center for Renewable Energy Systems (Greece)
DEA	Danish Energy Authority
EC	Energy Conservation
ECCJ	Energy Conservation Center of Japan
ECF	Energy Conservation Fund (Sri Lanka)
ECIDC	Energy Conservation Information Dissemination Center (China)
EE	energy efficiency
EECA	Energy Efficiency and Conservation Authority (New Zeland)
EERE	Office of Energy Efficiency and Renewable Energy (USA)
ENCON	Energy Conservation (Thailand)
EPPO	Energy Policy and Planning Office (Thailand)
ERI	Energy Research Institute (China)
ESCO	energy service company
ESMAP	Energy Sector Management Assistance Program (in the World Bank)
EST	Energy Savings Trust (UK)
EU	European Union
FY	fiscal year
G-8	Group of Eight (countries)
GCC	global climate change
GEF	Global Environment Facility
GHG	greenhouse gas
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit (German Technical Cooperation)

* In 2007, the CEIF initiative was superceded by the Strategic Framework for Climate Change and Development (which has recently been renamed: Development and Climate Change: A Strategic Framework for the World Bank Group).

IC	independent corporation
ICR	implementation completion report
IEA	International Energy Agency
ISA	independent statutory authority
JV	joint venture
KAPE	National Energy Conservation Agency (Poland)
KEMCO	Korea Energy Management Corporation
LPG	liquefied petroleum gas
MDG	millennium development goals
ME	microenterprise
MEM	Ministry of Energy and Minerals
MEPs	Minimum Energy Performance Standards
METI	Ministry of Economy, Trade and Industry (China)
MFI	microfinance institution
M&V	measurement and verification
NEEA	National Energy Efficiency Agency (South Africa)
NEPC	National Energy Policy Council (Thailand)
NGO	nongovernmental organization
NRCan	National Resources Canada
NRDC	National Development and Reform Commission (China)
NSW	New South Wales
OBA	output-based aid
OEE	Office of Energy Efficiency (Canada)
PAD	project appraisal document
PCRA	Petroleum Conservation Research Association (India)
PPP	public-private partnership
PROCEL	National Electricity Conservation Program (of Brazil)
R&D	Research & Development
RE	renewable energy
RPED	Regional Program on Enterprise Development
SAR	staff appraisal report
SE	Sustainable Energy
SEDA	Sustainable Energy Development Agency (Australia)
SEI	Sustainable Energy Iceland
SEEA	Serbia Energy Efficiency Agency
SEEP	Serbia Energy Efficiency Project
SIDA	Swedish International Development Agency
SIL	sector investment loan
SME	small and medium enterprise
SMME	small, medium, and microenterprise
TANESCO	Tanzania Electricity Supply Company
TTCL	Tanzania Telephone Company Limited
UNDP	United Nations Development Program
USAID	United States Agency for International Development
WHO	World Health Organization

Executive Summary

Energy efficiency (EE) is a proven and cost-effective measure to address rapidly increasing global greenhouse gas (GHG) emissions. There is great potential for improving EE across energy-consuming sectors, particularly in developing countries. However, this potential remains largely unrealized due to the technical, financial, economic, and institutional barriers to EE implementation. Governments have developed EE frameworks covering policies, regulations, legislations and strategies to help address these barriers and have created various institutions and agencies for implementation and monitoring. Various institutional frameworks, ranging from dedicated EE institutions within government to independent private corporations, have proven effective in creating the enabling conditions for scaling-up of EE investments.

The World Bank Group (WBG) has been active in promoting EE since the early 1990s. At the 2004 International Renewable Energy Conference, the WBG committed to increase lending for new renewable energy and EE by at least 20 percent per year through FY 2009. As a follow-up of the Gleneagles (July 2005) G-8 summit, the WBG has developed the Clean Energy Investyment Framework (CEIF), which includes a key emphasis on promoting EE investments. These commitments recognize the potential of EE to save developing countries billions of dollars in energy costs, contribute to energy security and reduce global GHGs and local air pollution in a cost-effective manner.

Despite considerable attention devoted to EE policies and programs, there has been little formal assessment of the institutional aspects of EE implementation. The World Bank's Energy Sector Management Assistance Program (ESMAP) initiated this study to examine the interplay of structure, role, and function of institutional frameworks supporting EE implementation.

An early draft of this report in the form of an issues paper was discussed at an international workshop on institutional frameworks for implementing EE implementation held in Seoul, Korea, in September 2006. This workshop was attended by EE institutional experts from both developed and developing countries. The findings of the issue paper and the workshop, as revised and updated by peer reviewers, are included in this report.

This report identifies, analyzes, categorizes, and describes the main elements of institutional models and practices that have proved effective in promoting EE investments, particularly in the end-use (industry, buildings, residential) consuming sectors. The report also suggests guidelines for designing new implementing institutions that can mobilize EE investments in developing countries by enabling coordinated market activity by end users, utilities, equipment manufacturers, municipalities, building owners, financial intermediaries, and specialized energy services providers (such as ESCOs).

Twenty-nine (29) EE agencies spanning twenty-seven (27) developed and developing countries and varying in age from 2 to 30 years were analyzed in detail for this report.[1] The analysis revealed seven distinct institutional

[1] The details of these 29 EE agencies are provided in Annex 3.

models, ranging from government agency to privately owned entities:

1. Government agency with broad energy-related responsibilities
2. Government agency focused on clean energy technologies (e.g., EE, renewable energy, sustainable energy, global climate change)
3. Government agency focused on EE only
4. Independent statutory authority (ISA) with a government-appointed board
5. An independent corporation (IC) owned by the government
6. A public–private partnership (PPP), generally in the form of a corporation with ownership by government and nongovernment entities
7. A nongovernment organization (NGO)

The older EE agencies, established during the 1990s, were mainly broad-based national energy agencies (Model 1) while, in more recent years, specialized agencies focused on EE and related clean energy investments (Models 2 and 3) are found more common. Several recently established implementing institutions have been independent statutory authorities (Model 4) or government-owned corporations (Model 5). The review also found only a relatively few public-private partnerships (Model 5) and nongovernmental implementation frameworks (Model 6). Table 1 summarizes the key characteristics of these seven models with some examples.

This report is primarily descriptive, seeking to capture the main structural, organizational, and functional elements of institutional frameworks for implementing EE. It is beyond the purview

Table 1 Observed Institutional Models for EE Implementation

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	U.K. 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 organization (NGO)	Nonprofit or nongovernmental organization	Austrian Energy Agency Croatia Energy Institute

of this report to identify all the key factors that label an institution as successful. However, the review does identify specific considerations that should be taken into account in developing an EE implementation framework. Based on reviewing 29 different EE agencies, the following emerge as important criteria to consider when establishing EE institutions:

- Country context, especially the relative importance of EE in energy sector policy
- EE-related technical and management capacity resident within existing institutions
- Statutory and regulatory basis for promoting EE investment
- Types of interventions (e.g., programs) developed to support EE improvement
- Integration between EE and other clean energy and clean development goals
- Benefits of organizational autonomy, flexibility, and agility
- Funding mechanisms
- Importance of stimulating private-sector participation

The review of existing EE agencies, together with inputs obtained at the international workshop, identified the following *core competencies* of EE institutions as important to effective EE implementation:

- Ability to work collaboratively with multiple public and private agencies with EE responsibilities
- Ability to leverage private-sector participation in EE implementation
- Ability to effectively engage with EE stakeholders
- Ability to influence energy goods and services providers, including utilities and energy services companies
- Ability to facilitate the role of energy regulators in scaling-up EE
- Independence and flexibility in decision making, adequate resources, including staff and funding
- A credible scheme for results monitoring.

Selection of a particular institutional model confers both advantages and limitations. Table 2 compares the seven models in terms of their distinctive advantages and inherent limitations. Each of these institutional models, from broad-spectrum public agency to narrow-focus private company or NGO, was reviewed as part of this study. Several of the institutional models are similar in terms of their advantages and limitations. For example, both statutory authorities and independent corporations share the advantage of being able to attract qualified staff by paying higher salaries. They also share the disadvantage of lack of direct access to public funding—unless this is specified in the statute or corporate charter. This combination of advantages and disadvantages for each model drives home the importance of carefully designing the institution to maximize inherent advantages while managing limitations.

The review compiled a large amount of detailed information regarding institutional practices for EE implementation that are presented in the Description of EE Agencies contained in Annex 3. Descriptions of each of the EE agencies reviewed include country context, enabling framework, mission and objectives, specific goals/targets, key activity areas, funding mechanisms, management structure, staff and budget, results, and lessons learned.[2]

Analysis of these 29 EE agencies produced findings useful for countries seeking to establish new or modify their existing institutional practices for EE implementation:[3]

- All of the EE agencies analyzed fell within one of seven distinct institutional models falling

[2] The data provided in Annex 3 is based on publicly-available information through websites or annual reports.

[3] The desk review methodology used here is limited in its ability to address important knowledge gaps, particularly with respect to the relationship between institutional design and effective implementation outcomes. The findings described here are primarily of a descriptive rather than analytical nature.

Table 2 Advantages and Limitations of Institutional Models for EE Implementation

Model	Advantages	Limitations
1. Government agency with broad energy responsibilities	There is greater credibility with stakeholders. Government agencies have access to public funding. There is integration of EE within broad sector objectives.	EE must compete with other energy programs for resources and management attention. Large bureaucracy may impede decision making. It is difficult to retain staff.
2. Government agency focusing primarily on EE/RE/SE	Agency focus is consistent with EE. It is easier to attract dedicated staff. Dedicated "clean energy" agency provides greater voice in sector policy and obtaining resources.	Narrower focus provides less clout. Potential for competition between technologies (EE, RE) within the clean energy umbrella.
3. Government agency focusing entirely on EE	There is opportunity to create a pro-EE agency culture. It is easier to attract dedicated staff and dynamic management. There is possible leveraging of other resources (e.g., GEF, donors).	Narrower focus provides less clout. Success is highly dependent on effective top management. Agency may not be isolated from broader energy policy agenda. Agency must compete for resources.
4. Independent statutory authority (ISA) focused on EE	Independence facilitates operational discretion. There is flexibility in accessing outside advice and support. ISAs have flexibility in hiring management and staff. ISAs have flexibility in fund raising and decision making.	Agency may not be viewed as mainstream. There is potential competition between ISA and public agencies. ISAs have less direct access to public funding. Changing scope may require legislation.

Table 2 *continued*

Model	Advantages	Limitations
5. Independent corporation focused on EE	Independence facilitates operational discretion. Independent corporations can access private-sector talent and technical capacity. They have the ability to form JVs and subsidiaries. There is flexibility to obtain external inputs and funds, including shares flotation.	Independent corporations have less direct access to public funding. Board selection and composition will determine effectiveness. Agency may not be viewed as mainstream. Potential competition exists between IC and public agencies.
6. Public/private partnership focused on EE	Partnerships have flexibility in obtaining private-sector inputs (and possibly funding). Independence allows greater freedom and flexibility in decisions.	There are potential conflicts between public and private perspectives. Partnerships have less direct access to public funding.
7. Nongovernmental organization focused on EE	NGOs have greater credibility with some stakeholders. They may attract dedicated staff and management. EE focus helps build core competencies. There is flexibility to obtain external inputs and funding.	NGOs have less direct access to public funding. Some public- and private-sector stakeholders may find the NGO not credible. NGO governance structure may impose other strictures.

along two dimensions—location within government and degree of topical focus.

- Each of the seven institutional models has inherent advantages and limitations.
- Recently established EE agencies tend to be of two broad institutional types—specialized public agencies (focusing on EE/RE/SE or on EE alone) or independent statutory authorities.
- Factors influencing selection of an appropriate institutional framework include country context, goals and objectives for the EE agency, the sectors and barriers to be addressed, and existing government agency responsibilities for EE.
- Most (21) of the 29 EE agencies studied were created by a statute.

Recommendations for follow-up work include:

- Continue research on EE institutional frameworks and factors that facilitate EE market transformation and scaling-up of investment.

- Establish an information portal or clearinghouse for updating and maintaining information regarding EE institutional frameworks for EE implementation, especially as regards conditions for successful EE implementation and how to create these conditions through enabling legislation.
- Engage with developing countries in establishment of new institutional frameworks for EE implementation, by facilitating information exchange with countries having implementation frameworks in place.

1 Rationale for Developing Energy Efficiency Institutional Frameworks

This chapter develops a conceptual basis justifying the need for institutional frameworks in support of EE implementation. This conceptual basis will be used to consider and compare different approaches to encouraging EE, and to suggest guidelines for institutional frameworks and implementation arrangements that are workable in different country contexts.

Energy Efficiency and Sustainable Development

Access to affordable energy is needed to increase productivity, improve social welfare, and provide for the efficient delivery of economic and social services. Improving EE in a consuming sector, by reducing the amount of input energy required without changing the quality or quantity of end-use services rendered, makes any economic development path less costly and more sustainable. EE improvements yield direct benefits, such as affordability, reduced investment burdens for energy infrastructure expansion, improved access to modern energy through more-affordable energy services, reduced emissions of local air pollution, and global benefits in terms of reduced greenhouse gas emissions. Improved EE also yields macroeconomic and social benefits, including enhanced energy security (through reduced reliance on imported fossil fuels), reduced fiscal drain (when energy prices are subsidized), reduced consumer impacts of energy price increases, and employment generation (as domestic EE industries are developed).

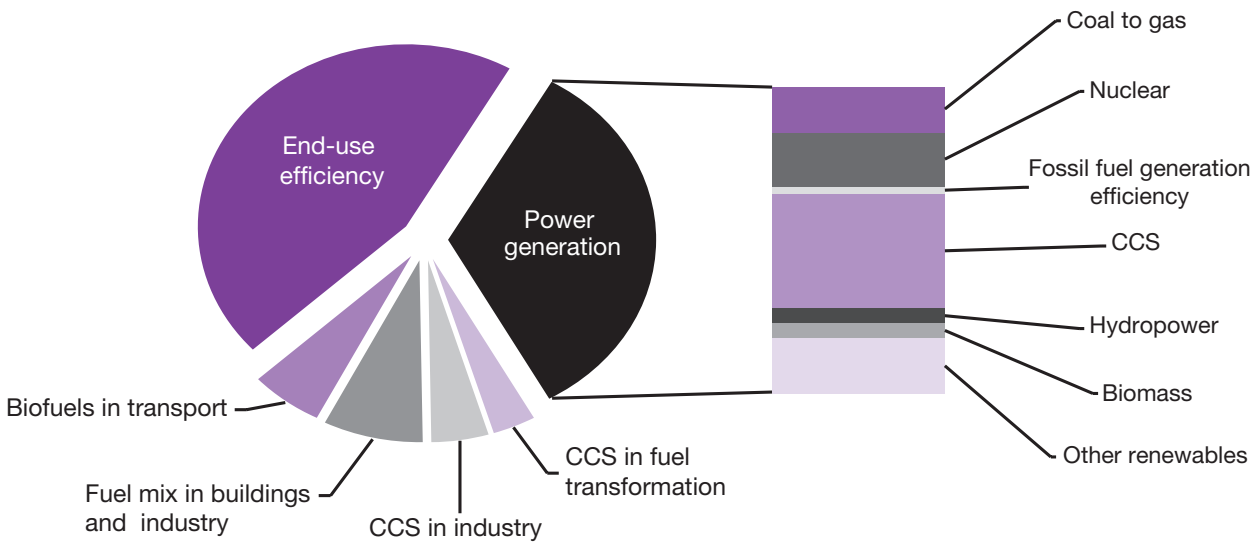
Although its role in mitigating climate change is well understood, large gaps remain between industrialized and developing countries in terms of EE potential and investments. As per the International Energy Agency (IEA), more than 65 percent of GHG reductions through 2030 could come from EE measures in developing and transition countries.[4] Improved EE in buildings, industry, and transport alone could lead to a one-third reduction in energy use by 2050. Figure 1.1 illustrates that, among the menu of existing and emerging energy options, improved end-use efficiency stands out as the most important single contributor to reduced GHG emissions. Improving EE—by getting more light, heat, mobility or other services from less primary energy input—is also one of the least expensive sources of GHG emissions reductions. As with other climate change mitigation projects, if the EE investment is cost-effective, then the GHG emissions savings are essentially free.

Energy Efficiency Potential by Consuming Sector

Only one-third of the world's primary energy consumption is converted into useful energy. EE opportunities exist in all aspects of modern energy production, distribution and consumption (see Table 1.1). Improving the efficiency of electricity consumption in particular reduces investments needed to expand generation and transmission capacity, and lowers the risk of capacity shortages if demand growth is higher than forecast or new additions are delayed. Demand management

[4] IEA, 2004. World Energy Outlook, Paris.

Figure 1.1 GHG Emissions Reductions through 2050, by Consuming Sector



Source: Energy Technology Perspectives, IEA (2006).

Table 1.1 Opportunities for EE Improvements by Consuming Sector

Sector	EE Improvement Opportunities
Buildings	Building design and measures such as better insulation, advanced windows, EE lighting, space conditioning, water heating, and refrigeration technologies
Industry	Industrial processes, cogeneration, waste heat recovery, preheating, efficient drives
Cities and municipalities	District heating systems, combined heat and power, efficient street lighting, efficient water supply, pumping, and sewage removal systems
Agriculture	Efficient irrigation pumping and efficient water use, such as drip irrigation
Power systems	*New thermal power plants:* Combined cycle, supercritical boilers, integrated gasification combined cycle (IGCC), etc. *Existing generation facilities:* Refurbishment and repowering, improved O&M practices, and better resource utilization (higher plant load factors and availability) *Reduced transmission and distribution losses:* High voltage lines, insulated conductors, capacitors, low-loss transformers, and improved metering systems
Transport	Efficient vehicles, urban mass transport systems, modal shifts to inter- and intra-city rail and water transport, CNG vehicles, traffic demand management
Households	Lighting, appliance efficiency, improved cook stoves

and electricity conservation can improve the profitability of energy providers, create new EE services industries, and, most importantly, help to *decouple* economic development from electricity demand growth.

Moving toward a high-efficiency, low-carbon global economy requires adopting EE within the designs of long-lived infrastructure such as buildings, factories, equipment, and transport facilities. Realizing these opportunities for EE improvements requires changing patterns of human behavior large and small, from how large infrastructure investment decisions are made to how and when individuals consume electricity and other modern energy. Existing and newly emerging technologies offer many opportunities to economically reduce energy use with no productivity loss or reduction in comfort and with payback periods measured in months or a few years.

World Bank Group Efforts to Scale-up Energy Efficiency

The World Bank Group (WBG) has been active in promoting EE since the early 1990s. At the 2004 International Renewable Energy Conference, the WBG committed to increase lending for new renewable energy and EE by at least 20 percent per year through FY 2009. As a follow-up of the Gleneagles (July 2005) G-8 summit, the WBG has developed the Clean Energy Investment Framework, which includes a key emphasis on promoting EE investments. These commitments recognize the potential of EE to save developing countries billions of dollars in energy costs, contribute to energy security, and reduce GHGs and local air pollution in a cost-effective manner.

Impetus for the Current Study

Despite considerable attention devoted to EE policies and programs, there has been relatively little formal assessment of the institutional aspects of EE implementation. The World Bank's ESMAP initiated this study to further examine the key elements related to structure, role, and functions of alternative models of institutions for EE implementation.

An issue paper, which led to the early draft of this report, was discussed at an international workshop on institutional frameworks for implementing EE implementation (held in Seoul, Korea, September 2006) attended by EE institutional experts from both the developed and developing countries. This report is based on the findings of the issue paper and the workshop.

The report identifies, analyzes, categorizes, and presents the main elements of institutional models and practices that have proven to be effective in promoting EE investments, particularly in the end-use (industry, buildings, residential) consuming sectors. The report also suggests key guidelines for the design of new implementing institutions that can effectively mobilize EE markets in developing countries by creating a suitable enabling environment for various stakeholders such as the end users, utilities, equipment manufacturers, municipalities, building owners, financial intermediaries, and specialized energy services providers (such as ESCOs) in scaling up EE investments.

Twenty-nine (29) EE agencies, spanning across developed and developing countries, were identified and analyzed in the study. The results of this analysis could become a potential building block for the development of various EE implementation strategies under the CEIF.

Barriers to Increased Energy Efficiency

Why has investment in EE lagged behind other investment in the energy sector, including new energy production capacity? Part of the problem is that saved energy is invisible—reductions in end-use consumption are far less tangible than electricity production from new power stations. Energy-saving technologies may look and outwardly perform just as inefficient ones, so consumers need help in making informed purchase decisions. Energy consumption is also deeply rooted in the economic activities in which the consumption takes place. These

economic activities are, in turn, governed by long-embedded incentive structures, consumer behavior, rules and regulations, infrastructure design and construction practices, investment decision making, and even cultural considerations.

Therefore, all EE improvement strategies involve systematic efforts to overcome the status quo of existing patterns of energy consumption. It is only through systematic efforts to encourage more economically rational consumptive practices that reductions in overall energy intensity can take place. However, because energy conservation investments are largely made by individual heads of household or business owners, the potential for rationale decision making is hampered by financial, institutional, policy, market and, sometimes, technical, barriers.

There are numerous barriers large and small that prevent the decision making and consumer behavior changes needed for EE improvements to take place. *Financing barriers* include high first costs and payback periods of months or years and financial institutions unfamiliar or risk averse as regards EE investments. *Information barriers* are important because EE is an invisible product attribute unless energy performance labeling or promotion is undertaken. Targeted information is needed to overcome unfamiliarity with energy efficient products, lack of awareness of EE benefits, and a perceived risk penalty when evaluating potential investments. *Market organization and price distortions* can affect any energy-related investment, but especially EE improvements. Consumers must face prices that reflect the true cost of consumption, including environmental and even social costs, in order to appropriately value EE investments. The so-called tenant–landlord or split incentive problem—when the person investing in EE does not reap the benefits of reduced energy use and energy bills—is particularly troublesome. *Transaction cost barriers* occur when development costs are high relative to potential energy savings because projects are small or there is difficulty in finding and developing bankable projects. *Institutional bias* is a barrier when there is a plant and wires focus of supply side providers or a lack of confidence in the ability of EE improvements to offset the need for new capacity. *Technical and availability barriers* hold when there is a lack of affordable and available energy efficient technology suitable to local conditions, when there is insufficient local capacity to identify, develop, implement, and maintain EE investments, or when there is no distribution or delivery network to get energy efficient goods to consumers. *Regulatory policy* can be a major barrier, notably when the profitability of energy providers relies on energy sales, thus creating a disincentive to participate in supporting or delivering EE improvements to customers. Other regulatory barriers occur when there is a lack of capacity to consider, develop, or enforce minimum energy performance standards or codes, when prices are set below marginal costs of service, or when there is uncertainty on recovery of EE program costs.

Interventions and Mechanisms to Overcome Barriers

Governments have developed a number of policies, legislations, regulations, and strategies to try to address EE market barriers, and have used different types of institutional frameworks to implement policies and programs. Dedicated EE institutions—either within the government, in the private sector domain, or as a public–private partnership—have been established in many cases to help achieve widespread scale up of EE projects. The focus of such institutions has been on creating an enabling environment for the private sector for overcoming technical, economic, and financial barriers to implementation using market-based mechanisms.

Alongside these institutions, governments have adopted a wide range of policies and strategies to overcome the barriers to rationale energy consuming behavior. The theory is simple: Market, technical and institutional barriers can be overcome or removed with the careful design of policies, programs, and interventions. Once

removed, market forces will, over time, ensure economical levels of EE.

Most interventions are focused on increasing investment in energy efficient equipment or infrastructure by or on behalf of energy consumers. These interventions, sometimes called mechanisms, include *pricing* or *market mechanisms,* in which consumers are given stronger price signals and incentives to conserve energy or shift consumption out of the peak periods, *regulation* or *control mechanisms,* in which governments impose requirements that stimulate more efficient behavior (e.g., energy building codes or minimum energy performance standards for appliances); *fiscal* or *tax policies,* in which governments financially support investment in energy conservation or directly procure efficiency goods and services; *promotion and market transformation programs,* in which governments or energy providers influence consumer behavior on a voluntary basis (e.g., appliance labeling and customer education); *technology development,* where the government or energy provider supports development of energy efficient technologies; *commercial development* or *industry support mechanisms,* where the government or energy provider partners with the private sector to increase the amount of commercial capacity focused on energy conservation; and *financial remediation,* where the government or energy provider creates special channels for end users to access financing needed to invest in energy conservation.

Sector Characteristics Affect How Intervention Strategies Are Implemented

Sector structure is an important consideration in selecting intervention strategies and developing institutional frameworks, including implementing agencies.[5] In many developed economies, sector reform has affected the selection of EE strategies and institutional frameworks and implementation arrangements. Sector reform and restructuring affects EE strategies and implementation by doing the following:

- Changing the incentives for energy providers to implement EE
- Splitting the financial benefits from EE improvements among multiple parties
- Reducing the ability of regulators to require energy providers to deliver EE
- Creating new market participants (ESCOs, retailers) who can implement EE
- Complicating the process of long-term energy planning, both for resource adequacy and sustainable development

Sector structure affects both the implementation arrangements and financing of EE programs. Implementing EE programs can be primarily the responsibility of government agencies or can be assigned to the energy services providers. If prices are right and organizational capacity is in place, private companies such as ESCOs can be expected to undertake EE implementation on their own.

As vertically integrated monopolies are unbundled and competitive energy markets develop, the optimal mix of implementation and financial arrangements may change. New potential arrangements may emerge along with competitive markets and new sector entities. Similarly, there are many potential financing strategies for EE programs and investments, including government budget allocations, energy taxes, wires charges, rate payer funding via the budgets of regulated utilities, carbon financing such as through the Clean Development Mechanism (CDM), commercial financing, and private equity investment (e.g., ESCOs).

[5] Edward Vine, Jan Hamrin, Nick Eyre, David Crossley, Michelle Maloney, and Greg Watt, "Public Policy Analysis of Energy Efficiency and Load Management in Changing Electricity Businesses," Energy Policy 31 (2003) 405–430.

Institutional Frameworks for Energy Efficiency

Institutional frameworks could broadly include enabling mechanisms (including laws or decrees), oversight of government policy and strategies, EE implementation including program design and administration, goods and services delivery, and results monitoring. Developing an institution capable of helping achieve the desired EE goals or targets at national or provincial level, well suited to market and economic conditions, and acceptable to stakeholders are important inputs to a successful implementation outcome. As the institutional framework provides the basis for interventions designed to overcome market, economic, and technical barriers, it should reflect the unique economic, technical, governmental, and political characteristics and capacities of each country. It can comprise either new or existing organizations in either the public or private sector or involving public–private partnerships.

Energy Laws and Decrees

EE decrees and legislation serve several purposes. Most importantly, they state the government's overall intentions, policy, and strategies for EE. In addition, they often specify targets, progress, or activities to be undertaken, often at the level of consuming sectors or industries. Finally, EE laws and decrees can enable the institutional frameworks and implementation arrangements to carry out the EE program, including budgets and other resources. Most of the institutional practices and implementation arrangements described in this report had some legal basis in terms of an energy law or decree that established both the EE agency (the implementation arrangement) and the supportive legal and financial frameworks, under the overall institutional framework.

Laws and decrees can also specify and enable regulatory reforms that enable EE improvements. Some market barriers, such as subsidies to end users, can be directly addressed through sector reforms that encourage EE through cost-based pricing. Second-best solutions can also be enacted by law or decree, including EE regulations such as building codes and appliance efficiency standards or minimum uptake requirements (e.g., audits or investment) on large consumers.

Decrees and legislation can take many forms according to legal system and promulgating branch of government, including laws, decrees, directives, rule making and regulations, and proclamations. Regardless of the legal basis, experience from industrialized as well as developing countries with successful EE track records shows a commonality in terms of the legal underpinning of comprehensive EE programs. These enabling frameworks generally include the following:

- Articulation of purpose and intent, in the form of a national EE policy
- Specific, quantitative, time-bound goals or targets
- Identification and justification of government interventions
- Establishment of institutional frameworks and implementation arrangements
- Provision for resources to support the interventions
- Provision for enabling conditions to support market-based EE
- Oversight arrangements including monitoring and reporting systems

Delivery Arrangements

EE implementation arrangements can be divided into three parts—governance, program administration, and services delivery (see Table 1.2). Certain functions in a publicly funded EE activity must be performed by a government or quasi-government body (e.g., governance), while other functions can be undertaken by a variety of public or private entities. Program administration could be assigned to the parastatal utility company or a new or existing agency of national or provincial government or newly formed autonomous "trusts" within or outside government. Program implementation including delivery of EE goods and services could be done by any number of private- or public-sector entities, including retail

Table 1.2 Functional Breakdown of Energy Efficiency Implementation Arrangements with Examples[6]

	Potential Arrangement	Example:
Governance/Oversight	• Ministry of Energy • Regulator • Independent oversight board	• Pacific Northwest Energy Efficiency Alliance Board of Directors (USA) • Oregon Public Utilities Commission (USA)
Program administration	• Parastatal utility company • Statutory Energy Efficiency Agency	• Energy Trust of Oregon (USA) • Northwest Energy Efficiency Alliance (USA)
Services delivery	• Government-funded EE centers • Private ESCOs	• Competitively selected implementation contractors

energy services providers, NGOs, EE centers financed by government, commercial entities such as ESCOs, or even equipment (appliance) manufacturers or retailers.

Program administration may be the most demanding EE implementation arrangement. Administrative duties range from overall program planning and budgeting to procurement of services delivery providers and evaluations of individual project performance (see Table 1.3). Program administration requires a significant repository of technical specialties and organization capacity. Choosing an EE program administrator should take into account both practical and political considerations, including the beneficiaries of the program, relationships with the target population, and existing technical and administrative capacity.

The implementation administrator should be able to accomplish the following:

- Realize economies of scale and scope
- Work collaboratively with government and other agencies
- Leverage private-sector participation in EE implementation
- Effectively engage with EE stakeholders
- Engage with and influence energy goods and services providers
- Facilitate the role of energy regulators in scaling-up EE

Based on the considerable variability in institutional practices studied and described in this report, it seems clear that there is no single administrative structure superior to all the rest. Rather, it is the starting point and nature of the EE strategy itself that will drive selection of implementation administrator.

For example, in many developed and developing economies it is the *vertically integrated utility* and *electricity distribution company* that have been most successful in designing and implementing cost-effective and innovative EE programs. These utilities have developed expertise in administering and sometimes delivering EE programs, not least because of a significant competitive advantage they enjoy in terms of access to capital, an existing relationship with end users, including billing systems and market data, a well-known brand name, and technical capacity.

However, utilities can suffer considerable disadvantages as well. In many cases, the regulatory regime discourages utilities from undertaking direct market interventions to stimulate uptake of EE, because under cost-of-service rate making their revenues and profitability are directly tied to end-use sales volumes. Regulatory arrangements and new business models are often needed to encourage utility participation in implementing EE. Utilities are also seen to be somewhat limited in the types of EE programs in which they have a

[6] All examples presented in this table are not included amongst the 29 institutions analyzed in this study.

Table 1.3 Functions of the EE Program Administrator[7]

Elements of Energy-Efficiency Program Administration and Delivery	
Program Function	**Specific Responsibilities**
General Administration and Coordination	• Manage overall budget for portfolio of programs • Manage contracts with all primary contractors • Maintain centralized information system for reports to regulators, legislators, advisory groups, etc.
Program Development, Planning, and Budgeting	• Prepare initial technical and/or market reports necessary for program strategies and initial program designs • Facilitate development of public planning process • Prepare general program descriptions and budgets for regulatory approval
Program Administration and Management	• Prepare detailed program designs and propose changes based on experience-to-date • Hire and manage staff and/or sub-contractors for program implementation • Develop and implement quality assurance standards and tracking protocols • Review and approval of invoices
Program Delivery and Implementation	• Promote and market programs • Develop and implement program 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
Program Assessment and Evaluation	• Assess program impacts and/or cost-effectiveness • Evaluate effectiveness of program processes and administration

competitive advantage. Utilities are better suited to implement programs where EE improvements represent a resource that substitutes for new generation or distribution capacity, only it happens to reside in the hands of customers.

Other types of EE interventions may be better administered by *government agencies with broad energy-related responsibilities* or *government agencies focusing on EE* or *sustainable development*. Certain types of regulatory or control mechanisms, such as minimum energy performance for equipment and buildings, should be administered by an agency of government or their designee. Similarly, intervention focused on moving markets toward more-efficient equipment requires coordination with manufacturers and importers that only a government agency can effectively provide.

There are other types of institutional frameworks for EE implementation. As described in this report, these include *independent statutory authorities* (ISAs) with a government-appointed board; *independent corporations* owned by the government; *public/private partnerships* (PPPs), generally in the form of a corporation with ownership by government

[7] Carl Blumstein, Charles Goldman, and Galen Barbose. *Who Should Administer Energy Efficiency Programs?* Environmental Energy Technologies Div., Lawrence Berkeley Lab, LBNL-53597, August 2003.

and nongovernment entities; and nonprofit or *nongovernment organizations* (NGOs). Each of these configurations blends different levels of flexibility and incentive structures, while still allowing the administrator to act with the authority of a government designee.

It is possible to develop specific criteria and measures to help evaluate the suitability of an institutional framework given prevailing market conditions, regulatory regimes, and intervention plans in support of improved EE. Broad-spectrum criteria include compatibility with policy goals, accountability and oversight consideration, administrative effectiveness, and start-up and transition issues. For each of these broad criteria, there are specific measures. Some framework comparisons can be made generically, such as the pros and cons of energy utilities versus government agencies undertaking EE implementation. However, absent the specific design of institutional frameworks such as independent corporations or statutory authorities it is difficult to draw any firm conclusions.

2 Review of Energy Efficiency Institutional Practices

The World Bank's Energy Sector Management Assistance Program (ESMAP) initiated this study, titled "Building Up on Energy Efficiency Institutional Best Practices," as a vehicle to investigate the key elements related to structure, role, and functions of institutions for EE implementation. The study identifies, analyzes, categorizes, and presents main elements of institutional models and practices that have proven to be effective in promoting EE investments, particularly in the end-use (industry, buildings, residential) consuming sectors. These institutional practices can enable EE market activity in developing countries by mobilizing key market actors, including end users, utilities, equipment manufacturers, municipalities, building owners, financial intermediaries, and specialized energy services providers (such as ESCOs).

Summary of Approach

The review examined 29 EE agencies selected from a wide range of industrialized, developing, and emerging economies. The review sought to identify the specific institutional practices that could potentially be adapted to, and mainstreamed in, developing countries that are in the process of establishing similar EE institutions. An issue paper was prepared based on secondary research including published information, Web sites, and prior studies and reports generated by the various EE agencies. The issue paper documented institutional structures for EE implementation and was used as a background paper for discussion at the Workshop on Best Practices in Institutional Frameworks for Energy Efficiency Implementation held in Seoul, Korea, in September 2006.

This report draws upon activities conducted under the auspices of the study, including the following:

- Desk review of existing documents, recent studies, reports, and other information available in the public domain
- Identification of well-established EE institutions providing illustrations of good implementation practices, as well as potential beneficiary countries in the process of setting up or strengthening their EE institutions
- Interaction with institutional practitioners and key leaders of selected EE institutions
- Development of the analytical framework to categorize the institutional frameworks into a set of seven generic models
- Assessment of the characteristics of these models and the experience from their operation and preparation of the draft issue paper
- Discussion of the draft issue paper at the Workshop on Institutional Frameworks for EE Implementation, held in Seoul, Korea in September 2006

Identifying Distinctive Institutional Models

The study considered 29 EE institutional frameworks, and considering the structure, functions, and ownership of these institutions, it was possible to identify seven generic

institutional models for public sector EE implementation to categorize these institutional frameworks:

1. Government agency with broad energy-related responsibilities (Model 1)
2. Government agency focusing primarily on "clean energy" (Model 2)
3. Government agency focusing on EE only (Model 3)
4. ISA with a government-appointed board (Model 4)
5. An independent corporation owned by the government or state-owned enterprise (Model 5)
6. PPPs, usually with government majority ownership (Model 6)
7. A nonprofit or nongovernmental organization (Model 7)

A discussion of each model, with examples from different countries, is provided in Annex 1.

Enabling and Establishing Institutional Frameworks

Table 2.1 shows the importance of national legislation in creating the overall institutional framework for EE agencies and institutions. Of the 29 EE agencies studied in this report, 21 were created by national legislation. Examples include the Energy Conservation Act (2001) in India, the Energy Efficiency and Conservation Act (2002) in New Zealand, and various acts including the Energy Policy Act of 1995 and 2005 in the United States. Other establishing or enabling mechanisms included: (1) presidential decrees, such as the presidential decree establishing the National Program for Energy Conservation (PROCEL) in Brazil; (2) government orders, such as the establishment of DENA in Germany by the Ministry of Economy and Labor, and China's Energy Research Center and Energy Conservation Information Dissemination Center established by the Chinese government orders; and (3) reorganization of divisions or offices by existing organizations, such as the Canadian Office of Energy Efficiency by Natural Resources Canada, and the Energy Efficiency Division established by METI in Japan.

Practitioner Views on Developing Energy Efficiency Institutions

A highlight of this study was the opportunity for the EE institutional practitioners to discuss the issues associated with establishing and operating effective EE agencies. Some of the key issues that emerged from the discussions are summarized in Table 2.1. The inputs were obtained via presentations and discussions at the International Workshop on Best Practices in Institutional Frameworks for Energy Efficiency Implementation, held September 28 to 29, 2006, in Seoul, Korea.[8] An issue paper distributed to participants provided a starting point for discussion.

Are Certain Institutional Models More Appropriate for Specific Programs or Activities?

Most of the EE agencies reviewed have implemented similar EE programs; therefore, it is not possible to comment on whether a particular institutional model is more or less conducive to a different type of EE market intervention. Based on a cursory review, it appears that all seven models can be effective at implementing programs targeted to overcoming information and technology availability barriers, including awareness building, technology transfer, technology development and demonstration, and conferences and workshops.

Cursory review suggests that regulatory interventions, such as standards and labeling programs, development of new policies, and certification/accreditation, are most effectively

[8] Details regarding this workshop including a list of participants and the workshop agenda are provided in Annex 2.

Table 2.1 Energy Agencies Reviewed, Their Enabling Mechanisms, and Observed Institutional Models

Country	Agency Name	Enabling Mechanism	Institutional Model
Australia	Australia Greenhouse Office	Financial Management and Accountability Act (1998)	Public energy agency
Brazil	PROCEL	Presidential decree (1985)	Public agency focused on EE
Canada	Office of Energy Efficiency	Agency reorganization (1998)	Public energy agency
China	Energy Research Institute	Government order (1980)	Public energy agency
China	Energy Conservation Information Center	Government order (1998)	Public agency focused on EE
Czech Republic	Czech Energy Agency	Government order (1995)	Public agency with clean energy focus
Denmark	Danish Energy Agency	National legislation and executive order (1976)	Public energy agency
Finland	Motiva	National legislation (1993)	Clean energy public agency
France	ADEME	National legislation (1990)	Clean energy public agency
Germany	DENA	Government order (2000)	Clean energy public agency
Greece	Center for Renewable Energy	National legislation and presidential decree (1987)	Clean energy public agency
India	Bureau of Energy Efficiency	Energy Conservation Law (2001)	Public agency focused on EE
Ireland	Sustainable Energy Ireland	Sustainable Energy Act (2002)	Clean energy public agency
Japan	Energy Conservation Center	Energy Conservation Law (1979)	Public agency focused on EE
Japan	Natural Resources and Energy Agency	Agency reorganization (1980)	Public energy agency

Table 2.1 *continued*

Country	Agency Name	Enabling Mechanism	Institutional Model
Korea	Korea Energy Mgmt Co 1980	Rational Energy Utilization Act (1980)	SOE with EE focus
Mexico	CONAE	National legislation	Clean energy public agency
Mongolia	National Renewable Energy Center	National legislation (2005)	Clean energy public agency
Netherlands	NOVEM	National legislation	Public energy agency
New Zealand	EE and Conservation Authority	EE and Conservation Act (2002)	Public agency focused on EE
Norway	ENOVA SF	National legislation (2001)	Clean energy public agency
Poland	National Energy Conservation Agency	State-owned corporation with clean energy focus (1990)	SOE with clean energy focus
Serbia	Energy Efficiency Agency	Energy Law of 2004	Public agency focused on EE
South Africa	Energy Efficiency Agency	Government order (2006)	SOE focused strictly on EE
Sri Lanka	Energy Conservation Fund	Energy Conservation Fund Act (1985)*	Statutory Authority focused on EE
Sweden	Swedish Energy Agency	National legislation (1998)	Public energy agency
Thailand	Dept. of Alternative Energy Development and Efficiency	Energy conservation and promotion act (1992)	Public agency focused on EE
United Kingdom	Energy Saving Trust	National legislation (1993)	NGO focused strictly on EE
United States	U.S. Department of Energy	National legislation (1977)	Public energy agency

*By the time of publication, the Energy Conservation Fund ceased to exist. The ECF was converted into a statutory body called the Sustainable Energy Authority, which became operational on October 1, 2007.

implemented by government agencies (Models 1, 2, and 3) or statutory agencies (Model 4). This underscores the importance of creditability and clear delegation of statutory authority as important reasons for public agency involvement in EE implementation.

For collaborations and partnerships, including voluntary agreements, the statutory agency (Model 4) and government-owned corporation (Model 5) seem to be effective, although some government agencies have also been very successful at such partnerships/agreements.

Are Certain Institutional Models Better Suited for Multiple Agency Collaboration?

Difficulty in generalizing across country contexts makes this question difficult to answer. On the one hand, a national energy agency that is large and has good representation at the cabinet level may have the influence and clout needed to obtain the cooperation and coordination form the other agencies. On the other hand, interagency rivalries may hinder such cooperation. The experience in the United Kingdom and Ireland has indicated that the independent statutory authority can be very effective at fostering the cooperation and coordination among various implementing agencies and the private sector.

Which Institutional Models Can Better Leverage Private-Sector Participation?

Most EE agencies recognize the importance of mobilizing private-sector participation in scaling-up EE investment. Cursory review suggests that Models 4, 5, and 6 (statutory agency, corporation and public/private partnership) are likely to be the most effective at leveraging private-sector participation given similar organizational cultures, business models and cross-linking of personnel and management.

Which Institutional Models Are Better Suited to Managing Stakeholder Processes?

Government agencies seem to have a clear advantage in collaborating with stakeholders. Public agencies with more focus (either strictly on EE or more generally on clean energy) may be more effective than the national public energy agency (Model 1).

Which Institutional Models Are More Effective in Engaging Energy Services Providers?

The government agencies (Models 1, 2, and 3) have had some success at engaging utilities and energy companies. However, energy services providers, particularly private utilities, are often skeptical of government bureaucracies and may be reluctant partners. Alternative models including statutory EE agencies may be more effective at forging implementation alliances, as suggested by experience in the United Kingdom and Ireland. However, the enabling legislation of such agencies must be appropriately designed and there should be good representation of utilities and energy companies in the management structure.

What Type of EE Agency Can Best Develop Policies to Enable EE Implementation?

As a general rule, public agencies will be most effective at developing new regulations and policies, especially if enabling legislation is required. The statutory EE agency and the government-owned corporations can be effective at formulating the needed policies and legislation, but may only have an advisory role in the enactment process.

Are Different Institutional Structures Better Suited to "Large" vs. "Small" Countries?

For a small country (e.g., Sri Lanka or Mongolia), it may be more appropriate to capture a balance between level of focus and access to resources. The Clean Energy Agency (Model 2) may be a good balancing point. For a larger country (e.g., China or India), a stand-alone more public agency or statutory authority focused on EE is a good solution, both in terms of attracting dedicated staff and leveraging donor funding as well as public monies.

How Important Is the Location of the EE Agency within the Government Structure?

The specific location of the EE agency within the government structure can have a large impact on its effectiveness. An EE agency located within a much larger organization responsible for a broad spectrum of energy issues may receive little attention, and may have difficulty obtaining budgetary resources or access to decision makers or legislators. An independent agency with its own management structure (such as Models 4 and 5) may be more effective at getting management attention and organizational resources. A key variable is the degree of funding autonomy for the EE agency.

How Important Is Independence and Flexibility in Decision Making?

Most practitioners placed a high value on independence and flexibility, particularly with respect to developing the policies and programs needed to mobilize the private sector, stimulate market transformation, and set and meet national EE goals. Models 4 and 5 are likely to be the most effective at achieving such independence and flexibility.

How Important Is Results Monitoring of EE Agencies, and How Best Can We Do It?

It is vital to have an objective and independent means of evaluating the performance of an EE agency. The review suggests that insufficient attention has been devoted so far to monitoring and evaluation. One way to ensure sufficient results monitoring is to build targets and measures into the enabling legislation or the annual budget allocation of an EE agency.

How Can the EE Agencies Be Made Sustainable?

Sustainability in this context is primarily a financial issue. Although EE is important, the resources allocated must be in proportion to other public goals and objectives and responsive to changing economic conditions. In almost all the countries studied herein, the government supplied the major portion of the funding. Models 1 through 4 represent agencies directly established by the government and are, therefore, allocated government budgets for their continued operation. The governments need to assure that such budgets are commensurate with the mission, goals/targets, and activities of the agencies. Models 5, 6, and 7 represent alternatives to a government structure, and may possibly be less applicable in developing countries unless the government creates a specific mechanism to fund these agencies.

3 Guidelines for Developing Energy Efficiency Implementation Agencies

This chapter presents preliminary guidelines related to establishing appropriate and effective EE institutions and agencies, drawing from the review of the 29 EE agencies and the inputs of practitioners. A road map for a developing country interested in establishing a new or modified institutional framework for EE implementation is also recommended.

Lessons Learned from EE Institutional Development

A number of countries have established institutions for EE implementation. A review of 29 EE agencies in developed and developing countries revealed considerable variation in structure, function, and programs, even though the barriers to EE implementation being addressed are quite similar. It was beyond the scope of this study to examine why and how a particular country selected a particular institutional structure vis-à-vis the country background.[9]

What was observed from the review was that EE agencies established during the 1980s and early 1990s were mostly housed within broad-based energy agencies (Model 1—National Energy Agency). Over the years, there appears to have been a gradual transition toward the preferred structures from this model to the "clean energy agency" model (Model 2—Public Agency focused on EE/RE/SE), and more recently toward agencies focused entirely on EE (Model 3). There also is a general trend toward autonomous public bodies not housed strictly within government agencies. These can be in the form of independent statutory authority (Model 4) or a state-owned enterprise or corporation (Model 5). The review did not discern very many EE agencies based on Model 6 (public–private partnerships) or Model 7 (NGOs).

Advantages and Limitations of the Institutional Models

Each of the seven institutional models has distinctive advantages and limitations (see Table 3.1). When EE implementation is subsumed within a large national energy agency (Model 1) responsible for a wide range of energy-related functions and priorities, it may not get the attention and resources needed to effectively accomplish its mission and goals. In such a large agency, while the overall budget for EE may be large, it may represent a very small fraction of the total agency budget and therefore may not represent a high priority at the top management level. On the other hand, there is increased potential to integrate EE goals and policies into the larger sectorwide context and framework, including macroeconomic linkages and sector and development objectives. Similarly, access to legislators and ministerial decision makers may be more available for an EE department within a national energy agency.

A public agency focused on clean energy or sustainable development (Model 2) is likely to be able to focus more agency resources and management attention on EE than Model 1, but will need to have sufficient dedicated funding to allow it to successfully pursue its more narrowly

[9] The rationale for selecting a particular framework is not readily available or obvious in the enabling legislation or regulations.

Table 3.1 Advantages and Limitations of the Institutional Models

Model	Advantages	Limitations
1. Government agency with broad energy responsibilities	There is greater credibility with stakeholders. Government agencies have access to public funding. There is integration of EE within broad sector objectives.	EE must compete with other energy programs for resources and management attention. Large bureaucracy may impede decision making. It is difficult to retain staff.
2. Government agency focusing primarily on EE/RE/SE	Agency focus is consistent with EE. It is easier to attract dedicated staff. Dedicated "clean energy" agency provides greater voice in sector policy and obtaining resources.	Narrower focus provides less clout. Potential for competition between technologies (EE, RE) within the clean energy umbrella.
3. Government agency focusing entirely on EE	There is opportunity to create a pro-EE agency culture. It is easier to attract dedicated staff and dynamic management. There is possible leveraging of other resources (e.g., GEF, donors).	Narrower focus provides less clout. Success is highly dependent on effective top management. Agency may not be isolated from broader energy policy agenda. Agency must compete for resources.
4. Independent statutory authority (ISA) focused on EE	Independence facilitates operational discretion. There is flexibility in accessing outside advice and support. ISAs have flexibility in hiring management and staff. ISAs have flexibility in fund raising and decision making.	Agency may not be viewed as mainstream. There is potential competition between ISA and public agencies. ISAs have less direct access to public funding. Changing scope may require legislation.
5. Independent corporation focused on EE	Independence facilitates operational discretion. Independent corporations can access private-sector talent and technical capacity. They have the ability to form JVs and subsidiaries. There is flexibility to obtain external inputs and funds, including shares flotation.	Independent corporations have less direct access to public funding. Board selection and composition will determine effectiveness. Agency may not be viewed as mainstream. Potential competition exists between IC and public agencies.
6. Public/private partnership focused on EE	Partnerships have flexibility in obtaining private sector inputs (and possibly funding). Independence allows greater freedom and flexibility in decisions.	There are potential conflicts between public and private perspectives. Partnerships have less direct access to public funding.
7. Nongovernmental organization (NGO) focused on EE	NGOs have greater credibility with some stakeholders. They may attract dedicated staff and management. EE focus helps build core competencies. There is flexibility to obtain external inputs and funding.	NGOs have less direct access to public funding. Some public and private sector stakeholders may find the NGO not credible. NGO governance structure may impose other strictures.

focused mission. A public agency focused on EE alone (Model 3) would by definition prioritize EE implementation, but its influence on top decision makers and access to public funding may be more limited. As a general organizational design guideline, practitioners should take into account the trade-off between a dedicated EE (or EE and RE) agency outside of the broad-based energy agency in that will have a better focus and ability to carry out its mandate but may lack the resources and political influence needed to accomplish its mission. One solution to this trade-off is legislation that specifies that the EE-focused public agency report to the ministerial level and that it has access to a dedicated source of funding.

Independent and autonomous bodies such as independent statutory authorities (Model 4), independent corporations/state-owned enterprises, public–private partnerships, and NGOs have certain clear advantages over public agencies—flexibility, shorter reporting and decision-making chains, freedom from government bureaucracies and rules including salary limitations, and operational discretion. However, these nonpublic or quasi-public institutional models have potential liabilities in terms of access to funding, stakeholder credibility, statutory authority, and legislative and bureaucratic influence.

Independent statutory authorities (Model 4) combine the authority of government with the flexibility of private-sector firms. They are increasingly popular, but bring with them the problem of isolation as well as the potential that public agency interests and statutory scope may overlap and cause political problems. An independent corporation (Model 5) has even greater advantages than the statutory authority (in that it can have the flexibility to obtain substantial inputs from the private sector and from EE stakeholders) even if it is government owned, provided it has a good board of directors and dedicated and predictable funding.

A public–private partnership (Model 6) has a further advantage in that it has even greater private-sector input, but may be subject to issues related to potential conflicts due to different objectives and/or perspectives of the private and the public-sector partners. This type of organization also needs dedicated and predictable funding. An NGO (Model 7) may offer some advantages with respect to spreading the EE message particularly to the residential consumers, but may be limited in its effectiveness with respect to business and industrial energy users.

Issues to Consider in Establishing a New EE Agency

Before selecting a particular type of institutional structure, there needs to be a demonstrated political will to implement significant EE programs and activities. Without a serious commitment at the national level, it would be very difficult to mobilize essential political support behind the mission, goals, activities, and resource requirements of the EE agency. In many countries, the commitment of the national government has been demonstrated with the passage of enabling legislation that provided the necessary basis for the establishment and funding of the EE agency. Given the political backing, the major considerations in selecting the most appropriate institutional structure for EE implementation are listed below.

The review attempts to identify the specific considerations that should be taken into account in developing institutional aspects of EE implementation framework. In this context, based on the review of the 29 different institutions in this study, the following emerge as important criteria, while establishing EE institutions:

- Country context, especially the relative importance of EE in energy sector policy
- EE-related technical and management capacity resident within existing institutions
- Importance of developing new legislation and rules to enable EE investment
- Types of interventions (e.g., programs) in support of scaling-up EE
- Level of integration between EE and other clean energy and clean development goals

- Requirements for organizational autonomy, flexibility and agility
- Funding mechanisms
- Importance of stimulating private sector participation

Furthermore, the review of existing EE agencies, as well as inputs obtained at the international workshop on institutional frameworks, identified the following *core characteristics,* of EE institutions, as key requirements for effective EE implementation:

- Ability to work with government agencies charged with EE responsibilities
- Ability to leverage private sector participation in EE implementation
- Credibility with and ability to effectively engage with multiple EE stakeholders
- Ability to engage with and influence energy goods and services providers including utilities and energy services companies
- Ability to coordinate with and facilitate the role of energy regulators in scaling up EE. Ability to work collaboratively with multiple government agencies
- Independence and flexibility in decision making
- Adequate resources, including staff and funding
- A credible results monitoring activities

A Road Map for Developing EE Implementation Agencies

Based on review of data available on the 29 EE agencies and discussions with EE practitioners, the following steps are suggested as essential elements before developing a new or improving an existing EE implementation agency:

1. *Define the country context and the need for a new or modified institutional structure for EE implementation*, including national priorities, commitments and goals, primary motivations for improvement in EE, and benefits of EE improvement to the nation.
2. *Define the specific objectives and or goals for the EE agency*. For example, is the EE agency to focus on energy reductions, peak load reductions, or both? Is it to address a specific energy type (electricity, gas, oil, etc.), or all energy types? How important are national and global (such as GHG reduction) environmental objectives as part of the EE agenda?
3. *Define the major consuming sectors that will be addressed by the agency,* such as industrial, commercial, buildings, housing, transportation, and agricultural sectors.
4. *Define the major barriers that are limiting the implementation of the EE measures and options in the target sectors*, such as information and awareness issues, customer factors, financing issues, regulatory and policy barriers, risk perceptions, and so on.
5. *Assess the existing institutional structure(s) that may be addressing some of these barriers*, including relevant existing legislation, policies and regulations, roles and responsibilities of existing agencies, need for new or modified legislation, policies, and regulations, and need for new or modified institutional structures.
6. *Define the types of mechanism that the EE agency will need to establish.* Such mechanisms (strategies, policies, programs, projects, etc.) may include information/education/awareness, standards and labeling, pilots and demonstrations, technology transfer, financial incentives, procurement, collaboration/partnerships, certification/accreditation, public recognition/awards, and so on.
7. *Determine the potential funding sources.* These may include dedicated government budgets, levies or taxes on energy sales, fees from product registrations, fees from certification/accreditation, donor funds, and so on.
8. *Define the need for a new or modified institutional framework,* especially the areas and activities that a new or modified EE agency may be best able to perform.

9. *Assess the legislative or other means that would lead to the establishment of the new or modified structure*, such as how to best make the needed legislative, regulatory, executive, or other changes to establish the new or modified agency.
10. *Learn from the experience of other countries*. For example, this report provides a compendium of EE agency descriptions. This information may be used to identify countries with similar situations where EE agencies have been established, and contact them to obtain additional relevant information.
11. *Develop the strategy and plan for establishing the new or modified institutional framework.* This may include drafting new legislation, regulation or executive order, defining the type of institutional model to be used, identifying the potential "home" for the new or modified agency, or assessing the budget and staffing requirements, for example.

4 Conclusions and Recommendations

This report contains a compilation and descriptive analysis of the institutional frameworks for EE implementation from 27 developed and developed economies. The report provides a compendium of detailed information on country context, enabling framework, mission and objectives, goals and targets, key activity areas, funding mechanisms, management structure staff and budget, and results and lessons learned from the experiences of 29 EE agencies around the world. Based on this information, the report provides some observations and suggestions for countries interested in establishing or modifying the institutional frameworks for EE implementation.[10] The following are the major conclusions of this analysis:

- All of the EE agencies analyzed fell within one of seven distinct institutional models falling along two dimensions—location within government and degree of topical focus.
- Each of the seven institutional models has inherent advantages and limitations.
- Recently established EE agencies tend to be of two broad institutional types—specialized public agencies (focusing on EE/RE/SE or on EE alone) or independent statutory authorities.
- Factors influencing selection of an appropriate institutional framework include country context, goals and objectives for the EE agency, the sectors and barriers to be addressed, and existing government agency responsibilities for EE.
- Most (21) of the 29 EE agencies studied were created by a statute.

The report also presents a step-by-step road map for a developing country interested in establishing a new agency for EE implementation or modifying the existing institutional framework.

Finally, the findings of the study include the following recommendations for future work:

- Continue research on EE institutional frameworks and factors that facilitate EE market transformation and scaling up of investment.
- Establish an information portal or clearinghouse for updating and maintaining information regarding EE institutional frameworks for EE implementation, especially as regards conditions for successful EE implementation and how to create these conditions through enabling legislation.
- Engage with developing countries in establishment of new institutional frameworks for EE implementation, by facilitating information exchange with countries having implementation frameworks in place.

[10] Although a substantial amount of information has been assembled and documented, there are a number of important gaps, particularly with respect to the major results and lessons learned vis-à-vis the successful measurable impacts of EE institutions.

Annex 1 Description of the Energy Efficiency Institutional Models

This annex describes the key characteristics, advantages and limitations of the seven generic EE institutional models identified in this report, along with specific examples.[11]

Model 1–Government Agency with Broad Energy Responsibilities

Overview

Many countries have established national energy agencies (and, in the case of large countries, analogous state energy agencies) with overall responsibilities for energy-related issues. Examples of such agencies include the following:

- United States—U.S. Department of Energy (DOE)
- Denmark—Danish Energy Authority (DEA)
- Hungary—Hungarian Energy Office
- Portugal—ADENE
- Slovakia—Slovak Energy Agency
- China—Energy Research Institute
- Japan—Energy Efficiency Division (METI)

Some of these agencies place a high priority on EE and have designed and implemented policies and programs to promote EE. However, in their overall structure and responsibilities, EE is only one of many important responsibilities.

Examples

1. The Danish Energy Authority carries out tasks, nationally and internationally, in relation to the production, supply, and consumption of energy. This means that the Authority is responsible for the whole chain of tasks linked to the production of energy and its transportation through pipelines to the stage where the consumer uses oil, natural gas, heat, electricity and so on for energy services. By establishing the correct framework and instruments in the field of energy, the Danish Energy Authority attempts to ensure security of supply and the responsible development of energy in Denmark from the perspectives of the economy, the environment, and security.
2. The U.S. Department of Energy's overarching mission is to advance the national, economic, and energy security of the United States; to promote scientific and technological innovation in support of that mission; and to ensure the environmental cleanup of the national nuclear weapons complex. The Department has four strategic goals toward achieving the mission. Related to this mission, DOE has four strategic goals related to defense, energy security, scientific research, and environmental protection.

Both of these agencies place a high emphasis on EE. Nevertheless, it should be noted that EE is only a small part of their overall responsibilities.

[11] Some of the examples of EE institutions presented in this annex have not been included in the list of 29 EE institutions studied and analyzed in detail in the remaining report (including Annex 3).

Typical EE Roles and Functions

As national energy agencies, these organizations have a broad range of responsibilities and functions. While the specific roles and responsibilities may vary from one country to another, these agencies generally address the following:

- Policy development
- Information/awareness
- Education
- Technical assistance
- Technology transfer
- Financial incentives (grants, loans, subsidies, credit enhancement, etc.)
- Pilots and demonstration projects
- Conferences, seminars and workshops
- Standards and labeling
- Collaboration/partnerships
- Certification/accreditation
- Public recognition/awards

Advantages of Model 1

The advantages of this institutional framework include the following:

- Being a part of a larger, well-recognized agency (or Ministry) provides good visibility and credibility to the EE function with its stakeholders.
- The EE organization can access resources within the larger parent organization that may be needed for special assistance as needed.
- The large parent organization is likely to have greater clout in obtaining government funds than a small agency focusing only on EE.
- If the top management of the agency is truly committed to EE, it will facilitate obtaining funds for EE programs.

Limitations of Model 1

This type of institutional framework has several limitations:

- Since the EE function is likely to be a small part of the agency's overall responsibilities, it is likely that EE will not get sufficient priority for funds, staff, or other resources.
- If the top management of the agency is more committed to other functions (energy security, supply side-management, etc.) the EE function may become simply a "step-child" and not receive adequate attention or resources.
- Decision making may be more cumbersome and slow in a large agency.
- High-quality staff may seek positions in other functions than EE where they may perceive greater opportunities for career advancement.

Model 2–Government Agency Focusing Primarily on EE/RE/SE

Overview

Recognizing the importance of energy efficiency (EE) along with renewable energy (RE) and sustainable energy (SE) development, many countries have established specialized energy agencies focusing primarily on EE/RE/SE. Examples of such agencies include:

- Australia—Australian Greenhouse Office
- Australia (New South Wales)—Sustainable Energy Development Authority (SEDA)
- Czech Republic—Czech Energy Agency
- France—ADEME
- Netherlands—NOVEM
- Sweden—Swedish Energy Agency
- Mexico—CONAE
- Mongolia—Renewable Energy Center

The mission of these agencies includes a significant emphasis on EE.

Examples

In most cases, these agencies are a part of a larger government agency or ministry. For example, the Sustainable Energy Development Authority of New South Wales (NSW), Australia (originally a separate agency), is now a part of the Department of Energy, Utilities and Sustainability (DEUS) of the NSW government, NOVEM is a part of the

Dutch Ministry of Economic Affairs, and the Czech Energy Agency is a part of the Ministry of Industry and Trade of the Czech government. Two specific examples are described here.

1. ADEME is committed to action to preserve energy and natural resources, address pollution concerns, and advance sustainable development throughout the world. The International Affairs Division constructs and implements strategies spanning the spectrum from research and development work, to promotion of French products and services in export markets, with a global and planetary environmental policy in mind. These international objectives are pursued multilaterally and bilaterally, within the European Union, with developing and emerging countries, and in the framework of international development institutions. This global outlook focuses on energy use, renewable resources, managing the urban environment and infrastructure, from waste to transport. An international perspective is predominant in issues related to the greenhouse effect and emissions reduction, cross-border pollution, economic development and transfer of technology
2. The main function of the Czech Energy Agency is to encourage the activities of legal and physical persons aimed at energy savings and consequential reduction of the energy demand of the Czech economy and to promote higher utilization of renewable and secondary sources of energy. An integral part of the CEA's activity is to offer a promotion and public education in the fields of energy savings, the wider use of renewable and secondary sources of energy and the development of combined heat and power. Outputs of the CEA's activity are focused on saving primary energy sources and minimizing of negative impacts on the environment following on from the process of ineffective or technically inappropriate use of energy sources and on higher utilization of energies in the process of their transformation.

Typical EE Roles and Functions

Due to their focus on EE/RE/SE, these agencies have a wide range of responsibilities and policies and programs related to EE. Generally, the range of programs offered includes all of the programs covered by the broader national energy agencies.

Advantages of Model 2

- The focus of the agency is consistent with the major objectives of EE.
- There is likely to be a commonality of goals, approaches, program designs, and so on among the various functions of the agency.
- It may be easier to attract qualified staff dedicated to sustainable energy development.
- Combining EE with RE and SE functions will provide a larger voice in requests for funding, staff, and other resources from the government.

Limitations of Model 2

- The smaller size of the agency (relative to Model 1) may make it more difficult to obtain adequate funding, staff, and other resources.
- The combining of EE with RE and other sustainable energy options, may lead to a decreased emphasis on EE programs (as RE is generally more attractive to bureaucrats and politicians because it is more tangible and requires greater investments).
- Depending on where this type of agency is located within the government organization (i.e., who is the parent agency or ministry), EE may or may not get adequate attention.

Model 3–Government Agency Focusing Entirely on EE

Overview

Some countries have established specialized agencies to focus exclusively on EE. These have generally been set up in response to specific legislative, regulatory or executive initiatives

related to implementation of EE. Examples of such agencies include the following:

- Canada—Office of Energy Efficiency
- China—Energy Conservation Information Center
- New Zealand—Energy Efficiency and Conservation Authority (EECA)
- Japan—Energy Conservation Center of Japan (ECCJ)
- Romania—Romanian Agency for Energy Conservation (ARCE)
- India—Bureau of Energy Efficiency (BEE)
- India—Petroleum Conservation Research Association (PCRA)
- Bulgaria—Energy Efficiency Agency (EEA)
- Brazil—PROCEL
- Serbia—Energy Efficiency Agency (SEEA)
- Thailand—Department of Alternative Energy Development and Efficiency (DEDE)

Some of these agencies focus on all energy forms (e.g., EECA, ECCJ, ARCE), while others focus on specific energy types (BEE and PROCEL on electricity, and PCRA on petroleum).

Examples

The primary mission of these agencies is, by definition, EE. These agencies may be independent (such as EECA, which has been established as a "crown agency" in New Zealand) or may be a part of a larger ministry (such as the BEE, which is in the Ministry of Power in India). The programs and activities of these agencies are designed to meet the primary mission of improving EE. Three examples are provided:

1. The Energy Efficiency and Conservation Authority (EECA) promotes a sustainable energy future by changing the way New Zealanders think about and use energy. EECA works to raise community awareness of EE issues and provides businesses and individuals with the tools to make changes. EECA develops programs to meet the needs of specific markets, often working in partnership with other organizations. EECA is the main body responsible for helping to deliver the Government's extensive EE agenda. Its function is to encourage, promote, and support EE, energy conservation, and the use of renewable energy sources. It has developed the National Energy Efficiency and Conservation Strategy in conjunction with the Ministry for the Environment.
2. The Energy Conservation Center of Japan contributes to promoting the efficient use of energy, protection from global warming, and sustainable development. Japan has to rely on imports for most of its domestic demand for fuel resources. In such a situation, the country's energy consumption is increasing at a high level with the development of the national economy in recent years—which had led to expansion in production, distribution, and consumption—and with changing people's lifestyles. However, there is the constant possibility of a global crisis in energy supply and demand, as well as the growing problem of global warming. With this in mind, ECCJ has developed certain fundamental policies prescribe the matters needed for the comprehensive promotion of rational use of energy at factories or workshops and buildings and for machines, and so on.
3. In India, the Bureau of Energy Efficiency (BEE) was established in response to the Energy Conservation Act of 2001. The mission of BEE is to institutionalize EE services, enable delivery mechanisms in the country, and provide leadership to the key players involved in the energy conservation movement. The primary goal of the Bureau is to reduce the energy intensity in the economy. The broad objectives of BEE are to: (1) exert leadership and provide policy framework and direction to national energy conservation and efficiency efforts and programs; (2) coordinate EE and conservation policies and programs and take it to the stakeholders; (3) establish systems and procedures to measure, monitor and verify EE results in individual sectors as well as at a macro level; (4) leverage multilateral and bilateral and

private sector support in implementation of Energy Conservation Act and efficient use of energy and its conservation programs; (5) demonstrate delivery of EE services as mandated in the EC bill through private–public partnerships; and (6) interpret, plan and manage energy conservation programs as envisaged in the Energy Conservation Act.

Typical EE Roles and Functions

Because these agencies are focused entirely on EE, they generally have the widest range of EE programs and activities. They cover all the program areas listed in the two prior models and provide greater depth and breadth of programs and activities.

Advantages of Model 3

- The agency's focus is entirely on EE, which allows for a more dedicated staff.
- The focus on EE can lead to better program design.
- With a dynamic management, the agency can be successful in leveraging significant resources for EE implementation.
- If the parent agency has a leader committed to EE, it will be easy to obtain adequate funds, staff, and other resources.

Limitations of Model 3

- The agency is likely to be located under a larger organization with a focus that may not be consistent with EE, leading to neglect.
- Without a dedicated top management, the EE agency may face a lack of adequate funds, staff, and other resources.

Model 4–Independent Statutory Authority

Overview

Some countries have established independent statutory organizations to focus on EE. Generally, these are established by legislation and are governed by a board of directors appointed by the government. Their funding may come from a special allocation or from an existing ministry, but they are otherwise an independent organization and not part of the ministry. Examples of such organizations include the following:

- Ireland—Sustainable Energy Ireland (SEI)
- United Kingdom—Energy Saving Trust (EST)
- Greece—Center for Renewable Energy Sources (CRES)
- Sri Lanka—Energy Conservation Fund (ECF)

Examples

Here are two examples of the functions and responsibilities of these organizations:

1. SEI has a mandate to promote and assist the environmentally and economically sustainable production, supply, and use of energy. SEI's mission is to promote and assist the development of sustainable energy. In support of these objectives, SEI has undertaken a number of important policy and program initiatives related to home energy rating, efficient home construction, public-sector EE, information and awareness programs, collaborative large industry EE agreements, technology promotion, CHP, and renewable energy R&D. The funding for SEI comes from the Ministry of Communications, Marine and Natural Resources, and is administered by a 12-member board of directors.
2. The U.K. Energy Savings Trust (EST) is a nonprofit organization established by the government and funded mostly by the government (with some private funding). Its goals are to achieve sustainable use of energy and to reduce carbon dioxide emissions. EST encourages EE and the integration of renewable energy resource. EST works with households, business and the public sector to encourage more efficient use of energy, stimulate demand and supply of cleaner-fueled vehicles, and promote the

use of small-scale renewable energy sources, such as solar and wind. The funding for the EST comes from several ministries, and it is governed by a 13-member board of directors that includes representatives of the government and private sector.

Typical EE Roles and Functions

The major advantage of this institutional structure is the ability to benefit from the independent nature of the organization to obtain inputs from a range of public and private organizations (usually represented on the board). As a result, the organization can undertake more innovative programs and activities.

Advantages

- The ISA is an independent agency, with a separate and well-defined function and related funding. This facilitates the operation of the EE function.
- The agency can easily obtain external advise and assistance through private-sector board members or advisors.
- Because it is a smaller organization, decision making can be more rapid and flexible.

Limitations

- The agency may not be considered mainstream by other government agencies and by some stakeholders.
- Being a small agency, it may not have sufficient clout with the government for funding, staff, and other resources.
- It may be difficult to increase the scope and budget for EE activities without going to the legislature.

Model 5—Independent Corporation

Overview

Some governments have established independent corporations to develop and implement EE programs. Generally, the governments own the corporations. Examples of such corporations include the following:

- Korea—Korea Energy Management Corporation (KEMCO)
- Finland—Motiva
- Norway—ENOVA
- Spain—IDEA
- Italy—ENEA
- United States (New York State)—NYSERDA
- South Africa—National Energy Efficiency Agency

Examples

These organizations are somewhat similar to the independent statutory authorities (Model 4) but are set up as corporations. Two examples follow:

1. KEMCO is perhaps the earliest such organization. The mission of KEMCO is to create an "Enertopia" by "placing a high priority on conservation and efficiency, thus to leave a land of clean energy and green environment for the future. It also promotes implementation of rational energy conservation programs toward a sustainable development by harmonizing between energy, economy and environment. The activities of KEMCO include:
   - Energy audits and surveys
   - R&D, demonstration, and dissemination of technologies on energy resources
   - Promotion of EE
   - Commercialization and diffusion of higher-efficient energy appliances
   - Energy savings programs by sector
   - Climate change mitigation efforts
2. Another example is Enova, the Norwegian organization. Enova was officially created on June 22, 2001, and is a public enterprise owned by the Royal Norwegian Ministry of Petroleum and Energy. Enova's main mission is to contribute to environmentally sound and rational use and production of energy, relying on financial instruments and incentives to stimulate market actors

and mechanisms to achieve national energy policy goals. The establishment of Enova SF represents a shift in Norway's organization and implementation of its EE and renewable energy policy. By gathering strategic policy responsibilities in a small, flexible, and market-oriented organization, Norway hopes to create a proactive agency that has the capacity to stimulate EE by motivating cost-effective and environmentally sound investment decisions. Enova enjoys considerable freedom with regard to the choice and composition of its strategic foci and policy measures.

Typical EE Roles and Functions

The roles and functions of these organizations are very similar to the statutory authorities (Model 4), the main difference being that as an independent corporation, the organization has even greater flexibility to conduct innovative programs. Also, these organizations are almost always focused entirely on EE. More important, these organizations have the capability to mobilize private-sector funds for their activities (although to date, few have leveraged external funding for EE).

Advantages

- Focus on EE facilitates better program design and implementation.
- Independent nature allows greater freedom and flexibility in decision making and in setting objectives and policies.
- The agency has the substantial flexibility to obtain external inputs through board members and advisors.

Limitations

- Being outside the government structure may make it more difficult to obtain government funding, unless dedicated funding is available from the government.
- The appointment of board members is still a government function, and if the right choices are not made, the agency may be at a disadvantage.

Model 6–Public–Private Partnership

Overview

There are a few examples of public–private partnerships established to promote EE at the national level. Following the collapse of the Iron Curtain, the European Union launched a major initiative to establish a set of *energy centers* in Eastern and Central Europe and in the countries of the former Soviet Union. Some of these were established as public–private partnerships. Most have now been changed to one of the models already described. There remain, however, the following examples of public–private partnerships:

- Poland—KAPE
- Germany—DENA

Examples

1. The Polish National Energy Conservation Agency (KAPE) was created after the resolution passed by the Polish Parliament, a decision of the government of the Republic of Poland, together with agreement between shareholders. KAPE was established by a parliamentary resolution November 9, 1990, concerning guidelines for energy policy of Poland until 2020, followed by a decision of the government of the Republic of Poland to create the Energy Conservation Agency. While the agency was created by the government, its shareholders include the National Economy Bank (16.13%), Industrial Development Agency (16.13%), Ministry of Treasury (51.61%), and National Fund for Environmental Protection and Water Management (16.13%). The mission of KAPE is to develop and implement the principles for the attainment of sustainable energy policies in Poland.
2. DENA (German Energy Agency Deutsche Energie-Agentur GmbH) is the competence center for EE and renewable energies in Germany. Its manifold objectives include the rational and thus environmentally friendly

production, conversion and use of energy, and the development of sustainable energy systems with a greater emphasis on renewable energy sources. To this end, DENA initiates, coordinates, and implements innovative projects and campaigns at a national and international level. It provides information to end-use consumers, works with all social groups active in politics and the economy, and develops strategies for the future supply of energy. Its shareholders are three ministries of the Federal Republic of Germany (Ministry of Economics and Technology, Ministry of Transport, Building and Urban Development, and Ministry for the Environment, Nature Conservation and Nuclear Safety), and the KfW Bankengruppe (KfW Banking Group).

Typical EE Roles and Functions

These agencies are very similar to the private corporation (Model 5), the major difference being that the organization may not necessarily be a corporation, and they have both public- and private-sector participants.

Advantages

- The agency can benefit from the private-sector participation since sustainable EE programs need mobilization of the private sector for implementation.
- This structure allows for substantial flexibility to obtain external inputs through board members and advisors.
- Independent nature allows greater freedom and flexibility in decision making and in setting objectives and policies.

Limitations

- Potential conflicts may arise due to different objectives and/or perspectives of the private- and the public-sector partners.
- Being outside the government structure may make it more difficult to obtain government funding, unless dedicated funding is available from the government.

Model 7—Nongovernmental Organization

Overview

There are a limited number of examples of nongovernmental organizations (NGOs) for promoting EE. Here are two:

- Austria—The Austrian Energy Agency
- Croatia—Energy Institute Hrvoje Požar

Examples

1. The Austrian Energy Agency is a nonprofit energy research and policy institution. Its mission is to promote rational use of energy and stimulation of renewable energy sources and of innovative technologies. The agency is the energy research and policy institution in which the federal and the provincial administrations and some 50 important institutions and corporations from a variety of economic sectors cooperate. The board of directors comprises the federal minister charged with environmental affairs, the federal minister charged with energy affairs, and the chairman of the provincial governors. The Austrian Energy Agency is the principal partner of the Austrian federal government in its effort to attain its energy policy objectives, which aim mainly at a macro-economically efficient production and a rational use of energy, at a stimulation of renewable energy sources, and of innovative technologies. The Austrian Energy Agency acts, for all of its members, as a clearinghouse and a coordination platform for all associated national and international activities. The overall mandate of the Austrian Energy Agency is to make energy *savings* an energy source that can successfully compete with conventional sources of energy, and to advocate boundary conditions under which market forces can act in favor of renewables and improved EE.

2. The Croatian Energy Institute Hrvoje Požar has been founded as a nonprofit institution and is the central scientific and professional institution in Croatia for global planning in the energy system and its subsystems. Its goals are to provide expert and scientific support to the strategic development of the Croatian energy system and its subsystems, the processes of legislative reform and development, the advancement of economic relations, and the development of relevant institutions. The Institute's main tasks include expert and scientific research in the field of energy for state, regional and local administration and energy companies; expertise and analyses for the Croatian Energy Regulatory Council; management of National Energy Programs and pilot projects; organization of seminars, workshops, and courses; and publication of editions, periodicals, and other forms of communication with experts, scientists, and the general public, especially via Internet. The Institute carries out its mission in cooperation with numerous scientists and institutions from Croatia and abroad.

Typical EE Roles and Functions

As an NGO, this type of organization is similar to the public/private partnership (Model 6). Often, NGOs can find it easier to obtain grant funding. However, they may be limited in certain types of activities, such as EE financing and implementation.

Advantages

- An NGO may have greater credibility with the stakeholders and may be more effective at information and communication programs.
- The focus on EE facilitates better program design and implementation.
- Independent nature allows greater freedom and flexibility in decision making and in setting objectives and policies.
- The agency has the substantial flexibility to obtain external inputs as well as grant funds through board members and advisors.

Limitations

- Being outside the government structure may make it more difficult to obtain government funding, unless dedicated funding is available from the government.
- An NGO may find it difficult to take a major role in program implementation, unless it can find suitable private-sector partners.
- Some stakeholders (such as industrial firms) may not find the NGO a credible source for EE information.

Annex 2 International Workshop on Best Practices in Institutional Frameworks for Energy Efficiency Implementation

Workshop Objectives

As a part of this study, the Workshop on Best Practices in Institutional Frameworks for Energy Efficiency Implementation was conducted in cooperation with the Korea Energy Management Corporation (KEMCO) in Seoul, Korea, in September 2006. The primary objective of the workshop was to build on the experience gained from countries with well-established EE institutions, to help in the evolution of similar institutions in developing countries. The workshop was designed to do the following:

- Provide a platform for initiating continuing information exchange between participants from selected developing countries (interested in or in the process of establishing EE institutional frameworks) and expert speakers and resource persons from countries and international organizations that have had successful experience with dedicated EE institutions
- Review and discuss the preliminary categorization and assessment of the characteristics, viability, and experience of different institutional models
- Enable the participants to assess the viability, applicability, and transferability of models to their own countries in the context of their own political, legal, and regulatory environments
- Obtain feedback from the developing country participants to refine the preliminary categorization and assessment and develop recommendations.

The Workshop program, participants list, and other details are provided in this annex.

Countries and Organizations Participating In the Workshop

Country	Organization
–	International Energy Agency
United States	U.S. Department of Energy
Germany	Deutsche Gesellschaft für Technische Zusammenarbeit (German Technical Cooperation—GTZ)
Japan	Agency for Natural Resources and Energy; Ministry of Economy, Trade and Industry (METI)
Korea	Korea Energy Management Corporation (KEMCO); MOCIE
Brazil	National Electricity Conservation Program of Brazil (PROCEL)
China	Energy Conservation Information Dissemination Center (ECIDC), Energy Research, Institute, NDRC
India	Bureau of Energy Efficiency (BEE), Ministry of Power
Indonesia	Directorate General of Electricity and Energy Utilization
Jordan	Ministry of Planning and International Cooperation
Mongolia	National Renewable Energy Center (NREC)
South Africa	National Energy Efficiency Agency (NEEA)
Sri Lanka	Energy Conservation Fund (ECF)
Thailand	National Economic and Social Development Board (NESDB)
–	The World Bank, Energy Sector Management Assistance Program (ESMAP)

Workshop Agenda

Day One: Thursday, September 28, 2006

08:15–08:45 **Registration**

Session 1: **Opening Session**

08:45–09:00 Welcome Remarks—Mr. Cho Seok, Director General of Energy and Resource Policy Office, MOCIE, Republic of Korea

09:00–09:20 World Bank Perspectives and Programs on Energy Efficiency—Dr. Ashok Sarkar, The World Bank

09:20–10:00 Overview of the Study and Issues Paper: Key Findings—Mr. Dilip Limaye, The World Bank

10:00–10:20 **Coffee break**

Session 2: **Energy Efficiency Institutional Models in Developed Countries**

Session Co-Chairs:

Dr. Tae Yong Jung, The World Bank, and Dr. Kevin Nessiep, National Energy Efficiency Agency, South Africa

10:20–10:45 Experience with Energy Efficiency Institutions in IEA/OECD Countries—Dr. Mark Ellis, International Energy Agency, Paris

10:45–11:10 Energy Efficiency Institutional Experience in Germany—Dr. Markus Kurdziel, GTZ, Germany

11:10–11:35 Japan's Experience with Energy Efficiency Institutions Makito Takami, Agency for Natural Resources and Energy, Japan

11:35–12:00 Experience with Energy Efficiency Institutions and the Role of KEMCO in Korea Dr. Dae-Gyun Oh, KEMCO, Republic of Korea

12:00–12:25 Federal and State Level Energy Efficiency Institutional Framework and Experiences in the United States Ms. Cynthia Wilson, U.S. Department of Energy, USA

12:30–13:30 **Lunch**

Session 3: **Energy Efficiency Institutional Practices and Programs in Developing Countries**

Session Co-Chairs:

Dr. Dae-Gyun Oh, KEMCO, and Dr. Mark Ellis, International Energy Agency

13:30–13:50 **Brazil:** Mr. George Alves Soares, PROCEL, Brazil

13:50–14:10 **China:** Prof. Jianmin Zhang, Energy Conservation Information Dissemination Center, China

14:10–14:30 **India:** Mr. K.K. Chakravarti, Bureau of Energy Efficiency, India

14:30–14:50 **Indonesia:** Ms. Maryam Ayuni, DGEEU, Department of Energy and Minerals, Indonesia

14:50–15:10 **Jordan:** Dr. Saleh Al-Kharabsheh, Ministry of Planning and International. Cooperation, Jordan

15:10–15:30 **Mexico:** Dr. Maria Elena Sierra Galindo, CONAE, Mexico[12]

15:30–15:50 **Coffee break**

[12] Unable to participate.

Session 3 (continued)

Session Co-Chairs:
Ms. Cynthia Wilson, U.S. Department of Energy, and Dr. Markus Kurdziel, GTZ, Germany

15:50–16:10 **Morocco:** Ms. Zohra Ettaik, Morocco[13]
16:10–16:30 **Mongolia:** Mr. Dorj Purevsuren, Ministry of Fuel and Energy, Mongolia
16:30–16:50 **South Africa:** Mr. Barry Bredenkamp, National Energy Efficiency Agency, South Africa
16:50–17:10 **Sri Lanka:** Mr. Ananda Gunasekara, Energy Conservation Fund, Sri Lanka
17:10–17:30 **Thailand:** Ms. Thida Pattatham, National Economic and Social Development Board, Thailand

18:00–20:00 Reception hosted by KEMCO

Day Two: Friday, September 29

Session 4: Key Elements of Energy Efficiency Institutional Best Practices: Synopsis from Day One Program and Issues Paper

Session Co-Chairs:
Mr. Ananda Gunasekara, Energy Conservation Fund, Sri Lanka, and
Prof. Zhang Jianmin, NDRC, China

8:30–9:00 Presentation by Mr. Dilip Limaye, World Bank
9:00–10:00 Open discussion

10:00–10:30 Coffee break

Session 5: Stakeholder Roundtable: Lessons Learned and Implications for Developing Countries

Session Co-Facilitators:
Dr. Dae-Gyun Oh, KEMCO, and Dr. Marcus Kurdziel, GTZ

10:30–12:00 Open discussion by country participants

12:00–13:00 Lunch

Session 6: Continued Discussion of Lessons Learned and Implications for Developing Countries

Session Chair: Dr. Tae Yong Jung, The World Bank

13:00–13:30 Summary reports to be presented by Group 1 and 2 representatives
13:30–14:00 Open discussion

Session 7: Feedback and Recommendations for the Report from Developing Country Perspective

Session Co-Chairs:
Mr. Dilip Limaye, The World Bank, and Mr. K. K. Chakravarti, India

15:00–15:20 Coffee break

Sessions 8: Closing Session
15:20–15:40 Wrap-up and Next Steps: Dr. Ashok Sarkar, The World Bank
15:40–16:00 Closing Remarks: Dr. Tae Yong Jung, The World Bank
16:00 Workshop adjourns

[13] Unable to participate.

	Name	Country	Email
Developing Country Participants			
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6	Ms. Maria Elena Sierra Galindo	Mexico	esierra@energia.gob.mx
7	Mr.Dorj Purevsuren	Mongolia	puujeemoogii@yahoo.com
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20	Mr. Dilip R. Limaye	USA	dlimaye@attglobal.net
Local (Korea) Participants			
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22	Dr. Shin Ho Chul	Korea	hcshin@kemco.or.kr
23	Ms. Nam Hee Jung	Korea	heejung@kemco.or.kr

Annex 3 Descriptions of Energy Efficiency Agencies

LIST OF COUNTRIES[14]

1. Australia
2. Brazil
3. Canada
4. China—ERI
5. China—ECIDC
6. Czech Republic
7. Denmark
8. Finland
9. France
10. Germany
11. Greece
12. India
13. Ireland
14. Japan—ECCJ
15. Japan—EED
16. Korea
17. Mexico
18. Mongolia
19. Netherlands
20. New Zealand
21. Norway
22. Poland
23. Serbia
24. Sri Lanka
25. South Africa
26. Sweden
27. Thailand
28. United Kingdom
29. United States

[14] The information presented in this annex has been obtained through websites, annual reports and inputs from the participants of the International Workshop on Best Practices in Energy Efficiency Implementation held in Seoul, Korea in September 2006.

Australia

Australia: Australian Greenhouse Office	
Date Established	1998
Type of Agency ("Who")	Government department focusing on EE/RE/SE
Enabling Framework ("How established?")	A prescribed agency under the Financial Management and Accountability Act to be the lead Commonwealth agency on greenhouse matters. The Australian Greenhouse Office (AGO) was abolished as an executive agency under the *Public Service Act 1999* on October 26, 2004, and as a prescribed agency under the *Financial Management and Accountability Act 1997* on November 3 following ministry changes announced at the recent election. Under the new arrangements, the Australian Greenhouse Office will become a division of the Department of the Environment and Heritage.
Country Context and Rationale for Establishment ("Why established?")	The prime minister announced establishment of the Australian Greenhouse Office in his statement *Safeguarding the Future: Australia's Response to Climate Change*, published just before the landmark Kyoto Conference on climate change in late 1997.
Mission and Objectives	The objective of the Australian Greenhouse Office is to meet Australia's international greenhouse commitments through effective domestic action in a way that advances our national interests in terms of the following: • Ecologically sustainable development • Playing our part globally • Supporting efficient and competitive industries • Promoting employment
Specific Goals/Targets	• To lead the development and implementation of the government's major climate change programs, working in partnership with other departments • To work with industry, business, and the community across Australia in taking action to reduce national greenhouse gas emissions • To enhance Australia's regional development and natural resource management by promoting greenhouse action on the land • To act to increase the uptake of energy efficiency • To pursue a multipronged effort to build a practical and effective global response to climate change, including action at the multilateral, regional, and bilateral levels • To extend Australia's world-class scientific expertise in climate change, and build the capacity of regions, industries and community to adapt to climate change • To deliver robust projections of Australia's progress in meeting its internationally agreed 108 percent greenhouse gas emissions target

Australia: Australian Greenhouse Office *(continued)*	
Key Areas of Activity	All activities leading to GHG reductions; reporting, and monitoring of greenhouse emissions
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	Government budget
Management Structure (board of directors, adv. boards/committees, executives, etc.)	Chief executive reports to ministers. Several advisory groups exist.
Size (staff, supporting resources, etc.)	Staff size—167
Annual Budget	A$82 million
Technologies and Sectors Addressed	All sectors
Types of Programs and Activities	• Policy development • Information/awareness • Education • Technical assistance • Technology transfer • Financial incentives (grants, loans, subsidies, credit enhancement, etc.) • Pilots and demonstration projects • Conferences, seminars, and workshops • Standards and labeling • Collaboration/partnerships • Certification/accreditation • Public recognition/awards
Major Results Achieved	2004/5 annual report The Australian government's new climate change strategy is delivered through climate change energy measures outlined in the 2004–05 federal budget and the energy white paper, *Securing Australia's Energy Future*. • Projections of Australia's future greenhouse gas emissions, released in September 2003, show Australia is on track to meet its target of limiting emissions to 108 percent of 1990 emissions over the period 2008–12. • Australia's *2002 National Greenhouse Gas Inventory* reports a drop of more than 31 percent in greenhouse gas emissions per dollar of Gross Domestic Product from 1990 to 2002, highlighting that Australia has successfully decoupled emissions growth from economic growth.

Australia: Australian Greenhouse Office *(continued)*

Major Results Achieved (continued)

- New bilateral climate change partnerships with New Zealand and China are negotiated and announced.
- *Climate Change: An Australian Guide to the Science and Potential Impacts*, the first major publication to review the science of climate change in Australia and the southern hemisphere, is released to inform global and national responses to climate change.
- The Australian Parliament passes the *Ozone Protection and Synthetic Greenhouse Gas Management Act 1989,* which extends existing controls on the import, export and manufacture of ozone depleting substances to their synthetic greenhouse gas alternatives.
- Australia's Cities for Climate Protection™ program remains the world's largest and highest achieving Cities for Climate Protection™ program, growing to involvement of 189 local governments covering around 75 percent of the Australian population.
- Two new products are certified as part of the Greenhouse Friendly offsets initiative that allows companies to market *greenhouse neutral* products and services to consumers. The two new electricity products (Western Power's *Earth Friendly* and AGL's *Green Balance*™) are launched to 2.9 million households in Victoria, New South Wales, South Australia, and Western Australia. BP also launches its Greenhouse Friendly™ LPG product, *autogas*, to the Australian business market.
- An Australian Greenhouse Office report, *EnergyUuse in the Australian Government's operations 2002–03*, shows that Australian government agencies have reduced their energy consumption by 15.4 percent from 1997–98 to 2002–03, saving an estimated $30 million a year in energy costs.
- The Australian government decides on measures to improve the efficiency and effectiveness of its Mandatory Renewable Energy Target following the review conducted by a panel headed by the Hon. Grant Tambling.
- The Partnership Agreement with States and the Northern Territory for delivering the Renewable Remote Power Generation Programme is revised to improve program delivery and extend the deadline for expenditure of funds to June 2010.
- Australia and New Zealand become the first countries to publish a national standard specifying how to measure the standby power used by equipment and appliances.
- The Australian government announces that the Australian air-conditioning industry is bringing forward the implementation of more stringent energy efficiency regulation for air-conditioners from October 2007 to April 2006.
- The Top Energy Saver Award Winner label for 'best in class' products is launched to make it easier for consumers to identify the most energy efficient electric and gas appliances on the market.

Australia: Australian Greenhouse Office *(continued)*

Future Directions

Lessons Learned

Contact Information

Brazil

Brazil: PROCEL—National Electricity Conservation Program	
Date Established	December of 1985
Type of Agency ("Who")	Governmental program—housed in government owned utility Eletrobras—focusing on EE only
Enabling Framework ("How established?")	Presidential decree
Country Context and Rationale for Establishment ("Why established?")	World energy crisis was the primary motivation. The motivations were changing over time.
Mission and Objectives	Strategy of the federal government to assist the electric sector and society, aiming to promote energy efficiency and its rational use to benefit of society.
Specific Goals/Targets	Combat wasteful use of electric energy. Stimulate efficient and rational use of the electric energy. Reduce the environmental impact of electric energy use and provide greater benefits to society.
Key Areas of Activity	Energy efficiency
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	Two types of funding: government budget and funds from electric bills
Management Structure (Board of Directors, Adv. Boards/Committees, Executives, etc.)	As this program is hosted by a state-owned company (Eletrobras), the management structure is from this company: two departments are directed linked to the board director.
Size (staff, supporting resources, etc.)	85 people located in Rio de Janeiro downtown
Annual Budget	US$20 million of governmental budget and US$80 millions for loans
Technologies and Sectors Addressed	• Domestic lighting • Efficient appliances • Street lighting programs • Building energy use • Industrial energy use • Municipal energy management • Water and sewage • Public buildings • MEPS • Preliminary and university education programs

Brazil: PROCEL—National Electricity Conservation Program *(continued)*	
Types of Programs and Activities	• Policy development • Information/awareness • Education • Technical assistance • Financial incentives (grants, loans, subsidies, credit enhancement, etc.) • Pilots and demonstration projects • Conferences, seminars, and workshops • Standards and labeling • Collaboration/partnerships • Public recognition/awards
Major Results Achieved	By 2004, 17 billions of kWh of saved energy and electrical sector avoided investments of US$6 billions. The energy saving was equivalent to the annual consumption of 10 million houses (national average consumption)
Future Directions	The main objective is to include energy efficiency results in the energetic planning of Brazil, not only in demand reduction scenarios but also as a project that competes with other energy generation projects.
Lessons Learned	During the last 20 years, PROCEL has developed a lot of skills. Its activities are strong in the energy efficiency equipment labeling in which we developed an specific approaching mixing voluntary and mandatory actions. Another skill that is well-developed is the mounting of national programs: It uses many tools for training, legislation, commitment, awareness of decision makers, financing, and others in order to obtain the saved energy in a sustainable manner.
Contact Information	

Canada

Canada: Office of Energy Efficiency	
Date Established	April 1998
Type of Agency ("Who")	National government department, a part of Natural Resources Canada (NRCan)
Enabling Framework ("How established?")	The Office of Energy Efficiency was not established by legislation, nor by regulation, nor by executive order. It was established in April 1998 as part of Natural Resources Canada (NRCan) with a mandate to communicate the importance and value of energy efficiency and alternative transportation fuels and to advise the public on actions they can take to contribute to individual and societal benefits. The OEE builds on efforts by NRCan over the past three decades to promote energy conservation, continuous increases in energy efficiency, and greater use of alternative sources of energy as ways to help protect the environment and strengthen Canada's economic competitiveness. The only legislation on energy efficiency in Canada is the Energy Efficiency Act, which came in force in 1992. It gives the government of Canada the authority to make and enforce regulations and labeling requirements for energy-using products that are imported into Canada or shipped across provincial or territorial borders. This EE Act has nothing to do with the enabling framework of the OEE.
Country Context and Rationale for Establishment ("Why established?")	The OEE originated out of Canada's commitment to reduce greenhouse gas emissions by 6 percent below 1990 levels by the period between 2008 and 2012, as agreed to in the Kyoto Protocol. The main mandate is to renew, strengthen and expand Canada's commitment to energy conservation and energy efficiency.
Mission and Objectives	The OEE mission is to promote energy conservation, continuous increases in energy efficiency, and greater use of alternative sources of energy as ways to help protect the environment and strengthen Canada's economic competitiveness. Equally the OEE main task is inform key decision makers in government, industry, and the environmental and international communities about Canada's energy efficiency efforts and successes.
Specific Goals/Targets	The goal is to help to reach Canada's commitment to reduce greenhouse gas emissions by 6 percent below 1990 levels by the period between 2008 and 2012.
Key Areas of Activity	The Office of Energy Efficiency (OEE) offers a wide range of programs and services to improve energy conservation and energy efficiency in every sector of the Canadian economy. The program benefits include reduced greenhouse gas emissions, a healthier environment, financial savings, and conserved energy resources. The OEE has seven major areas: • Buildings: Support and incentives for energy efficient design and improving EE of existing buildings. These programs concern all type of building, commercial, institutional, industrial, and federal buildings.

Canada: Office of Energy Efficiency *(continued)*	
	• Equipment: Equipment program helps Canadians make energy-efficient choices when buying, selling, or manufacturing energy-using equipment. Several initiatives aim to eliminate inefficient energy-using equipment from the Canadian market by prescribing minimum energy efficiency performance levels. • Government operations: Beside the federal building programs, the OEE helps Canadian organizations track and monitor their greenhouse gas emissions and develop strategies to reduce them. • Housing: The OEE's housing program offers resources to help to keep homes comfortable and well ventilated for healthy indoor air quality while conserving energy. • Industry: The OEE works hand in hand with industry to encourage the sector to invest in, develop, and use methods and industrial processes that are more energy efficient. • Transportation: The OEE's transportation programs helps fleet managers (commercial and federal) find out how energy-efficient vehicles and business practices can reduce a fleet's operating costs, improve its productivity, and increase competitiveness. Take advantage of the many tools and resources to help you save and reduce energy and reduce emissions. Besides OEE, inform the public and encourage the production and end-use of alternative fuels such as biodiesel, ethanol, natural gas, and hydrogen, as well as cleaner conventional fuels such as low-sulphur diesel and reformulated gasoline. • Outreach: Providing useful and practical information to the public is one way that the OEE helps Canadians conserve energy and reduces greenhouse gases that contribute to climate change.
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	All OEE programs are funded through government budget allocation. There is no tax to collect funds for EE purposes by the federal government.
Management Structure (board of directors, adv. boards/committees, executives, etc.)	The OEE is headed by a director general who oversees directorates in the major energy end-use sectors: housing and equipment; buildings; industry; transportation; and public outreach. The OEE is assisted by the National Advisory Council on Energy Efficiency, which is composed of energy efficiency experts and leaders from all sectors of the economy, all levels of government and all regions of the country.
Size (staff, supporting resources, etc.)	Approximately 280
Annual Budget	2004–2005—$235 Million
Technologies and Sectors Addressed	• Efficient industrial process and technologies, combustion • Efficient motors, pumping, ventilation, compressed air

Canada: Office of Energy Efficiency *(continued)*	
Technologies and Sectors Addressed	• Residential efficient appliances, heating, lighting, energy efficient construction, house labeling, and energy efficient housing technologies • Commercial HVAC, refrigeration, efficient lighting • Building construction and retrofit • Cleaner fossil-fuel power generation • Transportation vehicle efficiency, biodiesel, ethanol, hydrogen and fuel cell
Types of Programs and Activities	• Policy development • Information/awareness • Education • Technical assistance and Technology Transfer • Financial incentives (grants, loans, subsidies, credit enhancement, etc.) • Pilots and demonstration projects • Standards and labeling • Public recognition/awards • Research and development
Major Results Achieved	The OEE Index shows that, even with the many barriers to improvement in energy efficiency strong and measurable progress has been made, due in part to the programs of the OEE. For 1990–2003, the OEE Index shows an increase in value, indicating that energy efficiency improved by 13 percent. As a result of this improvement, Canadians saved approximately $13.4 billion in energy costs in 2003 alone.
Future Directions	Many programs are launched in all economy sectors with incentives serving as leverage of private investments in energy efficiency. Periodic evaluations will allow adjustments in energy efficiency regulations and programs. Innovation and R&D aim to accelerate the development of cost-effective R&D mitigation technologies in multiple sectors, building the intellectual foundation for long-term technological advances, building alliances and partnerships and demonstrating federal leadership towards sustainable development.
Lessons Learned	
Contact Information	

China

China: Energy Research Institute (ERI)	
Date Established	1980
Type of Agency ("Who")	Government agency that is a branch of the National Development and Reform Commission (NDRC); it was established in 1980.
Enabling Framework ("How established?")	Originally established by executive order and affiliated with the former State Commission and the former State Economy Commission. Throughout, it was guided by the Chinese Academy of Sciences in many aspects of its research work. In 1988, ERI was put under the administration of the now former State Planning Commission. Further reforms in 2003 made ERI part of the National Development and Reform Commission.
Country Context and Rationale for Establishment ("Why established?")	ERI has been established to address China's major energy issues. The Beijing Energy Efficiency Center is a part of ERI.
Mission and Objectives	The major mission is to serve as a national research organization conducting comprehensive studies on China's energy problems.
Specific Goals/Targets	ERI is divided into four research centers: • Center for Energy Economy Research and Development Strategy • Energy Efficiency Center • Center for Renewable Energy Development • Center for Energy, Environment, and Climate Change Research
Key Areas of Activity	**Energy economics and strategy** Study on key energy-economic theories and methods, including national and regional issues of energy exploitation (including coal, power, oil, natural gas), development, and transform processing, transmission, by 15 and supply and demand balance; energy safety; regional and international cooperation. Much of this work is related to providing input to central and local governments for setting up energy development strategies. Development plans and policies are relevant to armed energy laws and regulations, as well as energy management system reform. **Energy efficiency** Study the theory and methodology of rational arrangement and utilization of energy resources including key energy conservation and energy conservation planning strategy, as well as policy and measures for promoting energy saving and energy efficiency. Assist government agencies to design and implement energy saving projects and programs. Provide guidelines to assess energy saving projects and auditing. Conduct policy and technology consultation outreach and information on energy markets

China: Energy Research Institute (ERI) *(continued)*	
Key Areas of Activity (continued)	**Energy efficiency and global climate change** Study the pathways and measures for new and renewable energy industrialization at home and abroad; furnish a decision-making base to government agencies for formulating mid- and long-term development plans and relevant industrial policy. Disseminate information on new and renewable energy industrialization, and provide technical consultant services to domestic and foreign new and renewable energy enterprises. **Renewable energy** Study on the theory, methodology, policy, and other countermeasures concerning energy and environment issues; provide assistance to relevant domestic departments for making the strategy. Implement countermeasures for energy and environment policy and coordination development; carry out studies on the relationship between energy and global climate change activities in order to inform policy and political dialogue; conduct international cooperation on energy and environment in the fields of emission inventory, modeling tools, JI mechanisms.
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	Government funding
Management Structure (board of directors, adv. boards/committees, executives, etc.)	The director and deputy director of ERI are directly appointed by the NDRC. The Institute uses a competitive method to select staff to fill leadership positions in each of the center's divisions and offices noted above. Senior research titles are also appointed through competitive openings.
Size (staff, supporting resources, etc.)	Over 80 staff members; 13 staff in the Energy Efficiency Center
Annual Budget	2004–2005—$235 million
Technologies and Sectors Addressed (Main Projects)	a. Outline of China Mid- and Long-term Study on Energy Saving Plan b. Energy Savings Development Framework c. Policy Study on Promoting DSM d. Scenarios Study of the "Public Benefits Fund" and Policy Recommendations e. Study of Financing Mechanisms in China 's Energy Saving Market f. Study for Auditing Standards and Methods g. Investigation Study of Oil Conservation Management Regulations h. Energy Savings in Village and Township Enterprises and GHG Emission Mitigation Program

China: Energy Research Institute (ERI) *(continued)*	
	i. Alternative China 's End-Use Energy Efficiency Program j. Alternative China Green Lights Program k. WB/GEF China Energy Conservation Promotion Project l. UNIDO Motor Driving System Energy Saving Program
Types of Programs and Activities	Encourage the development of policies to promote energy efficiency. Facilitate commercial activities to provide services, products, and processes directly related to energy efficiency, including the introduction and transfer of advanced technologies and management practices from other countries through joint ventures and foreign investment. Organize training and demonstration projects in energy efficiency. Coordinate and developing educational activities in energy efficiency, including distribution of publications, public education, and seminars.
Major Results Achieved	
Future Directions	
Lessons Learned	
Contact Information	

China: Energy Conservation Information Dissemination Center (ECIDC) of National Development and Reform Commission (NDRC) of the People's Republic of China	
Date Established	January 1 1998
Type of Agency ("Who")	Government-sponsored institution
Enabling Framework ("How established?")	ECIDC of State Economic and Trade Commission was approved foundation in January 1998 by China Central Organization Establishment Commission Office. It is an independent legal personality, nonprofit corporation. ECIDC is very conscientious in performing its duties and working utmost of its abilities for implementing this project. It got a recognized achievement, played an important role in China's energy conservation works since its foundation under the leadership of the Department of Environment and Resource Comprehensive Utilization of NDRC, and former Department of Resource Conservation and Comprehensive Utilization of the State Economic and Trade Commission.

China: Energy Conservation Information Dissemination Center (ECIDC) of National Development and Reform Commission (NDRC) of the People's Republic of China *(continued)*	
Country Context and Rationale for Establishment ("Why established?")	In order to promote energy conservation in China and to alleviate the effects of global greenhouse gases, "World Bank/GEF China Energy Conservation Promotion Project" was conducted in 1998. The project of energy conservation information dissemination is a subproject. According to the requirements of project implementation plan for information dissemination, Energy Conservation Information Dissemination Center (ECIDC) got support from the government and received the donation of GEF. It should carry on all the task of energy conservation information dissemination project, and accept supervision of the Project Office.
Mission and Objectives	Develop and disseminate the energy conservation information of high authoritative, independent, real, with bright future in the market, focuses on the energy conservation of the industrial sectors, promotes the advanced energy conservation technology among the companies, improves the energy efficiency at large, reduces the emission of CO_2 in China, and devotes on the decrease of the greenhouse effect.
Specific Goals/Targets	ERI Through implementation of the five-year energy conservation information dissemination project, by the seventh's year of the project. The information dissemination project will last for 5 years, and the amount of energy conservation would lag behind the dissemination work. The reason is that the receiver of the information needs some time to carry it out. It is feasible to achieve energy conservation amount of 10 Mtce for this year, total accumulative amount of 24.3 Mtce for seven years, and correspondingly reduce 63 Mt CO_2.
Key Areas of Activity	Energy conservation
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	Government budget allocation
Management Structure (board of directors, adv. boards/committees, executives, etc.)	Executives appointed by State Economic and Trade Commission
Size (staff, supporting resources, etc.)	At present, there are 2 research professors, 3 high-grade engineers, and 3 engineers in the ECIDC, with plans to add 3 extra staff. In addition, there are more than 100 experts who have worked more than 10 difference sectors, providing deep experience. They keep in close touch with ECIDC. There are more than 20 offices with total area 350 square meters, and 8 telephones and 3 electrographs in ECIDC. The communication can be conducted conveniently through Internet and e-mail.

China: Energy Conservation Information Dissemination Center (ECIDC) of National Development and Reform Commission (NDRC) of the People's Republic of China *(continued)*	
Annual Budget	US$100,000
Technologies and Sectors Addressed	Major in industrial energy conservation, building energy conservation, traffic energy conservation, etc.
Types of Programs and Activities	• Policy development • Information/awareness • Education • Technical assistance • Technology transfer • Conferences, seminars and workshops
Major Results Achieved	The ECIDC carried out the sub-Project of Energy Conservation Information Dissemination of World Bank/GEF China Energy Conservation Promoting Project under the lead of Department of Environment and Resource Comprehensive Utilization of NDRC, and former Department of Resource Conservation and Comprehensive Utilization of State Economic and Trade Commission. It develops and disseminates the energy conservation information amongst the market stakeholders So far, ECIDC has completed 75 case studies of the best energy conservation practice, distributed 350,000 information materials, organized 120 different types of energy conservation information dissemination meetings and issued more than 500 articles in different newspaper and magazines during the period of project implementation. Practice proved that energy conservation information dissemination mechanism was representative of the direction for the new energy conservation mechanism. At the same time, it explored a new way for the new energy conservation management system for the government.
Future Directions	ECIDC will carry out 2006–2007 subproject of Energy Conservation Information Dissemination of World Bank/GEF China Energy Conservation Promoting Project, develop 20 case studies and 5 technical guides.
Lessons Learned	China Energy Conservation Information Database and subproject of Energy Conservation Information Dissemination.
Contact Information	Prof. Zhang Jianmin Energy Conservation Information Dissemination Center National Development and Reform Commission People's Republic of China Room 1403, Guohong Building B, Muxidibeili No. 11, Xicheng District Beijing 100038 Tel: 861063908433, 13601128544 Fax: 861063908453 E-mail: zhangjianm@.263.net Web site: www.secidc.org.cn

Czech Republic

Czech Republic: Czech Energy Agency	
Date Established	1995, with subsequent authority conferred in 2000
Type of Agency ("Who")	Statutory energy agency charged with carrying out mandated government programs in energy efficiency, renewable energy, and other areas
Enabling Framework ("How established?")	Established by the Decision of the Minister of Industry and Trade, No.290/1995, as a subsidized organization of the Ministry of Industry and Trade.
Country Context and Rationale for Establishment ("Why established?")	An integral part of the CEA's activity is to promote and educate the public and professions in the fields of energy savings, the wider use of renewable and secondary sources of energy and the development of combined heat and power. Outputs of the CEA's activity are focused on saving primary energy sources and minimizing of negative impacts on the environment from energy production and consumption.
Mission and Objectives	The main function of the Czech Energy Agency is to encourage energy savings activities by persons and organizations in order to reduce the energy demand of the Czech economy and to promote higher utilization of renewable and secondary sources of energy.
Specific Goals/Targets	
Key Areas of Activity	• Project preparation and management of national programs • Program evaluation and reporting • Cooperation in international projects • Provision of consulting in the field of energy savings and RES utilization • Lecturing and publishing activities analysis, energy audit, and statistics department • Preparation and production of energy auditor test applications • Monitoring of the energy statistics of the Czech Republic, European Union, and other countries • Lecturing and publishing activities
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	Financed by government budget plus grants from the EU's European Regional Development Fund and donor organizations
Management Structure (board of directors, adv. boards/committees, executives, etc.)	
Size (staff, supporting resources, etc.)	CEA has a permanent staff of 24 employees, of whom 18 are experts with tertiary education and postgraduate qualification

Czech Republic: Czech Energy Agency *(continued)*	
Annual Budget	Operational budget: 17,280 CZK (2005) or USD800,000 Project subsidies processed: 175,000 CZK (2005) or USD8 million
Technologies and Sectors Addressed	
Types of Programs and Activities	Major programs include the Operational Program for Industry and Enterprise (OPIE), the Governmental Support Program, and the Foreign Cooperation Program. OPIE draws on EU funds from the ERDF (European Regional Development Fund) for strengthening economic and social cohesion and to decrease the economic differences among regions in the EU. Objectives of the OPIE include reducing the high energy demands of industry and developing small and medium-sized enterprises (SME) working on energy efficiency and renewable energy sources. CEA administers two programs—"The Energy Savings Program" and "The RES program"—where the investor from the SME field can access subsidies for technologies and project (see Results section). The governmental program for support of energy savings and utilization of renewable energy sources creates an enabling environment for activities that result in permanent reductions in energy consumption. It is a key instrument for achieving the national goals for energy efficiency and utilization of renewable and secondary energy sources. The CEA is the administrator of part A declared by the Ministry of Industry and Trade. The governmental program is divided into subprograms: • Support for processing of the regional energy concept (REC). The regional energy seeks sustainable development in each region that reflects patterns of settlement, climate and existing patterns of energy demand through setting of targets and providing subsidies and assistance to local governments. • Construction and rehabilitation of energy production and distribution facilities through direct investment in energy management systems, district heating schemes, public lighting, hospitals, and housing • Consultancy, education, and promotion of energy efficiency
Major Results Achieved	**Education and promotion:** • 54 educational events were supported in 2005 with a subsidy of CZK 4.29 million, including Ostrava Energo 2005, Infotherma 2005, Teplárenské dny, and For Arch 2005. • Processing of 27 consultancy, education and promotion projects was supported in 2005 including "Study of Installation of Stationary High-Temperature Fuel Cells," the "Study of Fuel for Mobile Equipment with a Fuel Cell," the "Hestia 2.0 Multimedia Guide to Energy Savings" software, leaflets for the general public, "Information about RSE" and also the "Energy Yearbook 2005."

Czech Republic: Czech Energy Agency *(continued)*	
	Energy Consultancy and Information Center—ECIC (EKIS) CEA: • The ECIC CEA network in 2005 included a total of 44 centers employing 176 consultants and provided 11,036 consultation sessions regarding insulation, heating, measurement, and regulation, and other topics. **Regional energy agencies—REA:** • Six (6) regional energy agencies were established in 2005, in the Central Bohemia, Ústí, Pilsen, South Bohemia, Vysočina, and Olomouc. **Internet consultancy center (www.i-ekis.cz)** • All consultants ranked in the ECIC CEA network were engaged. • Over 100 enquiries were answered electronically. • A unique opportunity to develop discussion about problems and search for answers.[15]
Future Directions	CEA celebrated 10 years of existence in 2005. A key activity has been preparations for the entrance by the CEA into the exclusive club of EU member energy agencies that comes with the Czech Republic's accession into the EU. CEA has been preparing by applying itself in a range of international projects, in partnership with the EU, the IEA, and the CDM. As a service organization, the CEA is preparing a national and governmental program for the Ministry of Industry and Trade for the support of energy savings and utilization of renewable and secondary energy sources, including use of biofuels for transportation. In terms of the preparation of these documents, the agency now cooperates with 14 government ministries and prepares the whole governmental sustainable energy program annually for the ministry. This modified status reflects the new possibilities on use of finances outside of the state budget for targeted activities in energy efficiency and RES, such as the Operational Program for Industry and Enterprise (OPIE).
Lessons Learned	
Contact Information	Ing. Bubeník Josef—Director bubenik@ceacr.cz Česká energetická agentura Vinohradská 8 120 00 Praha 2 www@ceacr.cz Tel: (+420) 257 099 011 Fax: (+420) 257 530 478

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Denmark

Denmark: Danish Energy Authority	
Date Established	Originally established as the Danish Energy Agency (DEA) in 1976, it is since 1994 an integral part of the Danish Ministry for Environment and Energy since 1994.
Type of Agency ("Who")	Government agency is responsible for a broad range of energy-related functions.
Enabling Framework ("How established?")	National legislation—Acts 450, 585, and 1209, and Executive Order 3501
Country Context and Rationale for Establishment ("Why established?")	This was established to address energy issues in Denmark.
Mission and Objectives	The Danish Energy Authority is responsible for designing and preparing main energy policies, including legislation and planning, implementing the adopted energy legislation, managing energy programs, and Danish participation in international multi- and bilateral energy relations. DEA is also responsible for energy efficiency, electricity, heat supply, hydrocarbon activities, and associated activities in the North Sea, natural gas supply, renewable energy sources, environmental aspects of energy policy, and energy research and development.
Specific Goals/Targets	
Key Areas of Activity	An integral part of the Danish central administration, the DEA traditionally offers services associated with the particular experience and expertise acquired during the construction of past and present energy policy in Denmark. These services include: • Energy planning • Organizational design • Management systems in the energy field • Program design and management • Specific assistance in the fields of expertise mentioned under the section "expertise."
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	Government budget
Management Structure (board of directors, adv. boards/committees, executives, etc.)	

Denmark: Danish Energy Authority *(continued)*	
Size (staff, supporting resources, etc.)	280 staff members
Annual Budget	
Technologies and Sectors Addressed	Main areas include: • Integrated energy planning • Economic instruments in energy policy making, including green taxes • CHP • Renewable energy sources including wind turbines and biomass • Heat planning • District heating • Environmental aspects of energy policies • Energy efficiency in buildings, industry, electrical appliances and equipment, and services • Electricity generation, transmission, and distribution • Natural gas supply and distribution • Hydrocarbon exploration and production
Types of Programs and Activities	• Strategic studies o National energy planning o Sector energy planning o Strategic planning for the energy sector • National energy efficiency programs o Buildings sector o Industry sector o Efficient appliances and equipment o Energy forecasting o Energy sector planning and program development • Environmental programs • Technology transfer and dissemination • Technical assistance programs sponsored by the Danish Co-operation for Environment and Development (DANCED) and EU
Major Results Achieved	
Future Directions	
Lessons Learned	
Contact Information	Mr. Aksel Mortensgaard Danish Energy Authority Amaliegade 44, DK-1256, Copenhagen K Tel: +45 33 92 75 88 Fax: +45 33 11 47 43 E-mail: AMo@ens.dk

Finland

Finland: MOTIVA	
Date Established	Motiva's operation began in 1993 as the Energy Information Center project, part of Finntech Finnish Technology Ltd. Over the years, its operation as energy sector expert organization was reinforced and expanded. In the year 2000, Motiva was incorporated, with the Finnish government owning the entire share stock.
Type of Agency ("Who")	Corporation owned by the government
Enabling Framework ("How established?")	
Country Context and Rationale for Establishment ("Why established?")	
Mission and Objectives	Motiva provides a range of services in order to promote efficient energy use and uptake of renewable energy sources. In central areas of climate change management, Motiva is • an invaluable partner for public administration • an active partner for companies and communities • the prime source of information for consumers.
Specific Goals/Targets	
Key Areas of Activity	
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	Government funding (about 80%) and fees for services (about 20%)
Management Structure (board of directors, adv. boards/committees, executives, etc.)	The board of directors is appointed by the government.
Size (staff, supporting resources, etc.)	27 staff members
Annual Budget	€4.4 million
Technologies and Sectors Addressed	

Finland: MOTIVA *(continued)*	
Types of Programs and Activities	Motiva operates as an in-house unit to public administration, and its operation is being developed as such. The impact of its services on carbon dioxide emissions, energy efficiency, and the economy is measurable and competitive in comparison with other alternatives. Major activities include: • Drafting, coordination, and monitoring of Energy Conservation Agreements • Promotion of energy audit and analysis activity • Adding impetus to adoption of energy-saving technology • Increasing use of renewable energy • Information dissemination of energy efficiency and renewable energy • Influencing attitudes and consumer habits • Monitoring and impact assessment
Major Results Achieved	
Future Directions	
Lessons Learned	
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France

France: Agence de l'Environnement et de la Maîtrise de l'Energie (ADEME)	
Date Established	1990
Type of Agency ("Who")	Government Agency
Enabling Framework ("How established?")	ADEME (Agency for Environment and Energy Management) was officially created in December 1990, implemented by the decree of application of July 26, 1991, amended by the decree of application of November 2, 1993. ADEME is a state industrial and commercial body, acting under the joint responsibility of the French Ministries of the Environment, Industry, and Research.
Country Context and Rationale for Establishment ("Why established?")	
Mission and Objectives	ADEME aims to reconcile economic and social development with rational exploitation of natural resources and harmonious integration of the human being into this environment, and has the following objectives: • Rational use of energy and of raw materials conservation • Promotion of renewable energy resources • Promotion of clean and energy-efficient technologies • Waste minimisation, disposal, recovery and processing for economic value • Prevention and reduction of air pollution • Fighting against noise pollution • Prevention and remediation of ground pollution.
Specific Goals/Targets	
Key Areas of Activity	**Industry** ADEME helps industries to introduce processes that consume less energy and fewer raw materials and allows them to reduce or prevent waste production (gas emissions, liquid, and solid waste). There are five main programs: 1. Environment and energy management in industry 2. Hazardous industrial waste and storage of residual waste after processing 3. Nonhazardous industrial waste management 4. Contaminated sites 5. Measurements of atmospheric emissions from fixed sources

France: Agence de l'Environnement et de la Maîtrise de l'Energie (ADEME) *(continued)*	
	Agriculture and bio-energy ADEME's agriculture and bio-energy programs promote environmental awareness and energy efficiency in the farming, forestry and agro-food sectors, and aim to increase the proportion of biomass in France's energy supply and as raw materials for industry. The two main programs are fuelwood and befouls. Three complementary programs include: lumber; farming, agro-food industries and waste recycling; clean, energy-efficient farming; and food production systems. **Buildings and local authorities** ADEME's programs address energy efficiency and environmental quality in buildings, urban planning and infrastructure, and municipal solid waste management. There are two main programs: 1. Buildings optimization (in terms of energy efficiency and environmental impact) 2. Municipal solid waste Two complementary programs include equipment performance, land use, and district heat networks. **Transport** ADEME's transport programs aim to limit energy consumption and pollution linked to the transport of goods and people, particularly in cities. There are two main programs: 1. Alternative vehicles 2. Combined road/rail transport of goods Three complementary programs include urban transport; efficient vehicles, efficient driving; assessment of energy; and harmful effects due to transport.
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	Government budget
Management Structure (board of directors, adv. boards/committees, executives, etc.)	
Size (staff, supporting resources, etc.)	800 employees, of whom 500 are technical staff
Annual Budget	€265 million

France: Agence de l'Environnement et de la Maîtrise de l'Energie (ADEME) *(continued)*	
Technologies and Sectors Addressed	
Types of Programs and Activities	ADEME initiates and supports the following activities: • Research • Data collection • Teaching and development programs • Demonstrating and promoting new technologies on the market • Information and consulting programs For sector and cross-disciplinary programs to succeed, there is a need for forward-looking analysis of the context in which they are conducted. Action must be assessed in a broader perspective so that priorities can be changed as situations evolve and new requirements emerge. ADEME is conducting five programs to support its sector action: 1. Socioeconomic and planning studies 2. Ecoproducts and eco-labeling 3. Observatories and measurements 4. Environmental impacts research 5. Training through research and multisector training The success of ADEME's policies also depends on how well the different players are informed. The agency provides decision makers, investors, and consumers with the technical data they need to make decisions: • Multisector and institutional communication • Information for the general public and awareness campaigns in schools
Major Results Achieved	
Future Directions	
Lessons Learned	
Contact Information	Mr. Christophe Fréring ADEME (European Affairs) 27 rue Louis Vicat 75737 Paris Cedex 15, France Tel: +33 1 47 65 24 86, Fax: +33 1 46 38 31 41, E-mail: Christophe.Frering@ademe.fr

Germany

Germany: Deutsche Energie-Agentur GmbH (DENA)—German Energy Agency	
Date Established	2000
Type of Agency ("Who")	Public/Public/Private Partnership owned 50% by the Federal German government—Ministries of (1) Economics and Technology, (2) Transport, Building and Urban Development and (3) Environment, and 50% by KfW Bankengruppe (state-owned)
Enabling Framework ("How established?")	Established by federal Ministry of Economy and Labor
Country Context and Rationale for Establishment ("Why established?")	As an instrument to implement energy efficiency tasks
Mission and Objectives	The Deutsche Energie-Agentur GmbH (DENA)—the German Energy Agency—is the competence center for energy efficiency and renewable energy. Its objectives include the rational and thus environmentally friendly production, conversion, and use of energy and the development of sustainable energy systems with a greater emphasis on renewable energy sources. To this end, DENA initiates, coordinates, and implements innovative projects and campaigns at a national and international level. It provides information to end consumers, works with all social groups active in politics and the economy, and develops strategies for the future supply of energy. Its shareholders are the Federal Republic of Germany and the KfW Banking Group.
Specific Goals/Targets	Helping implementing German climate policy goals by different means and measures
Key Areas of Activity	• EnergieEffizienz initiative for private households, trade and manufacturers • National house of the future campaign Zukunfthaus for owners and specialists • Development and introduction of a uniform national Energy Performance Certificate for Buildings • Information from consumers and specialists on the 2002 Energy Saving Ordinance • National solar heat initiative Solarwärme plus for specialists and house owners • Coordination of the Renewable Energy Export Initiative • Planning in respect of the integration into the national grid of wind energy generated both on land and at sea by the year 2020 • Development and implementation of a strategy for an offshore wind power industry • National energy-efficiency campaign Energieeffiziente Systeme in Industrie und Gewerbe for industry and commerce • Definition of an energy efficiency program for Russia • Implementation of individual projects from the program

Germany: Deutsche Energie-Agentur GmbH (DENA)—German Energy Agency *(continued)*	
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	50 percent by public sponsors (utilities, building companies), and 50 percent by the three ministries
Management Structure (board of directors, adv. boards/committees, executives, etc.)	Chief executive reports to a supervisory board that includes government and private-sector representatives.
Size (staff, supporting resources, etc.)	100 staff members
Annual Budget	€15 million
Technologies and Sectors Addressed	Almost all sectors related to energy except nuclear
Types of Programs and Activities	Campaigns, demonstration projects, marketing, and promotion
Major Results Achieved	There is no specific evaluation or measurement system in place. A survey concerning the EnergieEffizienz initiative found no public recognition of the campaign or influence on consumer behaviour and climate impact.
Future Directions	Possibly further privatization (with utility involvement)
Lessons Learned	DENA concentrates on profitable projects rising from private funding. This curbs the scope of projects and impedes a deeper engagement in the field of energy efficiency.
Contact Information	Deutsche Energie-Agentur GmbH (dena)—German Energy Agency Chausseestrasse 128a 10115 Berlin, Germany Tel: +49(0)30 72 61 65–600 Fax: +49(0)30 72 61 65–699 E-mail: info@dena.de www.dena.de

Greece

Greece: Centre for Renewable Energy Systems (CRES)	
Date Established	September 1987
Type of Agency ("Who")	Government Agency focusing on EE and RE
Enabling Framework ("How established?")	Presidential Decree 375/87, Law 2244/94 (Production of Electricity from Renewable Energy Sources), and Law 2702/99.
Country Context and Rationale for Establishment ("Why established?")	The Center for Renewable Energy Sources (CRES) was founded as the national coordination center for Renewable Energy Sources (RES), Rational Use of Energy (RUE), and Energy Saving (ES).
Mission and Objectives	Promote RES/RUE/ES applications at a national and international level, as well as support related activities, taking into consideration the environmental impacts, on energy supply and use.
Specific Goals/Targets	
Key Areas of Activity	As a Research and Technological Centre for RES/RUE/ES, CRES conducts applied research on new energy technologies and provides technical support to the market for the penetration and the implementation of these technologies. As the national energy center, CRES works on energy planning and policy for RES and ES and on developing the necessary infrastructure to support the realization of RES&ES investment projects.
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	The funding is mainly provided by national, European and international projects, as well as projects carried out on behalf of the industrial, hotel, and construction sector, etc.
Management Structure (board of directors, adv. boards/committees, executives, etc.)	Seven-member board of directors, which includes representatives from the General Secretariat of Research and Technology/Ministry of Development, the PPC (Public Power Corporation), and the Association of Greek Industries. The organizational structure of CRES is made up of the following basic units: • Division of Renewable Energy Sources • Division of Energy Saving • Division of Energy Policy • Division of Energy Information Systems, Dissemination and Market Development • Division of Financial and Administrative Services
Size (staff, supporting resources, etc.)	CRES has a scientific staff of more than 120 experienced and specialized scientists, and engineers.

Greece: Centre for Renewable Energy Systems (CRES) *(continued)*	
Annual Budget	
Technologies and Sectors Addressed	• Industry • Buildings • Transportation • New technologies in ES and RUE • Environmental impacts of energy investments • Energy saving measurements • Energy audits and on-site measurements (with the use of an energy bus) • Energy saving and emissions reduction in industries • Recording of the energy situation in energy intensive industries • Assessments of the environmental impact from the use of energy.
Types of Programs and Activities	CRES: • Is the official Greek government consultant on matters of RES/RUE/ES in national policy, strategy and planning • Carries out applied research and develops innovative technologies that are both technically/economically viable and environment-friendly • Organizes, supervises and carries out demonstration and pilot projects, to promote the above technologies • Implements commercial RES/RUE/ES applications in private sector energy projects, local authorities, professional associations, etc. • Provides technical services and advice, in the form of specialized know-how and information, to third parties • Disseminates technologies in its areas of expertise and provides reliable information and support to interested organizations and investors • Organizes and/or participates in technical and scientific seminars, educational programs, specialized training courses, meetings, etc.
Major Results Achieved	CRES has provided important services to third parties (private investors) and to local authorities, concerning the exploitation of the technical and techno-economical possibilities for the application of RES/RUE/ES projects. It has carried out national, European, and international investment projects for RES/RUE/ES, contributing substantially to the evaluation of investment proposals, the technical monitoring of the projects, the briefing of investors, public organizations, industry and other relevant sectors, as well as raising public awareness of RES/RUE/ES.

Greece: Centre for Renewable Energy Systems (CRES) *(continued)*	
	CRES has participated in more than 500 European, national and international projects. These include applied research projects and development, demonstration projects, energy policy studies, development of energy information systems and energy modeling, investment feasibility studies, technical and economic studies, environmental impact assessments, market research as well as activities for the promotion of RES/RUE/ES. Through these projects, CRES has developed co-operation with numerous public and private organizations, at a national, European and international level.
Future Directions	Possibly further privatization (with utility involvement)
Lessons Learned	DENA concentrates on profitable projects rising from private funding. This curbs the scope of projects and impedes a deeper engagement in the field of energy efficiency.
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India

India: Bureau of Energy Efficiency, Ministry of Power	
Date Established	March 2002
Type of Agency ("Who")	The Bureau of Energy Efficiency is a statutory body under Ministry of Power, Government of India.
Enabling Framework ("How established?")	Bureau of Energy Efficiency (BEE) was established under The Energy Conservation Act, 2001 (EC Act), which came into force in March 2002.
Country Context and Rationale for Establishment ("Why established?")	Government of India has enacted the Energy Conservation Act, 2001 and for implementing the various provisions contained in the EC Act Bureau of Energy Efficiency (BEE) was operationalized from March 2002. The Bureau was given the task of spearheading the task of improving the energy efficiency in various sectors of the economy through regulatory and promotional mechanism. BEE coordinates with designated consumers, designated agencies and other organizations; recognizes, identifies, and utilizes the existing resources and infrastructure, in performing the functions assigned to it under the EC Act. The EC Act provides for regulatory and promotional functions.
Mission and Objectives	The Mission of Bureau of Energy Efficiency (BEE) is to develop policy and strategies on energy efficiency with a thrust on self-regulation and market principles, within the overall framework of the Energy Conservation Act (EC Act), 2001 with the primary objective of reducing energy intensity of the Indian economy. This is to be achieved with active participation of all stakeholders, resulting in accelerated and sustained adoption of energy efficiency in all sectors. The primary objective of BEE is to reduce energy intensity in the Indian economy. In order to translate the objectives into result-oriented action the broad strategies of BEE include the following: • Provide a policy framework and direction to national energy conservation activities. • Coordinate policies and programs with stakeholders on efficient use of energy. • Establish systems and procedures to measure, monitor and verify energy efficiency (EE) improvements. • Leverage multilateral, bilateral, and private sector support to implement the EC Act. • Demonstrate EE delivery systems through public–private partnerships. • To coordinate policies and programs on efficient use of energy and its conservation with the involvement of stakeholders. • To plan, manage, and implement energy conservation programs as envisaged in the EC Act. • To demonstrate energy efficiency delivery mechanisms, as envisaged in the EC Act, through private–public partnership.

India: Bureau of Energy Efficiency, Ministry of Power *(continued)*	
	• To establish systems and procedures to measure, monitor, and verify energy efficiency results in individual sectors, as well as at the national level. • To leverage multilateral, bilateral, and private-sector support in implementation of programs and projects on efficient use of energy and its conservation.
Specific Goals/Targets	The Bureau set up under the EC Act, has drawn up various energy conservation programs and formulated an Action Plan, which was released to the nation by the prime minister in August 2002. BEE initiated various programs and activities during the year 2002 to 2003 to meet the commitment as laid out in the Action Plan. The ten Thrust Areas that have been identified for the implementation of the act include standards and labeling, demand side management, building energy efficiency and awareness creation, especially among schoolchildren. The strategy for promoting energy efficiency relies on self-regulation mechanisms and the use of market forces. The thrust areas identified are • Indian Industry Program for Energy Conservation • Demand-Side Management • Standards and Labeling Program • Energy Efficiency in Buildings and Establishments • Energy Conservation Building Codes • Professional Certification and Accreditation • Manuals and Codes • Energy Efficiency Policy Research Program • Energy Efficiency and Conservation in School Education • Delivery Mechanisms for Energy Efficiency Services
Key Areas of Activity	BEE coordinates with designated consumers, designated agencies and other organizations; recognizes, identifies, and utilizes the existing resources and infrastructure, in performing the functions assigned to it under the EC Act. The EC Act provides for regulatory and promotional functions. The major regulatory functions of BEE include: • Develop minimum energy consumption standards and labeling design for equipment and appliances. • Develop specific energy conservation building codes. Activities focusing on designated consumers • Develop specific energy-consumption norms. • Certify energy managers and energy auditors. • Accreditate energy auditors. • Define the manner and periodicity of mandatory energy audits. • Develop reporting formats on energy consumption and action taken on the recommendations of the energy auditors.

India: Bureau of Energy Efficiency, Ministry of Power *(continued)*	
Key Areas of Activity (continued)	The major promotional functions of BEE include the following: • Create awareness and disseminate information on energy efficiency and conservation. • Arrange and organize training of personnel and specialists in the techniques for efficient use of energy and its conservation. • Strengthen consultancy services. • Promote research and development. • Develop testing and certification procedures and promote testing facilities. • Formulate and facilitate implementation of pilot projects and demonstration projects. • Promote use of energy efficient processes, equipment, devices, and systems. • Take steps to encourage preferential treatment for use of energy efficient equipment or appliances. • Promote innovative financing of energy efficiency projects. • Give financial assistance to institutions for promoting efficient use of energy and its conservation. • Prepare educational curriculum on efficient use of energy and its conservation. • Implement international co-operation programs relating to efficient use of energy and its conservation.
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	Government of India has provided a corpus fund of US$10 million to support the activities of BEE. Further, BEE generates revenue of US$0.7million per year through National Certification Examination of Energy Managers and Energy Auditors. Further, Bureau is supported through technical assistance through bilateral cooperation program with government of Germany (IGEN Programme of GTZ), USAID (ECO Project) and Green Aid Plan (GAP) of government of Japan.
Management Structure (board of directors, adv. boards/committees, executives, etc.)	The general superintendence, direction, and management of the affairs of the Bureau of Energy Efficiency vest in the governing council, which is chaired by Union Minister of Power, government of India. It comprises 26 members, which are appointed by the government of India. All the major ministries, industry association, equipment and appliance manufacturers, and consumer organizations have representations in the Governing Council.
Size (staff, supporting resources, etc.)	The Bureau is headed by a director general and is supported by 6 energy economists and 14 supporting secretarial staff.
Annual Budget	Budget for financial year 2005–06 is about US$1.3 million.
Types of Programs and Activities	• Policy development • Information/awareness • Education • Technical assistance • Technology transfer • Pilots and demonstration projects • Conferences, seminars, and workshops • Standards and labeling • Collaboration/partnerships

India: Bureau of Energy Efficiency, Ministry of Power *(continued)*	
	• National Certification Examination for Energy Managers and Energy Auditors • Accreditation of energy auditors • National Campaign on Energy Conservation • National Painting Competition on Energy Conservation for students • National Energy Conservation Award for industries, commercial buildings, and railways
Major Results Achieved	The results achieved after implementation of various promotional and mandatory provisions in support of the EC Act are as follows: • 64 accredited energy-auditing firms are in place, which have carried out around 2000 energy audits in 2003 to 2005. • 512 Certified Energy Managers and 1156 certified energy auditors are in place. Certified energy auditors will be considered for accreditation whereas the designated consumers will consider certified energy managers for appointment or designation as certified energy manager under the EC Act. • 3rd National Certification Examination for Energy Managers and Energy Auditors was successfully conducted. • Four guidebooks were prepared to assist energy professionals. • Two interactive Web sites are in place. • Seven sector-specific Task Forces for aluminium, cement, Chlor alkali, fertilizer, pulp and paper, petrochemical and refinery and textile constituted and regular workshops have been held. • Seven draft energy auditing codes for utility equipment in place. • Savings of 865 MW of electric power, as equivalent avoided capacity, were achieved during 1999–2005 through National Energy Conservation Award Scheme. • Labeling plan for air conditioners, refrigerators, distribution transformers, fluorescent tube light, and motors were prepared. • Thirty state governments and union territories have notified state-level designated agencies for the purpose of implementing EC Act within the state. • Energy Conservation Building Codes (ECBC) structure and draft prepared. • Energy audit studies completed in eight government buildings to set up an example for private buildings to pursue similar efforts. Savings potential between 25 to 46 percent identified in the above buildings. • Implementation of Energy Audit Studies in four government have been completed through ESCO route. • Sixteen more government buildings are being taken up in the second phase for energy auditing and its implementation through ESCO mode.

India: Bureau of Energy Efficiency, Ministry of Power *(continued)*	
Future Directions	Bureau of Energy Efficiency plans to undertake the following program/projects during the years 2006 to 2009. These programs/projects are based on the lessons learnt during the implementation phase of the Action Plan of BEE: • Strengthening of capacity building (technical and legal) of state designated agencies • Specific energy consumption norms finalization for two more sectors, namely fertilizers and Chlor-alkali • Launching of a lifelong learning program for certified energy managers and certified energy auditors • Conduct of national certification examination for energy managers and energy auditors • Launching of energy labeling program for electric motors, agriculture pump sets, CFL, and ceiling fans • Completion of energy audit studies in the 16 government buildings • Continuation of national campaign on energy conservation and national energy conservation awards in order to create awareness and motivate industrial and commercial establishments to save energy. • Launching of Energy Conservation Building Codes (ECBC) on voluntary basis
Lessons Learned	
Contact Information	Director General Bureau of Energy Efficiency, Ministry of Power 4th Floor, Sewa Bhavan, R K Puram, New Delhi 110066, India Phone: 91-11-2617-8316 Fax: 91-11-2617 8328 E-mail: dg-bee@nic.in
Comments	Bureau of Energy Efficiency has adopted self-regulation and market-based mechanism for promoting efficient use of energy instead of resorting to command and control system. A self-regulating mechanism casts more responsibility on the stakeholders, and they make every effort to comply the provision of the legislation, particularly when it helps improving their business and thus profitability. It is a right approach in which market players provide the best and low-cost solution, which is bound to result in sustainable promotion of efficient use of energy.

Ireland

Ireland: Sustainable Energy Ireland (SEI)	
Date Established	2002
Type of Agency ("Who")	National Energy Agency focusing on RE/EE/SE
Enabling Framework ("How established?")	Formerly the Irish Energy center, SEI was established by the Irish government as the national energy agency under the Sustainable Energy Act, 2002.
Country Context and Rationale for Establishment ("Why established?")	SEI was established to promote and assist the environmentally and economically sustainable production, supply and use of energy, in support of government policy, across all sectors of the economy.
Mission and Objectives	• To promote and assist environmentally and economically sustainable production, supply and use of energy • To promote and assist energy efficiency and renewable sources of energy • To promote and assist the reduction of greenhouse gas emissions and transboundary air pollutants associated with the production, supply, and use of energy • To promote and assist the minimizing of the impact on the environment of the production, supply, and use of energy • To promote and assist research, development, and demonstration of energy efficiency and renewable energy technologies • To provide advice, information, and guidance: o To the minister for Communications, Marine and Natural Resources, and such other ministers or bodies as the minister may direct o To energy suppliers and users
Specific Goals/Targets	
Key Areas of Activity	Sustainable Energy Ireland conducts a diverse range of activities. Among them are: *Policy Advice and External Relations* • Advising and informing the Irish government on matters relating to energy efficiency and renewable energy • Acting as an implementing agency and technical competence for national and EU energy policy *Residential* • Consumer information program • Home energy rating program • Low income housing program • Consumer information phone service

Ireland: Sustainable Energy Ireland (SEI) *(continued)*	
Key Areas of Activity (continued)	*Industry and Public Sector* • Energy conservation program for state buildings. • Industry R&D program • Technology promotion program *Alternative Energy* • Renewable Energy Information Office • Renewables R&D program • Grid reinforcement program • CHP / district heating program *Energy Policy Statistical Support Unit* • Collection and publication of energy statistics to support policy analysis • Statistical and economic analyses of energy services *Other* • Development and promulgation of appropriate sustainability indicators • Research and development • Promoting and assisting the greater involvement of Irish interests in international energy programs • Coordination of a range of programs aimed at disseminating the results of energy conservation and alternative energy R&D
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	Funding provided by Ministry for Communications, Marine and Natural Resources
Management Structure (board of directors, adv. boards/committees, executives, etc.)	Twelve-member board is appointed by the Irish government, representing national and local government, industry, and environmental groups.
Size (staff, supporting resources, etc.)	
Annual Budget	€14 million
Technologies and Sectors Addressed	

Ireland: Sustainable Energy Ireland (SEI) *(continued)*	
Types of Programs and Activities	• Built environment o Public buildings o Home energy rating o "House of Tomorrow" o Low-income housing • Industry o Technology promotion o Large industry energy network o Energy agreements
	• Energy Services o Combined heat and power o Renewable energy R&D o Renewable energy policy and economics o Grid upgrade development program • Customer Services o Consumer information o Marketing and communication
Major Results Achieved	
Future Directions	
Lessons Learned	
Contact Information	Conor Toolan Sustainable Energy Ireland Glasnevin Dublin 9, Ireland Tel: +353 1 808 2286 Fax: +353 1 837 2848 E-mail: ctoolan@sei.ie

Japan

Japan: Energy Conservation Center—Japan (ECCJ)	
Date Established	October 1978
Type of Agency ("Who")	Government agency
Enabling Framework ("How established?")	Energy Conservation Law ("Law Concerning the Rational Use of Energy"), originally passed in 1979 and amended many times thereafter.
Country Context and Rationale for Establishment ("Why established?")	Japan sees a need to contribute to the sound development of the national economy through implementing necessary measures for the rational use of energy in factories, buildings, and machinery and equipment, and other necessary measures to promote comprehensively the rational use of energy in order to ensure the effective use of fuel resources that would meet the economic and social environment of energy at home and abroad.
Mission and Objectives	Promoting the efficient use of energy, protection of the global warming and sustainable development
Specific Goals/Targets	
Key Areas of Activity	Industry sector: • Energy conservation audits services for factories • Education and training on energy conservation • State examination for energy managers (assigned by the government) • Dissemination (conference for successful cases of energy conservation activities, excellent energy conserving equipment, etc.) • Technological development and spillover Residential, commercial and transportation sector: • Energy conservation audits services for buildings • Ranking catalog for energy efficient appliances (dissemination of Top Runner Program) • Promotion of energy labeling system • International Energy Star program implementation • Energy efficiency product retailer assessment system • Dissemination of energy conservation indicator "E-Co Navigator" • Energy education at primary and middle schools • ESCO research and development Cross sector: • Energy conservation campaign and exhibition (ENEX) • Commendation (grand energy conservation prize) • Information and database, publicity and publishing • Survey and monitoring • International cooperation and communications

Japan: Energy Conservation Center—Japan (ECCJ) *(continued)*	
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	Government funding
Management Structure (board of directors, adv. boards/committees, executives, etc.)	Managed by a board of directors representing government, utilities, and industry
Size (staff, supporting resources, etc.)	128 staff members
Annual Budget	(2005)—200 million yen Operation expansion funds: 1.68 billion yen
Technologies and Sectors Addressed (Main Projects)	Industry • Voluntary agreements with industry • Energy audits • Key conservation checkpoints Buildings • Efficient lighting • Energy Star • Efficient water heaters • Standby power • Home energy management systems • Building energy management systems • ESCO development • Energy audits • Building design guidelines Transport • "Top Runner" program • Idling program • Traffic and logistics Cross-sectoral • ENEX (Exhibition on energy efficiency and conservation) • Successful case studies • Commendations • "Smart Life" program • Energy Conservation Education • Energy Conservation Technology Promotion
Types of Programs and Activities	

Japan: Energy Conservation Center—Japan (ECCJ) *(continued)*	
Major Results Achieved	
Future Directions	
Lessons Learned	
Contact Information	The Energy Conservation Center, Japan Phone: +81 3 5543 3018 URL: http://www.eccj.or.jp/

Japan: Energy Efficiency Division (EED), Energy Conservation and Renewable Energy Department, Agency for Natural Resources and Energy (ANRE), Ministry of Economy, Trade and Industry	
Date Established	
Type of Agency ("Who")	Government agency
Enabling Framework ("How established?")	
Country Context and Rationale for Establishment ("Why established?")	With the oil shocks in the 1970s, oil prices that had until then supplied an abundant and inexpensive source of energy supporting the world's prosperity rose sharply. At the same time, concern was growing over the finite availability of oil itself. Energy is the most fundamental element for the maintenance and development of economy and society, but Japan, for all its position as one of the world's largest energy-consuming nations, is poor in domestic energy resources. This being the case, in addition to the existing energy policy of developing alternative energy sources, securing a stable supply of oil, and acquiring sufficient energy resources, Japan needed to promote energy efficiency in accordance with the characteristics of the industrial, commercial. and transport sectors. The goal is to attain a shift to an energy-efficient industrial structure in terms of energy use. To this end, the Energy Efficiency Division was established.
Mission and Objectives	To promote rational use of energy by • Establishing and amending the Law for Rational Use of Energy. • Implementing the law • Carrying out research and development • Supporting the introduction of energy efficiency equipment by using financial scheme such as subsidy, tax redemption, special treatment on depreciation • Disseminating the information on energy efficiency and conservation and raising awareness

Japan: Energy Efficiency Division (EED), Energy Conservation and Renewable Energy Department, Agency for Natural Resources and Energy (ANRE), Ministry of Economy, Trade and Industry *(continued)*	
Specific Goals/Targets	Since the oil shocks in the 1970s, the Japanese economy has achieved more than 30 percent improvements in energy efficiency. From now onward, we will seek to achieve at least a further 30 percent energy efficiency improvement by the year 2030 through the establishment of a favorable cycle of technological innovation and social system transformation.
Key Areas of Activity	In accordance with provisions under the law for rational use of energy, Japan will carry out the following activities: • Factory-related measure: Factories that consume more than a certain amount of energy are required to appoint a qualified person for energy management, submit an energy usage report on a regular basis, and submit a medium- and long-term plan to introduce facilities designed to promote energy efficiency. • Transport-related measure: Forwarding agents who possess transport vehicles larger than a certain capacity are required to submit an energy usage report on a regular basis and submit a medium- and long-term plan to promote energy conservation. Consignors who ship more than a certain volume of transport are required to submit an energy usage report for the consigned transport and submit a plan to promote energy conservation. • Housing- and building-related measure: Owners of buildings, including housing, that have a certain total floor area are required to give notification of energy-saving measures when they construct a new building, extend or remodel a building, or make major repairs on a building and to submit a regular report on the maintenance and management of buildings. • Measure related to machines and tools: Manufacturers are required to develop appliances that have a performance greater than the performance of the best of the available commercialized products (the top-runner system). In and after the target year that will be set 3 to 10 years after the standards are enacted, major manufacturers are allowed to ship solely products that outperform the standards. At present, a total of 21 items, such as automobiles, electric refrigerators, and air conditioners, are subject to this system. • Dissemination of information: Household electric appliance retailers, energy suppliers, and others are encouraged to provide information on energy conservation. • Although these measures are implemented in accordance with the law for rational use of energy, financial assistance is also provided. The cost of introducing energy-saving facilities and equipment in the industrial, commercial, and transport sectors is partially subsidized. A tax incentive for specific equipment and low-interest financing by a government-affiliated financial institution are also implemented. • Public relations activities, such as preparing pamphlets and posters and organizing a symposium, are also carried out to encourage the spread of energy conservation.

Japan: Energy Efficiency Division (EED), Energy Conservation and Renewable Energy Department, Agency for Natural Resources and Energy (ANRE), Ministry of Economy, Trade and Industry *(continued)*	
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	Government budget
Management Structure (board of directors, adv. boards/committees, executives, etc.)	Two directors are appointed in this division. One is director for energy efficiency and conservation division and the other director for office for the implementation of the law for rational use of energy. Director-general for Department of Energy Conservation and Renewable Energy supervises them.
Size (staff, supporting resources, etc.)	Personnel: 24 (as of October 1, 2006)
Annual Budget	Approximately 61.7 billion yen (FY 2006)
Technologies and Sectors Addressed	All sectors
Types of Programs and Activities	
Major Results Achieved	Since the oil shocks in the 1970s, more than 30 percent improvements in energy consumption efficiency have been achieved as a result of complete energy management, and the development and introduction of energy-efficiency technologies in the industrial sector, and as a result of the establishment of high energy-saving targets in the commercial and transport sectors, policy-based assistance to help attain these targets, and a rise in people's consciousness of energy saving.
Future Directions	The following initiatives will be implemented to establish a favorable cycle of technological innovation in the energy conservation field and a reformation of the social system that accepts it: • An energy-saving technology strategy that specifies the technological fields where cross-sectional and medium- to long-term breakthroughs are looked for will be formulated and a first version of this strategy will be presented by the end of fiscal 2006. Subsequently, the progress of the strategy will be evaluated and the strategy will be revised at regular intervals. • The sector-oriented top-runner standards will be enacted deliberately and enhanced assistance will be provided to those persons who come up to the standards on a priority basis. In the residential sector, a comprehensive energy conservation evaluation method for both housing and facilities will be developed and the framework for provision of information and assistance will be enhanced in order to accelerate the shift to high-performance housing and facilities.

Japan: Energy Efficiency Division (EED), Energy Conservation and Renewable Energy Department, Agency for Natural Resources and Energy (ANRE), Ministry of Economy, Trade and Industry *(continued)*	
Future Directions (continued)	• A business value evaluation method that allows those enterprises that are committed to investment in energy-efficiency technologies to be highly rated by the market (investors and others) will be developed by 2008, and efforts will be made to spread and establish this method. In order to extend this initiative in the international community, and to make the sector-oriented energy efficiency standards and the evaluation system internationally acceptable, an international dialogue will be promoted in earnest by 2008 when the G8 summit will be held in Japan. • Issues that call for a reform in the social system and the urban structure will be examined from the medium- and long-term perspective; among these are the construction of a road network conducive to a smooth traffic, the development and spread of information technology-based systems by making the most of IT, a shift to public transportation systems in urban areas, and the effective utilization of high-temperature waste heat in cities and regions.
Lessons Learned	Well-structured measures should be implemented, based on the different energy consumption patterns in the industrial, commercial/business, commercial/residential, and transport sectors, and with due consideration for the effects of laws and regulations, subsidies, taxes, and financial assistance measures. It is important that these measures be carried out through a public–private partnership, while within the government, different government agencies and local branches and bureaus should work together in a concerted manner.
Contact Information	Energy Efficiency Division, ANRE 1-3-1, Kasumigaseki, Chiyoda-city, Tokyo, Japan Tel: +81-3-3501-9726 Fax: +81-3-3580-8439

Korea

Korea: Korea Energy Management Corporation (KEMCO)	
Date Established	1980
Type of Agency ("Who")	Corporation owned by the government focusing primarily on EE
Enabling Framework ("How established?")	Rational Energy Utilization Act (REUA) of December 1979
Country Context and Rationale for Establishment ("Why established?")	Korea's national energy conservation policy objectives and directions are to do the following: • Improve trade deficit by reducing energy imports. • Strengthen industrial competitiveness by reducing production costs resulting from reduced energy use. • Contribute to global environment protection by minimizing CO_2 emissions. • Enhance efficiency in the whole energy flows of production, distribution and consumption to develop an energy-efficient socioeconomic structure. • Strengthen demand-side management (DSM) in power sector. • Best use market mechanism to encourage energy efficiency investments. • Intensify regulations to an appropriate level in key areas (including energy efficiency standards of the energy equipment and appliances). • Foster an energy and resource-saving lifestyle by raising energy conservation awareness, adjusting energy price levels properly, and the like. • Strengthen international cooperation.
Mission and Objectives	KEMCO functions as the national energy efficiency center responsible for the implementation of the national energy efficiency and conservation programs.
Specific Goals/Targets	
Key Areas of Activity	
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	Government funding
Management Structure (board of directors, adv. boards/committees, executives, etc.)	Board of directors is appointed by government. The organization includes the following groups: • Managerial strategy • Demand-side management • R&D management • Climate change • New and renewable energy center

Korea: Korea Energy Management Corporation (KEMCO) *(continued)*	
Size (staff, supporting resources, etc.)	
Annual Budget	
Technologies and Sectors Addressed	
Types of Programs and Activities	a. Management of energy-intensive buildings and industry b. Corporate energy saving partnership program c. Energy audits d. Technical assistance e. Promotion of waste heat recovery and utilization f. Promotion of energy service companies (ESCOs) g. Low interest loans for financing energy efficiency investments h. Information/awareness i. Education and training j. Regional energy planning k. Energy impact assessment l. Demand-side management m. Standards and labeling n. R&D on energy technologies o. Inspections of energy-using equipment p. Technology transfer q. Climate change mitigation
Major Results Achieved	
Future Directions	
Lessons Learned	
Contact Information	KEMCO 1157, Pungdeokchon Yongin, Gyeonggi 449-994 Republic of Korea Tel: +82-31-260-4453/4 Fax: +82-31-260-4459

Mexico

Mexico: CONAE—Comision Nacional de Actividades Especiales Also known as Comision Nacional Para El Ahorro De Energia (CONAE)	
Date Established	
Type of Agency ("Who")	An administrative agency of the Secretariat of Energy with technical and operative autonomy.
Enabling Framework ("How established?")	
Country Context and Rationale for Establishment ("Why established?")	CONAE was established to promote energy efficiency and renewable energy in Mexico.
Mission and Objectives	Coordinate and promote actions for the efficient utilization of renewable and nonrenewable energy resources.
Specific Goals/Targets	
Key Areas of Activity	Energy efficiency and renewable energy
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	Government funding
Management Structure (board of directors, adv. boards/committees, executives, etc.)	
Size (staff, supporting resources, etc.)	
Annual Budget	
Technologies and Sectors Addressed	
Types of Programs and Activities	
Major Results Achieved	
Future Directions	

Mexico: CONAE—Comision Nacional de Actividades Especiales Also known as Comision Nacional Para El Ahorro De Energia (CONAE) *(continued)*	
Lessons Learned	
Contact Information	Maria Elena Sierra Galindo Executive Secretary Comision Nacional Para El Ahorro De Energia (CONAE) Rio Lerma 302 5 Piso Col. Cuauhtemoc Deleg. Cuahtemoc, C.P. 06500, Mexico Phone: 52 55 3000 1032 E-mail: msierra@conae.gob.mx

Mongolia

Mongolia: National Renewable Energy Center (a former Renewable Energy Corporation since 1987)	
Date Established	August of 2005
Type of Agency ("Who")	An implementation agency of the Ministry of Fuel and Energy
Enabling Framework ("How established?")	The government of Mongolia
Country Context and Rationale for Establishment ("Why established?")	The National Renewable Energy Program, 2005 to 2020, has approved by the Parliament in June, 2005. The National Renewable Energy Center was established to implement the program and the renewable energy policy of Ministry of Fuel and Energy.
Mission and Objectives	The main objective is to reach the main target of the National Renewable Energy Program, 2005 to 2020, which is 20 percent share renewable energy of total energy production in 2020. The program aims to create conditions for ensuring ecological balance, unemployment and poverty reduction, and sustainable social and economic development by increasing the percentage of renewable energy share in the total energy supply of Mongolia, improving the structure of energy supply, and widely applying renewable energy in rural areas power supply.
Specific Goals/Targets	The National Renewable Energy Program Outcomes are: • Completion and utilization of 100MW Orkhon River hydropower plant will create flexibility of operational regime of the central power grid and to increase its independence. • Completion of constructions of 11MW Durgun and 12MW Taishir hydropower stations will ensure independence and reliability of the Western Region power supply. • The full achievement of objectives raised in the National Program titled "100,000 Solar Houses (Gers)" and delivery of renewable energy power sources to over 180,000 herding households will encourage development of household production and reduce the migration from countryside to urban areas. • Completion of the task to deliver renewable energy power source to all remote soums and settlements not connected to centralized power grids will create opportunities for rural inhabitants in education, information access and conditions for development of production based on electronic governance and knowledge in rural areas. • Construction of medium capacity (30–50 megawatts) wind parks in sites with proven wind energy potential and utilization these farms in the centralized power grid will create efficient and reliable operation condition.
Key Areas of Activity	Rural electrification, grid connected RE, and energy efficiency.

Mongolia: National Renewable Energy Center (a former Renewable Energy Corporation since 1987) *(continued)*	
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	Own income
Management Structure (board of directors, adv. boards/committees, executives, etc.)	Under the direct management of the minister of fuel and energy.
Size (staff, supporting resources, etc.)	50 researchers and workers
Annual Budget	US$1.2 millions
Technologies and Sectors Addressed	• Wind energy • Solar energy • Geothermal energy • Hydropower • New Energy Resources and CDM • PV factory • Project implementation units • Design and technical supervision
Types of Programs and Activities	• Policy development • Information/awareness • Education • Technical assistance • Pilots and demonstration projects • Conferences, seminars, and workshops • Standards and labeling • Collaboration/partnerships • Public recognition/awards
Major Results Achieved	
Future Directions	The Renewable Energy Law was drafted and going to be discussed by the Parliament in pall session of 2006. The National Renewable Energy Center will create the Energy Efficiency policy in the country.
Lessons Learned	
Contact Information	

Netherlands

Netherlands: NOVEM	
Date Established	
Type of Agency ("Who")	Government agency focusing on EE/RE/SE
Enabling Framework ("How established?")	
Country Context and Rationale for Establishment ("Why established?")	
Mission and Objectives	NOVEM's mission is to implement government policies on innovation, environment, and sustainability in inspiring, forward-looking, and professional ways and to promote their coherence. We get cost-effective quantifiable results, applying the best possible mix of policy instruments based on experience en synergy.
Specific Goals/Targets	
Key Areas of Activity	
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	
Management Structure (board of directors, adv. boards/committees, executives, etc.)	
Size (staff, supporting resources, etc.)	1,250 staff in three groups: • Innovation • Energy and climate change • Environment and spatial planning
Annual Budget	
Technologies and Sectors Addressed	

Netherlands: NOVEM *(continued)*	
Types of Programs and Activities	The directorate of Innovation is driven by demand from companies in the private sector and uses all sorts of instruments to assist them, including: • Strategic services • Industry projects • Science and education • Fiscal and regional innovation • Corporate financing The directorate of Energy and Climate Change manages programs for the International Energy Agency and the European Union. Domestic programs have international components as well. Programs and projects involve issues like: • Energy strategy • Energy transition • Reducing climate change • Adapting building practices • Marketing of energy investments The directorate of Environment and Spatial Planning is involved in programs related to • Mobility and spatial planning • Soil quality • Waste management • Social and legal issues related to sustainability
Major Results Achieved	
Future Directions	
Lessons Learned	
Contact Information	SenterNovem Tel: +31 30 239 35 33 E-mail: frontoffice@senternovem.nl

New Zealand

New Zealand: Energy Efficiency and Conservation Authority (EECA)	
Date Established	2002
Type of Agency ("Who")	Government agency focusing on EE
Enabling Framework ("How established?")	The Energy Efficiency and Conservation Act, 2002
Country Context and Rationale for Establishment ("Why established?")	The National Energy Efficiency and Conservation Strategy (NEECS or Strategy), released by the Minister of Energy on September 27, 2001, set the agenda for government programs to promote greater energy efficiency, energy conservation, and the use of renewable energy across the economy. The strategy focused on two national targets. The Energy Efficiency and Conservation Authority (EECA) promotes a sustainable energy future by changing the way New Zealanders think about and use energy. EECA works to raise community awareness of energy efficiency issues and provides businesses and individuals with the tools to make changes. EECA develops programs to meet the needs of specific markets, often working in partnership with other organizations.
Mission and Objectives	EECA is the main body responsible for helping to deliver the government's extensive energy efficiency agenda. Its function is to encourage, promote, and support energy efficiency, energy conservation, and the use of renewable energy sources. It has developed the National Energy Efficiency and Conservation Strategy in conjunction with the Ministry for the Environment.
Specific Goals/Targets	• A 20 percent improvement in energy efficiency by 2012 • Increasing New Zealand's renewable energy supply to provide a further 30 petajoules of consumer energy by 2012
Key Areas of Activity	
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	Government budget
Management Structure (board of directors, adv. boards/committees, executives, etc.)	EECA has a seven-member board appointed by the minister of energy. The chief executive is appointed by the board.
Size (staff, supporting resources, etc.)	
Annual Budget	

New Zealand: Energy Efficiency and Conservation Authority (EECA) *(continued)*	
Technologies and Sectors Addressed	
Types of Programs and Activities	*Products and Appliances* EECA's products program makes energy efficiency information easily available so consumers can make informed decisions when comparing products. Energy performance information is made available to consumers on energy rating labels. The labels allow consumers to compare the energy performance of competing models. Appliances currently requiring labeling are: • Domestic refrigerators • Freezers • Dishwashers • Clothes dryers • Clothes washers • Single-phase air conditioners Industry is operating a voluntary labeling program on the following: • Three-phase air conditioners • Three-phase electric (induction) motors • Ballasts for fluorescent lamps Minimum energy performance standards (MEPS) ensure that only efficient products are available for sale. Products must be tested and shown to meet a minimum standard for energy consumption. Products covered by MEPS are: • Air conditioners • Domestic refrigerators • Electric water heaters • Refrigerated display cabinets • Distribution transformers • Fluorescent lamps and ballasts • Three-phase motors *Standards and labeling for heating and cooling equipment* • Heat pumps • Air conditioners • Heat pump water heaters *Lighting* EECA aims to demonstrate that energy efficient lighting and lighting systems are beneficial to purchase and install—not only because they consume less energy and but because they in most every case will result in whole-of-life cost savings due to lower electricity charges. *Industrial and Commercial Appliances and Equipment* • Distribution transformers • Refrigerated display cabinets • Three phase electric motors

New Zealand: Energy Efficiency and Conservation Authority (EECA) *(continued)*	
	MPS for Standby Power • Televisions • Dishwashers • Microwaves • Cordless phones • Electric toothbrushes • Garage door openers • Computers • Computer screens • Printers *Home Energy Rating Scheme* *EnergyWise Home Grants* *Crown Loan Scheme for Local Government*
Major Results Achieved	
Future Directions	
Lessons Learned	
Contact Information	Energy Efficiency and Conservation Authority Level 1, 44 The Terrace PO Box 388 Wellington Phone: 0800 358 676 Fax: 04-499-5330 E-mail: info@eeca.govt.nz

Norway

Norway: ENOVA SF	
Date Established	June 2001
Type of Agency ("Who")	Government Agency focusing on EE/RE/SE. Part of the Ministry of Petroleum and Energy.
Enabling Framework ("How established?")	Act of Norwegian Parliament, 2000
Country Context and Rationale for Establishment ("Why established?")	Improved energy efficiency, more flexibility in the energy supply and decreased dependence on direct electricity for heating, and an increased share of renewable energy sources, other than large hydropower, in the energy supply mix are key features of Norwegian energy policy.
Mission and Objectives	Enova's main mission is to contribute to environmentally sound and rational use and production of energy, relying on financial instruments and incentives to stimulate market actors and mechanisms to achieve national energy policy goals. Enova's objectives, adopted by the Norwegian Parliament in the spring of 2000, are: • To limit energy use considerably more than if developments were allowed to continue unchecked; • To increase annual use of water-based central heating based on new renewable energy sources, heat pumps and waste heat of 4 TWh by the year 2010; • To install wind power capacity of 3 TWh by the year 2010 • Increase environmentally friendly land-based use of natural gas Enova focuses its efforts on both the energy supply and the energy demand side, and the development and adoption of reliable methodologies for performance measurement and verification of results are high priorities.
Specific Goals/Targets	
Key Areas of Activity	
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	Government funding from the Ministry of Petroleum and Energy
Management Structure (board of directors, adv. boards/committees, executives, etc.)	Enova SF is governed by an appointed board of directors and its activities by a four-year contract with the Ministry of Petroleum and Energy.
Size (staff, supporting resources, etc.)	30 staff members

Norway: ENOVA SF *(continued)*	
Annual Budget	€65 million per year (approved for 10 years)
Technologies and Sectors Addressed	
Types of Programs and Activities	• Heat energy • New energy efficient technologies • Energy use reduction (buildings, homes, new construction, equipment and industry) • Wind energy • Information and communication • Education and training • Collaboration and advisory services • Administration of "Intelligent Energy—Europe" (nontechnological program for renewable energy and energy use) • Administration of Energy Technologies Data Exchange
Major Results Achieved	In 2005, Enova entered into agreements with 186 projects that together provided an energy result of 2 TWh. The result is almost evenly divided between projects providing higher energy production and projects that reduce energy use. The energy production consists of 585 GWH in new wind power and 409 GWh in new heat energy in 2005. Overall for the period 2001 to 2005, Enova contracted for energy results of well over 6.6 TWH. Enova is doing well in relation to the objectives set for its activities.
Future Directions	
Lessons Learned	
Contact Information	Enova SF Abelsgate 5 N-7030 Trondheim Norway Phone: +47 73 19 04 30 Fax: +47 73 19 04 31 Web site: www.enova.no havard.solem@enova.no

Poland

Poland: Polish National Energy Conservation Agency (KAPE)	
Date Established	9th November 1990
Type of Agency ("Who")	Joint Stock Company created by governmental organizations. Shareholders: • Ministry of Treasury (51.61%) • National Economy Bank (16.13%) • Industrial Development Agency (16.13%) • National Fund for Environmental Protection and Water Management (16.13%)
Enabling Framework ("How established?")	• Originally established by parliamentary resolution of November 9, 1990, concerning guidelines for energy policy of Poland • Decision of the government of the Republic of Poland no 21/92 of May 19, 1992, on creation of Energy Conservation Agency, • Agreement of February 5, 1994, concerning creation of Energy Conservation Agency as a joint stock company, • Partnership agreement signed on April 15, 1994.
Country Context and Rationale for Establishment	To reduce energy consumption on national and regional level in Poland
Mission and Objectives	The mission of KAPE is to develop and implement the principles for the attainment of sustainable energy policies in Poland.
Specific Goals/Targets	To fulfill its mission, KAPE aims at playing a leading national role in the energy service market. In the development and implementation of sustainable energy policies for Poland, it looks to European standards as a reference point and develops policy in cooperation with both Polish and foreign partners.
Key Areas of Activity	• Sustainable development in buildings: o Thermomodernistation of buildings and heating stations o District heating systems o Energy monitoring and management systems in buildings • Sustainable energy policy: o Sustainable energy policy instruments o Renewable energy resources o Dispersed combined electricity and heat generation o Energy saving transport • Environmental protection issues connected with energy processes: o Impact of energy processes on the environment o Implementation of Kyoto Protocol mechanisms o Best energy-saving technologies • Municipal policy in the area of sustainable development and energy planning

Poland: Polish National Energy Conservation Agency (KAPE) *(continued)*	
	• Promotion campaigns aimed at better social understanding of sustainable energy policy • Financing small energy investments in the field of energy conservation and renewable energy sources
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	Public and business projects
Management Structure (board of directors, adv. boards/committees, executives, etc.)	KAPE operates under the direction of a supervisory board and a management board, both appointed by the shareholders. The organization is divided into the following sectors (departments units): • Energy Advisory Unit • Sustainable Energy in Buildings • Energy Audits • Energy Planning • Renewable Energy • International Cooperation
Size (staff, supporting resources, etc.)	35 employees
Annual Budget	1 million euro turnover per year
Technologies and Sectors Addressed	• Energy policy • Industry • Sustainable buildings • Renewable energy • District heating • Municipal energy planning
Types of Programs and Activities	KAPE carries out activities aimed at rationalization of energy management with respect to the environmental protection and through proecological measures related to energy generation, transmission, and utilization. The main activities are: • Preparation of various expertise and analysis, consultancy for governmental administration, the energy sector and local authorities • Realization of projects under international programs (e.g., EU (including governmental co-operation) and coordination of international programs in which Poland participates) • Preparation and realization of large international programs within governmental co-operation • National and international conferences, seminars and training courses

Poland: Polish National Energy Conservation Agency (KAPE) *(continued)*	
Types of Programs and Activities (continued)	• Publication of guidebooks, promotional and training materials • Managing Energy Audit Secretariat and Energy Planning Secretariat • Verification of energy audits for the National Economy Bank • Preparation of investment financing mechanisms in the field of energy efficiency and renewable energy resources • Investment identification in the field of energy conservation and renewable energy resources
Major Results Achieved	Participation in more than 150 UE and bilateral projects, organization of nationwide campaign "Polish Energy Bus," 2003–2005, creation of The Polish–Japan Energy Conservation Technology Center
Future Directions	Energy efficiency in transport projects, managing energy in industry
Lessons Learned	
Contact Information	35 Mokotowska Street 00-560 Warsaw, Poland Phone: +48-22-626-09-10 Fax: +48-22-626-09-11 E-mail: kape@kape.gov.pl

Serbia

Serbia: Energy Efficiency Agency of the Republic of Serbia	
Date Established	1 August 2004
Type of Agency ("Who")	Energy Efficiency Agency was formed as special republic organization meaning separate legal entity. The agency was registered in the Trade Court in Belgrade on October 4, 2004. The agency started regular operation by the same day.
Enabling Framework ("How established?")	An Energy Law published in the "Official Gazette of the RS" No.84/2004 of July 24, 2004 created the Energy Efficiency Agency. An English translation may be found at: http://www.seea.sr.gov.yu/Downloads/ZakonOEnergeticiEngleski.pdf
Country Context and Rationale for Establishment ("Why established?")	The establishment of the Energy Efficiency Agency as a separate republic organization takes into consideration the current state of energy efficiency renewable energy issues within the republic, and recognizes the contemporary practice in European countries with regard to the need for a national energy efficiency agency.
Mission and Objectives	The agency's mission is to promote and encourage the rational use of energy in all consuming sectors and the use of renewable energy sources.
Specific Goals/Targets	Under the Energy Law the Energy Efficiency Agency is tasked with the following activities: • Proposing incentive measures aimed at enhancing energy efficiency in the drafting of the Energy Development Strategy • Proposing programs and measures for stimulating rational and efficient energy use; and monitoring their implementation • Proposals for implementing energy efficiency, renewable energy sources exploitation and environmental protection • Proposing technical and other regulations for increasing energy efficiency • Drafting criteria for equipment efficiency evaluation in use of energy and method of marking them in line with adequate international regulations and standards • Providing financial and technical support in the preparation and implementation of priority energy efficiency projects • Providing consultative, advisory, and educational activities in promoting energy efficiency
Key Areas of Activity	The agency implements its mission through sectoral, multiyear programs for energy efficiency improvements in building stock, municipal energy, and industry, as well as programs for the affirmation and promotion of renewable energy sources. All programs are funded by European Union's donation, through European Agency for Reconstruction. Additionally, the agency is the implementation body for the Serbia Energy Efficiency Project (SEEP), initiated by the government of Serbia and financed by an IDA Credit plus local participation. The role of the agency within SEEP is as the technical support to relevant beneficiary ministries for energy efficiency improvements in approximately hundred schools, hospitals and other public facilities.

Serbia: Energy Efficiency Agency of the Republic of Serbia *(continued)*	
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	The agency's operation is financed through the budget of the Republic of Serbia. It also receives funding from the EU, through the European Agency for Reconstruction (EAR) for financing of specific programs and projects.
Management Structure (board of directors, adv. boards/committees, executives, etc.)	The agency is managed by a director appointed by the government of the Republic of Serbia. Internal organization and job description is approved by the government of the Republic of Serbia. The agency responds for the operation to the government of the Republic of Serbia. It submits annual program and report on the operation to the government of the Republic of Serbia.
Size (staff, supporting resources, etc.)	The agency has a permanent staff of 12 persons. An organization chart may be found at: http://www.seea.sr.gov.yu/English/Prezentacija1.htm
Annual Budget	
Technologies and Sectors Addressed	• Energy efficiency in building stock • Energy efficiency in industry • Energy efficiency in municipal energy sector • Energy efficiency in transport • Renewable energy sources • Combined Heat and Power (CHP) production
Major Results Achieved	The Energy Efficiency Agency has implemented 39 EE projects, including 29 focused on local governments and related to public building stock, street lighting, water supply, district heating, and renewable energy sources. A flagship project has been the Serbia Energy Efficiency project, which has included rehabilitation of the energy systems of the Clinical Centre of Serbia in order to improve energy efficiency and reduce environmental pollution and other energy efficiency improvements in retrofitted social public buildings (schools, hospitals, orphanages, and elder people houses) by implementing energy saving measures on the building envelope and heating system and interior lighting, resulting in Increased end user satisfaction, improved indoor comfort, and higher awareness of the end users about energy efficiency and need for rational use of energy.
Future Directions	A future tool for promotion and implementation of energy efficiency programs will be the Serbian Energy Efficiency Fund (SEEF), which will promote energy efficiency projects by rendering technical assistance and by direct financial contribution to the identification, preparation, and partial financing of specific projects. Expected sources of financing of the SEEF include the Republic of Serbia, the European Union, International financial institutions, and bilateral grants from individual countries.

Serbia: Energy Efficiency Agency of the Republic of Serbia *(continued)*	
Lessons Learned	The agency has recently organized a number of educational programs for local governments, industry experts, energy audit engineers regarding energy management and business plans, thus aiding institutional capacity building in Serbia. Since energy efficiency improvement is a continuous process, demanding an organized and systematic approach, the Energy Efficiency Agency has obtained the best results when performing its activities cooperatively with relevant ministries and other competent institutions and expertise and professional associations.
Contact Information	Bojan KOVACIC, Deputy Director SEEA—Serbian Energy Efficiency Agency Omladinskih Brigada 1 YU-11070 Novi Beograd SERBIA (REPUBLIC OF) Tel: +381 11 313 19 57 Fax: +381 11 311 16 49 bojan.kovacic@seea.sr.gov.yu Web site: www.seea.sr.gov.yu

Sri Lanka*

Sri Lanka: Energy Conservation Fund (ECF)	
Date Established	1985
Type of Agency ("Who")	Statutory Board under the Ministry of Power and Energy
Enabling Framework ("How established?")	Established by an act of Parliament—the "Energy Conservation Fund Act No. 2 of 1985"
Country Context and Rationale for Establishment ("Why established?")	Established in order to pave the way to meet the future energy needs of Sri Lanka by fostering the best energy management practices.
Mission and Objectives	Mission: To guide the nation in its efforts to develop and conserve energy resources through research and development, execution, training and facilitation. Objective: To finance, promote and initiate activities and projects relating to the improvement of any or all aspects of energy demand management and conservation in Sri Lanka.
Specific Goals/Targets	• Identify available technologies for improving energy efficiency. • Identify enforceable energy efficiency policies. • Create a core of active managerial level personnel who will formulate and develop action oriented energy conservation programs relevant to national needs. • Promote a program on energy efficiency demand management and conservation and fund the development and promotion of energy conservation programs by any institution.
Key Areas of Activity	• Develop and plan energy policy, including demand side surveys, market assessments of energy services sector, and preparing the National Energy Balance. • Develop resources. • Fund management, including operation of Sustainable Guarantee Fund. • Energy Efficiency Improvement, including development of ESCOs, Energy efficiency labeling and building codes, Advisory services, and energy efficiency awards. • Enhance awareness, including industrial workshops, human resources development, promotion of energy labeling, operating an Information Service Center, and establishing school programs and exhibitions. • Develop technology. • Coordinate research.

*By the time of publication, the Energy Conservation Fund ceased to exist. The ECF was converted into a statutory body called the Sustainable Energy Authority, which became operational on October 1, 2007.

Sri Lanka: Energy Conservation Fund (ECF) *(continued)*	
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	Through government consolidated fund and donor grants
Management Structure (board of directors, adv. boards/committees, executives, etc.)	Board of directors representing key government institutions Two advisory committees
Size (staff, supporting resources, etc.)	33 persons
Annual Budget	Approximately 100 LKR million ($USD900,000)
Technologies and Sectors Addressed	Renewable energy (hydro, wind, biomass, solar) Energy efficiency (industrial, commercial, domestic) Energy planning (information management, forecasting, reporting, energy balances)
Types of Programs and Activities	• Assist public and private sector institutions to embark on energy efficiency demand management or conservation programs. • Initiate, promote, conduct, and coordinate research, surveys, and investigations regarding any aspects of energy efficiency demand management or conservation. • Organize seminars, workshops, and courses in energy efficiency demand management or conservation and provide information and education to the public regarding energy demand management or conservation. • Specify standards, norms, codes, and other criteria for maintaining the quality of the energy and reduce wastage by energy conservation techniques. • Carry out research and development and pilot studies leading to the implementation of energy substitution schemes, especially involving new and renewable sources of energy. • Promote, encourage, coordinate, and carry out long-term planning and policy analysis in all aspects of energy management and conservation. • Publish reports, articles, periodicals, papers, supplements, and booklets, and provide information and education with regard to any aspects of energy demand management or conservation. • Provide funds for participation in seminars and workshops and supplementary scholarships organized by international institutions with respect to energy demand management or conservation.

Sri Lanka: Energy Conservation Fund (ECF) *(continued)*	
Major Results Achieved	• Management of energy database and publication of Sri Lanka Energy Balance • Introduction of energy labeling for electrical appliances • Establishment of Sustainable Guarantee Facility (SGF) to provide guarantees to financial institutions who lends to implement energy efficiency projects • Facilitation of ESCO industry including training and furnish them with equipments to conduct energy audits • Conducting energy audits—mostly in the public sector • Development of an energy-efficient building code • Introduction of energy conservation measures in industrial sector and rural off-grid technology applications • Facilitation of biomass energy development by paying an attractive tariff
Future Directions	The organization is gradually moving from promoter/facilitator to enforcer/implementer mode.
Lessons Learned	Voluntary programs have very little impact in a subsidized energy market. Mandatory powers and regulation are needed to attain a higher level of energy efficiency.
Contact Information	Bauddhaloka Mawatha Energy Conservation Fund 3G-17, BMICH, Colombo 07, Sri Lanka. Tel: +94-11-2677445 or +94-11-2676515 Facsimile : +94-11-2682534 E-mail: info@energy.gov.lk or chariman@energy.gov.lk www.energy.gov.lk

South Africa

South Africa: National Energy Efficiency Agency (NEEA)	
Date Established	March 2006
Type of Agency ("Who")	Division of the Central Energy Fund (CEF Pty Ltd), which is a private corporation, incorporated in terms of the Companies Act, owned by the South African government, and governed by the CEF Act.
Enabling Framework ("How established?")	Ministerial order from the Ministry of Minerals and Energy
Country Context and Rationale for Establishment ("Why established?")	Due to the continuing growth in electricity demand in South Africa, combined with the cost and time required to install new electricity generation capacity, energy efficiency has become an important national priority. The National Energy Regulator of South Africa (NERSA) has, in the past few years, approved electricity tariffs that include establishment of a Demand Side Management Fund, which is collected by the national electricity utility Eskom and used by Eskom to finance both demand side management (DSM) and energy efficiency (EE) initiatives. However, it was felt that EE activities are not necessarily viewed as high-priority initiatives by Eskom, and that some changes were needed to the DSM/EE implementation framework. NEEA was established to initially oversee the implementation of DSM and EE projects undertaken by Eskom and other entities in the country. The DSM funds however, will in the interim remain with Eskom as the main implementing agency, who will continue to manage these funds with the oversight of the National Energy Efficiency Agency's Governance Body.
Mission and Objectives	The key objectives and initial focus of NEEA will include the following: • Prioritize and recommend energy efficiency and DSM projects to be undertaken in the country. • Key strategies will be identified and developed to address the growing demand for energy in the country, including gas, electricity, liquid petroleum, and so on. • Stimulate areas neglected in terms of energy efficiency in the past, such as the transport sector. • NEEA will also develop and implement comprehensive annual EE and DSM awareness campaigns, to ensure that necessary and accurate information is communicated to the public, to assist them in making wise choices when purchasing energy-consuming equipment and appliances. • Oversee the integration and coordination of training in energy efficiency currently undertaken by various stakeholders in the country, to facilitate skills transfer, capacity building and, ultimately, the creation of additional jobs in the field of energy conservation.

South Africa: National Energy Efficiency Agency (NEEA) *(continued)*	
Mission and Objectives (continued)	• Oversee the Measurement and Verification (M and V) of all energy efficiency and DSM projects undertaken by registered Energy Service Companies, (ESCos), through Eskom. • Cooperate with persons, associations, and institutions undertaking energy efficiency programs in other countries, to ensure that the best practices are adopted and applied in South Africa.
Specific Goals/Targets	By the year 2015, the government of South Africa has specified a target of 12 percent reduction in energy consumption in the National Energy Efficiency Strategy.
Key Areas of Activity	• Overseeing the implementation of energy efficiency programs funded under the DSM Fund administered by Eskom • Monitoring and evaluation of DSM and EE activities
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	Budget allocation from the Central Energy Fund (which, in turn, is funded by the South African government)
Management Structure (board of directors, adv. boards/committees, executives, etc.)	CEF is managed by a board of directors appointed by the minister of Minerals and Energy. NEEA is supervised by a governance body also appointed by the minister.
Size (staff, supporting resources, etc.)	
Annual Budget	
Technologies and Sectors Addressed	
Types of Programs and Activities	
Major Results Achieved	
Future Directions	

South Africa: National Energy Efficiency Agency (NEEA) *(continued)*	
Lessons Learned	
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Sweden

Sweden: Swedish Energy Agency	
Date Established	1998
Type of Agency ("Who")	Government Agency responsible for energy supply and utilization
Enabling Framework ("How established?")	Acts of the Swedish Parliament, 1997 and 2002
Country Context and Rationale for Establishment ("Why established?")	The development of energy policies in Sweden was for many years the purview of the Ministry of Industry, Employment and Transport. Since January 1, 2005, responsibility for energy issues was transferred to the newly created Ministry of Sustainable Development. The new ministry builds on the pillar of green government (i.e., use of new technology, construction and an active energy and environmental policy) to drive forward the transformation and modernization of Sweden to benefit sustainable development, new jobs, growth, and welfare.
Mission and Objectives	Achieve a safe, efficient, and sustainable supply and use of energy.
Specific Goals/Targets	The target for energy efficiency in buildings is a 20 percent reduction in total energy use per heated area unit in dwellings and public buildings by 2020 and a 50 percent reduction by 2050 against a 1995 baseline.
Key Areas of Activity	Energy technology procurement, voluntary agreements with industry, information and advice, research on consumer behavior as well as development of new products and systems, energy efficiency campaigns, energy taxation, testing and certifications for energy efficient products and systems (e.g., house hold appliances, domestic electronic appliances and domestic heating systems), measuring the energy use in dwellings and public buildings
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	Government budget
Management Structure (board of directors, adv. boards/committees, executives, etc.)	• The Energy Markets Inspectorate conducts studies and analyses of the development of the electricity, natural gas, and district heating markets. • The Department for System Analysis is in charge of analyses of national and international energy systems and energy markets. • The Energy Technology Department is in charge of research support and development programs, which are designed to develop sustainable energy technology, and to spread knowledge about the supply, conversion, and use of energy.

Sweden: Swedish Energy Agency *(continued)*	
	• The Sustainable Energy Department is in charge of energy efficiency in the residential, service, and industrial sectors. • The Planning Department assists the heads of the agency's departments in the management, planning, coordination, and development of the business.
Size (staff, supporting resources, etc.)	288 full-time staff, with 30 persons working on energy efficiency issues.
Annual Budget	1,300,000,000 SEK
Technologies and Sectors Addressed	The agency has overall responsibility for energy related research, development, and demonstration. Technology procurement, municipal energy advisory service and energy preparedness are other fields of activity. The Energy Agency takes active part in international cooperation concerning climate issues, among other topics. The Agency's Energy Markets Inspectorate ensures that the power transmission is conducted efficiently, so as to promote competition in the power trade.
Types of Programs and Activities	• Execute national energy policy and implement major part of energy policy programs. • Perform regulatory tasks. • Serve as principal staff organization of the central government. • Enhance knowledge, skills, and competence in the energy field. • Monitor and analyze the performance and development of energy markets and the energy system. • Support introduction of renewables and promote efficient energy use and energy supply. • Establish contingency emergency planning. • Promote international cooperation. • Measure effects of climate change policy.
Major Results Achieved	Administration of "Handeln med Utsläpprätter," the Energy Certificate System and the Program for Energy Efficiency in energy-intensive industries. The agency's Energy Markets Inspectorate ensures that the power transmission is conducted efficiently, so as to promote competition in the power trade.
Future Directions	Public sector leadership in energy efficiency: In all public purchases of energy-consuming equipment, the most-economical high-efficiency alternative should be chosen, based on the application of life-cycle costing concepts. New buildings: The current requirements as to energy efficiency in new buildings will be increased, along with requirements for new electricity heated dwellings.

Sweden: Swedish Energy Agency *(continued)*	
Future Directions (continued)	Existing buildings: Building rehabilitations will be required to include energy efficiency improvements, and the mandatory control of ventilation in buildings shall be investigated. Submetering of hot water and electricity: The government is investigating the feasibility of submetering apartments for electricity and hot water to encourage energy efficiency. Buildings research: The government will increase the research on energy use in buildings in preparation for future refurbishments of older buildings. Public awareness: The government has instructed the agency to start an energy-efficiency campaign that will target single-family home owners, owners of multi-family buildings, and other relevant actors.
Lessons Learned	Sweden's energy-efficiency policy was evaluated last year by the Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA). Their recommendations included: • Analyze long-term demand and supply with a view to better assess the potential contribution of energy efficiency and renewables in the energy balance of the country. • In implementing the relevant EU directives, the government should adopt a higher level of commitment, reflecting the importance given to energy efficiency in the overall energy policy in the country. • The government should ensure that the proposed National Program for Energy Efficiency and Energy Smart Buildings covers all the key areas for improving energy efficiency and includes clearly defined objectives and implementation mechanisms. • The government should further promote public awareness on the benefits of improving energy efficiency and secure more public involvement in the policy making in this area. • Monitoring and evaluation of energy efficiency programs should be strengthened. • Synergies between energy efficiency and climate change mitigation measures should be further explored in the implementation of environmental policies and programs. • The government should increase energy efficiency and renewables implementation in small- and medium-size enterprises (SMEs), especially in the services sector. • The government should ensure that the cost for obtaining energy certificates for buildings is not creating a barrier for public acceptance. • The government should ensure that the growing policy requirements in the area of energy efficiency and renewables are matched with adequate capacity in the responsible implementing institutions.

Sweden: Swedish Energy Agency *(continued)*	
	• Given the high number of organizations with responsibilities in the energy efficiency and renewables areas, the government should make efforts to secure continuous good coordination between them. • Municipalities should be encouraged to make wider use of available instruments for improving energy efficiency at community level. • The government should consider introduction of effective regulation of the district heating sector. • The government should assess the benefits of introducing individual heat metering in centrally heated buildings. • The government should further develop the energy taxation system in a way to encourage EE improvements, while not constraining economic development, social welfare, and competitiveness of the national industry. • Considering the existing potential and the declared targets for energy efficiency improvements in buildings in the country, the government should provide greater support for R&D in this area. • The government should further encourage the private sector to invest in energy efficiency, including through the use of ESCOs and performance contracting. • The property tax system should be further developed in a way to secure incentives for energy efficiency measures in buildings. • The government should consider a more EE-oriented tax system for cars, accompanied by other measures such as energy labeling.
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Thailand

Thailand: The Department of Alternative Energy Development and Efficiency (DEDE) and Energy Policy and Planning Office (EPPO)	
Date Established	
Type of Agency ("Who")	Government agency
Enabling Framework ("How established?")	National conservation policy was implemented in 1953 under the National Energy Authority Act. According to the act, the National Energy Authority was established to formulate policy and make consideration on various energy projects. In 1992, Energy Conservation and Promotion Act (ENCON) was announced, and the name of The National Energy Authority was changed to the "Department of Energy Development and Promotion" and was under the Ministry of Science, Technology and Energy by the Energy Development and Promotion. However, in 2002 the name of Department of Energy Development and Promotion has been changed to the Department of Alternative Energy Development and Efficiency and is under the Ministry of Energy. During the sixth National and Economic development plan (1987–1991), Thailand faced several energy crises. Due to the existence of various agencies and units involved in the country's energy matter, these agencies and units were not brought under the command of a single organizational chain, thus resulting in difficulties with management and coordination. In 1986, the National Energy Policy Council (NEPC) was functioned under the chairmanship of the prime minister. The council further decided to establish the National Energy Policy Office (NEPO), which would be referred to as the secretariat to the NEPC and would function under the supervision of the secretariat of the prime minister and transferred to Ministry of Energy. NEPO has since be renamed as the Energy Policy and Planning Office. The main objective of ENCON is to provide financial support to designated factories and buildings for investment in and operations under energy conservation programs. At the same time, the ENCON Fund can also be used to support other agencies that wish to undertake energy conservation, including activities on renewable energy projects, energy-related research and development, and human resource development. The ENCON Program during the fiscal year period of 1995 to 1999 comprised three sub-programs (compulsory, voluntary, and complementary sub-programs) and 10 main projects. In order to assist with the work of the ENCON Fund Committee, three subcommittees have been appointed to implement each respective subprogram. Under ENCON, DEDE is responsible for the Compulsory Programs, and EPPO is authorized to manage the voluntary and the complementary program.

Thailand: The Department of Alternative Energy Development and Efficiency (DEDE) and Energy Policy and Planning Office (EPPO) *(continued)*

	Energy Conservation Promotion Subcommittee **Regulated subcommittee Compulsory program** a. Government building d. Existing designated factories and building e. Public awareness Campaign DEDE **Regulated subcommittee Voluntary Program** b. Promotion of renewable energy utilization f. Promotion of small power producers using renewable energy g. Industrial liaison h. Promotion of research and development i. Existing nondesignated factories and building EPPO **Regulated subcommittee Complementary Program** c. Human resource development j. Public awareness campaign k. Management and monitoring EPPO However, there are still limitations and barriers in implementation of the ENCON Act, including the fact that financial institutes are not familiar with energy conservation projects, end users do not see the necessity of saving energy in their operations, and the economy is still recovering from the 1997 economic crisis. DEDE is aware of these barriers, and has established an Energy Efficiency (EE) Revolving Fund to promote and push investment in EE projects, as well as to increase the confidence of financial institutes in lending for EE projects.
Country Context and Rationale for Establishment ("Why established?")	The fast-evolving commercial and industrial sectors, together with consistent population growth, have constantly escalated Thailand's energy demand. Although energy demand has risen sharply, domestic sources of supply remains limited, thus forcing a significant reliance on imports. High dependency is the main reason why Thailand should prioritize energy efficiency and conservation as a main energy strategy. National commitment for energy efficiency and conservation (EE&C) is oriented toward sustainable supply of energy. DEDE and EPPO are actively pursuing energy conservation activities such as consumer education, industrial energy audits, thermal/electricity energy efficiency demonstration projects, and end-use studies. The primary focus of EE&C program is the implementation of a comprehensive Demand-Side Management Program.
Mission and Objectives	DEDE mission is to support and promote energy efficiency, provide the energy sources, develop the options of integrated energy uses as alternative sources for adequately demand responsive to every sector at optimal costs beneficial to the country development and improve living standards for Thai people. EPPO mission is to develop energy policy and plan, promote and assist energy efficiency, as well as implement and evaluate country's energy policy in order to achieve national energy security and competitiveness.

Thailand: The Department of Alternative Energy Development and Efficiency (DEDE) and Energy Policy and Planning Office (EPPO) *(continued)*	
Specific Goals/Targets	Government agencies' ultimate goal is to improve energy efficiency and energy mix, promote cost-effective mechanisms to enhance energy security, and reduce financial losses caused by ineffective use and investments on new sources of energy.
Key Areas of Activity	In Thailand, most of the energy policies and programs are focused mainly on building (residential/commercial), transportation, and industrial sectors that, on average, consume around 20 to 25 percent and 35 to 40 percent of the final energy consumption throughout the country, respectively.
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	The energy conservation program in Thailand has been funded by the ENCON Fund. The capital and assets of the ENCON Fund will come from the following sources: money transferred from the Petroleum Fund at an amount determined by the prime minister; and levies imposed on petroleum product producers and importers at a rate determined by NEPC. Additional sources are surcharges on power consumption, government subsidies at times, remittances from the private sector in the country and abroad, and the interests incurred from the ENCON Fund. At the initial stage, on August 24, 1992, an amount of 1,500 million baht was transferred from the Petroleum Fund. In addition, the NEPC imposed a remittance rate on domestic gasoline, kerosene, diesel, and fuel oil to raise revenue for the Petroleum Fund, effective on November 1, 1992. The government finances related energy policies and duties such as energy security promotion, private-sector participation, research and development on renewable energy, and general administration responsible by DEDE and EPPO.

Management Structure (board of directors, adv. boards/committees, executives, etc.)	DEDE is headed by a director general and has the following divisions:
	• Energy Development
	• Energy Research
	• Solar Energy
	• Training
	• Technology Transfer
	• Energy Efficiency Promotion
	
	EPPO is also headed by a director general and has the following divisions:
	• Energy Policy and Planning
	  o Strategic Planning and Policy
	  o Energy Information and Systems
	  o Monitoring and Evaluation
	• Energy Systems Analysis
	  o Petroleum
	  o Power
	  o Energy Conservation and Renewable Energy.

Thailand: The Department of Alternative Energy Development and Efficiency (DEDE) and Energy Policy and Planning Office (EPPO) *(continued)*	
Size (staff, supporting resources, etc.)	DEDE has 1,662 employees (530 government officers, 303 permanent employees and 829 temporary employees). Approximately 715 employees, or 43 percent of the work force, are working at the Energy Development Bureau. There are 141 employees working for EPPO; 85 of them are government officers and the remaining 56 are temporary employees. Only 25 officers are working in the Energy Conservation and Renewable Energy division.
Annual Budget	From the implementation plan, the total budget for the ENCON Program during the period of 1995 to 2004 is 22,713 million baht, or an average of 2,271 million baht/year (about US$60 million). The Compulsory Program has the highest priority, utilizing 46 percent of the total budget. The Voluntary Program utilized 40 percent of the total budget, and the Complementary Program will account for 14 percent. Within the Compulsory Program, the Existing Designated Factories and Buildings Project is of the highest priority, since the owners of designated facilities must take action on energy conservation improvement to comply with the laws.
Technologies and Sectors Addressed	Industry and buildings • Voluntary agreement with industry • Industrial liaison program • Energy labeling and minimum performance standards Transport • Traffic and logistics management • Modal shift (from road to rail) • NGV station expansion Residential • Fluorescent lamps • Various types of ballast for fluorescent lamps • Energy labeling and minimum performance standards
Types of Programs and Activities	Under the ENCON, large energy users are obligated to adopt the process cycle of energy management as part of their normal business practice. Compliance entitles them to various incentives provided by the Energy Conservation Promotion Fund. Smaller industries are encouraged to use a similar approach, but in a less stringent way. Noncompliance creates new difficulties, including additional costs through electricity surcharges imposed as monetary penalties. Other programs include the following: • Government buildings program—Government offices all over Thailand have been encouraged to adopt an energy audit and retrofit program for their buildings. The programs are completely financed by the ENCON.

Thailand: The Department of Alternative Energy Development and Efficiency (DEDE) and Energy Policy and Planning Office (EPPO) *(continued)*

Types of Programs and Activities (continued)

- Industrial liaison program, EPPO has set up procedures to: (1) fund capacity building of the industrial sector to produce energy efficient and renewable energy equipment, (2) disseminate information on energy conservation, (3) support demonstration projects in buildings and factories, and (4) provide tax incentive and financial assistance for new coming EE industries.
- Energy labeling and minimum performance standards—Standards and labeling activities are being developed for the following:
  - Various types and sizes of air conditioners; induction motors; various types and sizes of alternating fans
  - Fluorescent lamps
  - Various types of ballast for fluorescent lamps
- Training, information, advice, and services for users
- Speeding up demonstration of good practices

Major Results Achieved

Compulsory program

From 1995 to 2004, a total of 10,540 million baht was spent to implement the ENCON Program under DEDE. The program helped to reduce 232 MW energy demand, which is equivalent to 1,809.46 million bath/per year saving in total energy expenditure. The electricity saving is still less than the target at 34,033 million baht spending, and less than the expectation for electricity substitution of 5,696 Gwh/year, fuel substitution of 791 million liter of oil equivalent per year, in total 17,922 million baht per year saving in total energy expenditure.

Type	No.	Energy saving (Million unit per year)	Fuel saving (million baht per year)	Total saving (million baht per year)
Designated factories	50	1.15	3.56	11.30
Designated buildings	50	5.14	0.87	14.55
Small/medium factories and buildings	50	0.49	1.73	3.87
Total	**130**	**6.78**	**6.16**	**29.72**

Voluntary Program

Five major projects and 285 subprojects are taken care of by EPPO in total of 9,203 million baht from 1995 to 2004. This program will save energy by 740 ktoe/year or 230 percent of the fund. This will also help pollution reduction and promote more energy efficiency.

Thailand: The Department of Alternative Energy Development and Efficiency (DEDE) and Energy Policy and Planning Office (EPPO) *(continued)*

	Phase1 saving result (1995–1999)		Phase2 saving result (2000 -2004)		Total	
	Ktoe/yr	M.Baht/yr	Ktoe/yr	M.Baht/yr	Ktoe/yr	M.Baht/yr
1. Renewable energy	35.37	158.20	48.74	413.70	84.10	571.90
2. Business Promotion	2.35	68.90	512.64	14,326.90	514.99	14,395.80
3. Study and Research	0.17	3.10	1.01	22.20	1.18	25.40
4. SPP	–	–	138.99	4,077.80	138.99	4,077.80
5. Factories and Buildings	–	–	1.15	11.00	1.15	11.00
Total	**37.89**	**230.20**	**702.53**	**18,851.60**	**740.41**	**19,081.80**

Complementary Program

The total budget of 2,970 million baht was spent in the same period, mainly on the Human Resource Development Project (2,054 million baht (821 projects)), and public awareness project (916 million baht).

Project/budget	Phase1 (1995-1999)	Phase2 (2000- 2004)	Total (million baht)
1. curriculum development and training guideline	422.58	600.51	1,023.09
2. short course training	52.55	451.38	503.93
3. internal training and field trip	16.92	9.00	25.92
4. scholarship for graduate study	84.72	263.56	348.28
5. scholarship for R&D	10.46	48.06	58.52
6. others	7.66	86.42	94.08
Total	**594.89**	**1,458.93**	**2,053.82**

Future Directions

The Energy conservation plan Phase 3 (2005–2011) aims to improve energy efficiency by reducing commercial primary energy from 91,877 ktoe to 81,523 ktoe, together with increasing the use of other sources of energy to 9.2 percent of final energy and the share of renewable energy from 0.5 percent of the commercial primary energy to 8 percent of the commercial primary energy in 2011.

Lessons Learned

Reduction of energy consumption via economical and efficient use of energy will help not only the reduction of the public burden on energy procurement but also save foreign currency that will otherwise have to be spent on imported energy. Besides, the impacts from the risk of energy supply disruption and price instability can be reduced.

Contact Information

www.dede.go.th

www.eppo.go.th

United Kingdom

United Kingdom: Energy Saving Trust	
Date Established	1993
Type of Agency ("Who")	A statutory nonprofit organization established by the UK government up after the 1992 Rio Earth Summit to promote energy saving, funded by government and the private sector.
Enabling Framework ("How established?")	Act of British Parliament, 1992
Country Context and Rationale for Establishment ("Why established?")	In 1992, the Earth Summit in Rio de Janeiro highlighted, for the first time, the real threat of climate change on a global scale. The following year, the UK government established The Energy Saving Trust to reduce UK emissions of carbon dioxide (CO2)—the greenhouse gas responsible for climate change.
Mission and Objectives	• To achieve the sustainable use of energy • To cut carbon dioxide emissions, one of the key contributors to climate change To achieve these goals, we work with households, business, and the public sector: • Encouraging a more efficient use of energy • Stimulating the demand and supply of cleaner fuelled vehicles • Promoting the use of small-scale renewable energy sources, such as solar and wind To encourage energy efficiency and the integration of renewable energy sources into the economic fabric of our society. To achieve this, EST promotes the use of cleaner fuels for transport and better insulation and heating efficiency for buildings and homes. It champions small-scale renewable energy, such as solar and wind power.
Specific Goals/Targets	To reduce GHG emissions by 20 percent of 1990 levels by 2010.
Key Areas of Activity	
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	EST is an independent company funded by both government (including The Department for the Environment, Food and Rural Affairs; the Department for Transport; the Department for Trade and Industry and the Scottish Executive), and the private sector, including a wide range of energy companies.
Management Structure (board of directors, adv. boards/committees, executives, etc.)	Board of directors that includes the chairman, executive director, and nine nonexecutive directors (four elected and five independent)
Size (staff, supporting resources, etc.)	

United Kingdom: Energy Saving Trust *(continued)*	
Annual Budget	2005 funding £ 73.6 million
Technologies and Sectors Addressed	
Types of Programs and Activities	**Policy analysis** Provide independent evidence-based policy analysis in the areas of energy efficiency, small-scale renewable technologies such as Solar PV, small-scale wind and ground source heat pumps, and clean, low-carbon transport, covering both the United Kingdom and Europe. **Program design and implementation** Develop and manage programs on behalf of UK government, covering awareness raising, provision of advice, and support and grants for innovative technologies and techniques. **Independent information, accreditation, and evaluation** Provide consumers and stakeholders with accurate, independently verified information on the benefits of sustainable energy products and services. EST is recognized as a key provider of facts and figures on energy saving, while EST's Homes Energy Efficiency Database will provide a comprehensive picture of the uptake of measures across the United Kingdom. **Consumer marketing** EST's activities include ongoing marketing campaigns, most notably for home energy efficiency. Energy Efficiency is an ongoing awareness program, under which there are grant programs and specific call-to-action campaigns. **Partnerships** EST develops and maintains sustainable partnerships throughout the UK and Europe. EST works closely with local authorities through the Practical Help advice service and provides support to the Energy Efficiency Partnership for Homes and the Low Carbon Vehicle Partnerships, bringing together a diverse range of partners from the public and private sector with a common sustainable energy aim. EST is also the United Kingdom's formal representative in the European Energy Network (EnR), working to deliver innovative sustainable solutions on a pan-European level. EST programs cover the following: • Businesses/workplaces • Consumers/households/individual motorists via our consumer program • Housing associations and local authorities via our Practical Help program • Schools/education facilities via our schools program • Fleet advice program • Vehicle manufacturers/technology developers • Grant based support for refueling and recharging infrastructure

United Kingdom: Energy Saving Trust *(continued)*	
Major Results Achieved	
Future Directions	
Lessons Learned	
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United States

United States: U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy (EERE)	
Date Established	Originally established as the federal Energy Office in 1977, the U.S. DOE was established as a cabinet-level agency in the mid-1980s.
Type of Agency ("Who")	National Government Energy Agency
Enabling Framework ("How established?")	Various acts of U.S. Congress, the most recent being the Energy Policy Act of 2005.
Country Context and Rationale for Establishment ("Why established?")	As expressed by President Bush, *"America must have an energy policy that plans for the future, but meets the needs of today. I believe we can develop our natural resources and protect our environment."* The Department of Energy is committed to reducing America's dependence on foreign oil and developing energy efficient technologies for buildings, homes, transportation, power systems, and industry.
Mission and Objectives	The mission of the Office of Energy Efficiency and Renewable Energy (EERE) is to strengthen America's energy security, environmental quality, and economic vitality in public–private partnerships that enhance energy efficiency and productivity; bring clean, reliable, and affordable energy technologies to the marketplace; and make a difference in the everyday lives of Americans by enhancing their energy choices and their quality of life.
Specific Goals/Targets	
Key Areas of Activity	
How Funded (government budget allocation, levies or taxes, special legislative authorization, certification fees, etc.)	Government budget
Management Structure (board of directors, adv. boards/committees, executives, etc.)	
Size (staff, supporting resources, etc.)	
Annual Budget	The total U.S. DOE budget for 2006 was US$23.5 billion. Of this $1.8 billion was allocated to Energy Supply and Conservation.

United States: U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy (EERE) *(continued)*

Technologies and Sectors Addressed

Buildings

EERE works closely with the building industry and manufacturers to conduct research and development on technologies and practices for energy efficiency. The department also promotes energy- and money-saving opportunities to builders and consumers and works with state and local regulatory groups to improve building codes and appliance standards.

Energy Star—ENERGY STAR© is a government-backed program helping businesses and individuals protect the environment through superior energy efficiency. The Department of Energy's EERE is a supporter of the Energy Star program and provides information on energy efficient appliances and buildings.

Homes

EERE, through the Buildings Technologies Program, works closely with the building industry and manufacturers to conduct research and development on technologies and practices for energy efficient houses and multi-family buildings. Moreover, EERE's consumer information service provides fact sheets that can directly answer home energy efficiency questions.

Industry

EERE's Industrial Technologies Program works to improve the energy intensity of U.S. industry through coordinated research and development, validation, and dissemination of innovative energy efficiency technologies and practices.

Electric utilities

EERE's Distributed Energy and Electric Reliability Program conducts research, development, demonstration, technology transfer, and educational activities in partnership with industry, utilities, state agencies, universities, national laboratories, and other stakeholder organizations.

State activities

EERE assists states by providing planning assistance, data, and funding for state and community programs.

Transportation

The Clean Cities Program supports public–private partnerships that deploy alternative fuel vehicles and build supporting alternative fuel infrastructure. Additionally, DOE maintains the Alternative Fuels Data Center, a one-stop shop for alternative fuel and vehicle information needs.

Weatherization

The Weatherization and Intergovernmental Program provides consumers and decision makers with information on cost, performance, and financing energy efficiency and renewable energy projects. Through the Weatherization Assistance Program, DOE delivers weatherization services to low-income households throughout the United States.

United States: U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy (EERE) *(continued)*	
	Financing DOE offers financing solutions and incentives by providing useful resources about energy efficiency and renewable energy projects for the home, business, industry, utilities, and government.
Types of Programs and Activities	EERE leads the federal government's research, development, and deployment efforts in energy efficiency. EERE's role is to invest in high-risk, high-value research and development that is critical to the nation's energy future and would not be sufficiently conducted by the private sector acting on its own. Program activities are conducted in partnership with the private sector, state and local government, DOE national laboratories, and universities. EERE also works with stakeholders to develop programs and policies to facilitate the deployment of advanced clean energy technologies and practices. Specific programs include: • Energy for America's future—The National Energy Policy promotes the development and deployment of energy systems and practices that will provide current and future generations with clean, efficient, affordable, and reliable energy. • Protecting the environment through energy efficiency—By working closely with private industry, governments, and consumers, the Energy Star program was established in 1992 to identify energy efficient products and reduce carbon emissions. • Making homes more energy efficient—The Weatherization Assistance Program works to reduce the burden of energy prices on the disadvantaged by making low-income homes more energy efficient. • Maintaining energy for the future—Department initiatives help industry maintain the infrastructure to deliver energy to the consumer now, and for the future.
Major Results Achieved	
Future Directions	
Lessons Learned	
Contact Information	U.S. Department of Energy Office of Energy Efficiency and Renewable Energy (EERE) 1000 Independence Avenue, S.W. Washington, D.C. 20585 Phone: 1-800-dial-DOE Fax: 1-800-586-4403

List of Formal Reports

Region/Country	Activity/Report Title	Date	Number
	SUB-SAHARAN AFRICA (AFR)		
Africa Regional	Anglophone Africa Household Energy Workshop (English)	07/88	085/88
	Regional Power Seminar on Reducing Electric Power System Losses in Africa (English)	08/88	087/88
	Institutional Evaluation of EGL (English)	02/89	098/89
	Biomass Mapping Regional Workshops (English)	05/89	—
	Francophone Household Energy Workshop (French)	08/89	—
	Interafrican Electrical Engineering College: Proposals for Short- and Long-Term Development (English)	03/90	112/90
	Biomass Assessment and Mapping (English)	03/90	—
	Symposium on Power Sector Reform and Efficiency Improvement in Sub-Saharan Africa (English)	06/96	182/96
	Commercialization of Marginal Gas Fields (English)	12/97	201/97
	Commercializing Natural Gas: Lessons from the Seminar in Nairobi for Sub-Saharan Africa and Beyond	01/00	225/00
	Africa Gas Initiative—Main Report: Volume I	02/01	240/01
	First World Bank Workshop on the Petroleum Products Sector in Sub-Saharan Africa	09/01	245/01
	Ministerial Workshop on Women in Energy and Poverty Reduction: Proceedings from a Multi-Sector and Multi-Stakeholder Workshop Addis Ababa, Ethiopia, October 23–25, 2002	10/01 03/03	250/01 266/03
	Opportunities for Power Trade in the Nile Basin: Final Scoping Study	01/04	277/04
	Energies modernes et réduction de la pauvreté: Un atelier multi-sectoriel. Actes de l'atelier régional. Dakar, Sénégal, du 4 au 6 février 2003 (French Only)	01/04	278/04
	Énergies modernes et réduction de la pauvreté: Un atelier multi-sectoriel. Actes de l'atelier régional. Douala, Cameroun du 16–18 juillet 2003. (French Only)	09/04	286/04

	Energy and Poverty Reduction: Proceedings from the Global Village Energy Partnership (GVEP) Workshops held in Africa	01/05	298/05
	Power Sector Reform in Africa: Assessing the Impact on Poor People	08/05	306/05
	The Vulnerability of African Countries to Oil Price Shocks: Major Factors and Policy Options. The Case of Oil Importing Countries	08/05	308/05
Angola	Energy Assessment (English and Portuguese)	05/89	4708-ANG
	Power Rehabilitation and Technical Assistance (English)	10/91	142/91
	Africa Gas Initiative—Angola: Volume II	02/01	240/01
Benin	Energy Assessment (English and French)	06/85	5222-BEN
Botswana	Energy Assessment (English)	09/84	4998-BT
	Pump Electrification Prefeasibility Study (English)	01/86	047/86
	Review of Electricity Service Connection Policy (English)	07/87	071/87
	Tuli Block Farms Electrification Study (English)	07/87	072/87
	Household Energy Issues Study (English)	02/88	—
	Urban Household Energy Strategy Study (English)	05/91	132/91
Burkina Faso	Energy Assessment (English and French)	01/86	5730-BUR
	Technical Assistance Program (English)	03/86	052/86
	Urban Household Energy Strategy Study (English and French)	06/91	134/91
Burundi	Energy Assessment (English)	06/82	3778-BU
	Petroleum Supply Management (English)	01/84	012/84
	Status Report (English and French)	02/84	011/84
	Presentation of Energy Projects for the Fourth Five Year Plan (1983–1987) (English and French)	05/85	036/85
	Improved Charcoal Cookstove Strategy (English and French)	09/85	042/85
	Peat Utilization Project (English)	11/85	046/85
	Energy Assessment (English and French)	01/92	9215-BU
Cameroon	Africa Gas Initiative—Cameroon: Volume III	02/01	240/01
Cape Verde	Energy Assessment (English and Portuguese)	08/84	5073-CV
	Household Energy Strategy Study (English)	02/90	110/90
Central African Republic	Energy Assessment (French)	08/92	9898-CAR
Chad	Elements of Strategy for Urban Household Energy The Case of N'djamena (French)	12/93	160/94
Comoros	Energy Assessment (English and French)	01/88	7104-COM
	In Search of Better Ways to Develop Solar Markets: The Case of Comoros	05/00	230/00

Congo	Energy Assessment (English)	01/88	6420-COB
	Power Development Plan (English and French)	03/90	106/90
	Africa Gas Initiative—Congo: Volume IV	02/01	240/01
Côte d'Ivoire	Energy Assessment (English and French)	04/85	5250-IVC
	Improved Biomass Utilization (English and French)	04/87	069/87
	Power System Efficiency Study (English)	12/87	
	Power Sector Efficiency Study (French)	02/92	140/91
	Project of Energy Efficiency in Buildings (English)	09/95	175/95
	Africa Gas Initiative—Côte d'Ivoire: Volume V	02/01	240/01
Ethiopia	Energy Assessment (English)	07/84	4741-ET
	Power System Efficiency Study (English)	10/85	045/85
	Agricultural Residue Briquetting Pilot Project (English)	12/86	062/86
	Bagasse Study (English)	12/86	063/86
	Cooking Efficiency Project (English)	12/87	
	Energy Assessment (English)	02/96	179/96
Gabon	Energy Assessment (English)	07/88	6915-GA
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The Gambia	Energy Assessment (English)	11/83	4743-GM
	Solar Water Heating Retrofit Project (English)	02/85	030/85
	Solar Photovoltaic Applications (English)	03/85	032/85
	Petroleum Supply Management Assistance (English)	04/85	035/85
Ghana	Energy Assessment (English)	11/86	6234-GH
	Energy Rationalization in the Industrial Sector (English)	06/88	084/88
	Sawmill Residues Utilization Study (English)	11/88	074/87
	Industrial Energy Efficiency (English)	11/92	148/92
	Corporatization of Distribution Concessions through Capitalization	12/03	272/03
Guinea	Energy Assessment (English)	11/86	6137-GUI
	Household Energy Strategy (English and French)	01/94	163/94
Guinea Bissau	Energy Assessment (English and Portuguese)	08/84	5083-GUB
	Recommended Technical Assistance Projects (English & Portuguese)	04/85	033/85
	Management Options for the Electric Power and Water Supply Subsectors (English)	02/90	100/90
	Power and Water Institutional Restructuring (French)	04/91	118/91
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	Power System Efficiency Study (English)	03/84	014/84

	Status Report (English)	05/84	016/84
	Coal Conversion Action Plan (English)	02/87	—
	Solar Water Heating Study (English)	02/87	066/87
	Peri-Urban Woodfuel Development (English)	10/87	076/87
	Power Master Plan (English)	11/87	—
	Power Loss Reduction Study (English)	09/96	186/96
	Implementation Manual: Financing Mechanisms for Solar Electric Equipment	07/00	231/00
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Liberia	Energy Assessment (English)	12/84	5279-LBR
	Recommended Technical Assistance Projects (English)	06/85	038/85
	Power System Efficiency Study (English)	12/87	081/87
Madagascar	Energy Assessment (English)	01/87	5700-
	Power System Efficiency Study (English and French)	12/87	075/87
	Environmental Impact of Woodfuels (French)	10/95	176/95
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	Technical Assistance to Improve the Efficiency of Fuelwood Use in the Tobacco Industry (English)	11/83	009/83
	Status Report (English)	01/84	013/84
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	Household Energy Strategy (English and French)	03/92	147/92
Islamic Republic of Mauritania	Energy Assessment (English and French)	04/85	5224-
	Household Energy Strategy Study (English and French)	07/90	123/90
Mauritius	Energy Assessment (English)	12/81	3510-
	Status Report (English)	10/83	008/83
	Power System Efficiency Audit (English)	05/87	070/87
	Bagasse Power Potential (English)	10/87	077/87
	Energy Sector Review (English)	12/94	3643-
Mozambique	Energy Assessment (English)	01/87	6128-
	Household Electricity Utilization Study (English)	03/90	113/90
	Electricity Tariffs Study (English)	06/96	181/96
	Sample Survey of Low Voltage Electricity Customers	06/97	195/97
Namibia	Energy Assessment (English)	03/93	11320-
Niger	Energy Assessment (French)	05/84	4642-NIR
	Status Report (English and French)	02/86	051/86
	Improved Stoves Project (English and French)	12/87	080/87

	Household Energy Conservation and Substitution (English and French)	01/88	082/88
Nigeria	Energy Assessment (English)	08/83	4440-UNI
	Energy Assessment (English)	07/93	11672-
	Strategic Gas Plan	02/04	279/04
Rwanda	Energy Assessment (English)	06/82	3779-RW
	Status Report (English and French)	05/84	017/84
	Improved Charcoal Cookstove Strategy (English and French)	08/86	059/86
	Improved Charcoal Production Techniques (English and French)	02/87	065/87
	Energy Assessment (English and French)	07/91	8017-RW
	Commercialization of Improved Charcoal Stoves and Carbonization Techniques Mid-Term Progress Report (English and French)	12/91	141/91
SADC	SADC Regional Power Interconnection Study, Vols. I–IV (English)	12/93	—
SADCC	SADCC Regional Sector: Regional Capacity-Building Program for Energy Surveys and Policy Analysis (English)	11/91	—
Sao Tome and Principe	Energy Assessment (English)	10/85	5803-STP
Senegal	Energy Assessment (English)	07/83	4182-SE
	Status Report (English and French)	10/84	025/84
	Industrial Energy Conservation Study (English)	05/85	037/85
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	Urban Household Energy Strategy (English)	02/89	096/89
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Sierra Leone	Energy Assessment (English)	10/87	6597-SL
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Republic of South Africa	Options for the Structure and Regulation of Natural Gas Industry (English)	05/95	172/95
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	Power System Efficiency Study (English)	06/84	018/84
	Status Report (English)	11/84	026/84
	Wood Energy/Forestry Feasibility (English)	07/87	073/87

Swaziland	Energy Assessment (English)	02/87	6262-SW
	Household Energy Strategy Study	10/97	198/97
Tanzania	Energy Assessment (English)	11/84	4969-TA
	Peri-Urban Woodfuels Feasibility Study (English)	08/88	086/88
	Tobacco Curing Efficiency Study (English)	05/89	102/89
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	Wood Recovery in the Nangbeto Lake (English and French)	04/86	055/86
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Zaire	Energy Assessment (English)	05/86	5837-ZR
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	Status Report (English)	08/85	039/85
	Energy Sector Institutional Review (English)	11/86	060/86
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Zimbabwe	Energy Assessment (English)	06/82	3765-ZIM
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	Status Report (English)	08/84	019/84
	Power Sector Management Assistance Project (English)	04/85	034/85

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	Integrated Energy Strategy Evaluation (English)	01/92	8768-ZIM
	Energy Efficiency Technical Assistance Project: Strategic Framework for a National Energy Efficiency Improvement Program (English)	04/94	—
	Capacity Building for the National Energy Efficiency Improvement Programme (NEEIP) (English)	12/94	—
	Rural Electrification Study	03/00	228/00
	Les réformes du secteur de l'électricite en Afrique: Evaluation de leurs conséquences pour les populations pauvres	11/06	306/06
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	Fuelwood Forestry Preinvestment Study (English)	12/89	105/89
	Strategic Options for Power Sector Reform in China (English)	07/93	156/93
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	A Strategy for CBM and CMM Development and Utilization in China	07/07	326/07
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Indonesia	Energy Assessment (English)	11/81	3543-IND
	Status Report (English)	09/84	022/84
	Power Generation Efficiency Study (English)	02/86	050/86
	Energy Efficiency in the Brick, Tile and Lime Industries (English)	04/87	067/87
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	Urban Household Energy Strategy Study (English)	02/90	107/90
	Biomass Gasifier Preinvestment Study Vols. I & II (English)	12/90	124/90
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South Pacific	Petroleum Transport in the South Pacific (English)	05/86	—
Thailand	Energy Assessment (English)	09/85	5793-TH
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	Power Sector Reform and Restructuring in Vietnam: Final Report to the Steering Committee (English and Vietnamese)	09/95	174/95
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	Household Energy Supply and Use in Yemen. Volume I: Main Report and Volume II: Annexes	12/05	315/05
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