

ENERGY EFFICIENCY IN THE **PUBLIC SECTOR**

***Policies and Programmes in
ECT Member Countries***



Energy Charter Secretariat

Energy Efficiency in the Public Sector

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Executive Summary

In nearly every instance where public money is spent for government operations or for the provision of public utilities, there is good potential to improve energy efficiency. In the EU-15, the 2003 PROST study estimated that public administrations in EU member states could save up to 20% of their energy use (defined as heat and electricity) by 2020 and yield up to €12 billion in savings per year.¹ For the CIS, the potential is at least as large, and interventions in public sector facilities across the region have consistently resulted in energy savings of at least 25-30%. The overall potential for energy savings and greenhouse gas emissions reductions are even larger where the public sector is an important buyer of goods and services. In these cases, public sector practices can transform private sector markets as well.

While the technical measures used to reduce energy consumption are the same regardless of the user, governments often have different capacity and financing issues. Importantly, they face a mandate to use and oversee public funding responsibly, and yet data on performance and accountability – hallmarks of good governance – can be elusive where many governments consume energy or oversee public utilities. Despite a growing body of public sector programmes, governments in many countries continue to view energy efficiency activities as piecemeal environmental initiatives or as a luxury rather than a *tool for responsible fiscal management*.

This paper represents a review devoted specifically to public sector energy efficiency at all levels of government for PEEREA member countries. It examines what is known about the potential for energy savings in the public sector, where the potential lies, and how governments can capture it. The paper also examines trends in public sector efficiency in five groups of PEEREA countries: the EU-15, new EU member states, South East Europe, other OECD countries, and the CIS and Mongolia.

The Sector Overview first covers the end-use sectors that comprise a government's "energy footprint" in public administration and services of general interest. Issues and typical measures are described for public buildings, transportation, utilities ranging from public lighting to heat providers, and other facilities. The Policies and Instruments section, in turn, covers cross-cutting energy efficiency programmes, procurement, facilities construction and retrofitting, operations and maintenance, utility management, and capacity development programmes. This section includes four case studies: the SwissEnergy federal programme, an energy efficiency programme for Russian schools, the "carbon neutral" strategy combined with privatisation of an Australian water utility, and two municipal energy management networks. The review also provides lessons learned in each area of activity.

There is substantial potential for saving energy in the public sector. Table ES-1 summarises estimated and demonstrated potential for end-use sectors and countries and regions where information was available. However, the review also found a general lack of available data on public sector energy consumption and energy intensity. Without an

¹ PROST, *Harnessing the Power of the Public Purse: Final Report from the European PROST Study on Energy Efficiency in the Public Sector*, Borg & Co. AB, Stockholm, 2003, pp. ix-x.

accurate picture of energy use and energy intensity, governments cannot identify sectors with the greatest potential for savings, nor can they prioritise investments on the basis of cost-savings.

Other barriers identified by the review included insufficient or absent policies and programs, a lack of capacity to implement public sector efficiency measures, and a lack of financing, which included difficulties accessing commercial financing and – in a small number of cases – pricing or tariff barriers. The Roles of Major Actors section discusses how all levels of government can address these barriers and draw upon support from non-governmental actors such as NGOs and the private sector.

Table ES-1: Potential for Energy Savings in the Public Sector: Selected End-Use Sectors and Regions

	Estimated Potential	Demonstrated Potential
Transport	22% improvement in efficiency from vehicle procurement (EU) 5% improvement from tyre pressure maintenance in vehicle fleet (all countries)	
Public Buildings	20-30% improvement (Denmark) 20% improvement (Germany) 17% by 2010 relative to 2002 (Japan: for commercial and tertiary sector)	30% + in schools (Russia) 40% in schools (Bulgaria) 25-50% (Kyrgyzstan)
Procurement	21% improvement (Germany)	
Office Equipment	34% improvement (EU)	
Public Lighting	33% improvement in street lighting (Germany) 72% improvement in traffic lights (German)	
Heat Sector	Potential savings of 80 bcm annually; 26% of Russian DH boilers operate at less than 60% efficiency (Russia)	25-35% (Russia)
Electricity	28% improvement (Denmark)	
Overall Public Sector Potential	20% (EU-15) 7% (Russia, public administration)	

The key findings from the overview of potential areas for savings and the policies and programmes that are designed to capture those savings are:

- An integrated approach to energy efficiency can be cost-effective and offers the best potential for replication.
- Policy-makers should keep in mind both direct public sector policies and those with an indirect effect, such as building codes or fuel efficiency standards.

- Policy-makers should consider financial performance, environmental protection, and energy security when assessing the benefits of their energy efficiency programs.
- Energy efficiency in public procurement is currently underutilised, especially as this is an area where governments *are already investing* their resources so any marginal costs are low or negligible. Public sector procurement policies can have much greater impacts when the public sector is a significant purchaser in the market.
- Governments should incorporate capacity building in utilising financial mechanisms into the training and expertise provided by energy agencies.
- For the few countries where there are true barriers such as subsidies, improper pricing, and budget restrictions, barrier removal should be the top priority.
- Networks of municipalities, professional associations and other NGOs make good partners for governments in implementing energy efficiency policies, yet they are often underutilised.
- Local governments need adequate support and expertise in the evolving field of private sector participation in the provision of commercial services of general interest.
- National governments should encourage intergovernmental organisations to model efficient behaviours and to mainstream energy efficiency into their programming.

Public sector energy efficiency is an important area which would benefit from ongoing international attention. There are three areas in particular that could be further pursued by the PEEREA Working Group of the Energy Charter:

- First, it can advocate *public sector energy management as good public management*, particularly in countries where lack of knowledge is still an obstacle, and it should require a specific section on public sector energy efficiency in country reviews.
- Second, it can support additional analysis to compile a complete profile of public sector energy consumption in PEEREA countries and to determine the basic capacity needs of governments in implementing energy efficiency projects.
- Finally, it can continue to share information among members, disseminating best practices in public sector energy efficiency programs, including the determination of cost-effectiveness and the methodologies for monitoring and evaluating these programmes.

Introduction

The question of how governments should spend their money is a topic in the smallest municipality and in the largest federations of nations. However, there is a universal consensus that public funds should be spent wisely. At its core, public sector energy efficiency is synonymous with good public management: when energy is saved, the public funds used to pay for it are also saved. Yet data on performance and accountability – hallmarks of good governance – can be elusive where public sector energy use is concerned. Governments in many countries treat energy efficiency activities as piecemeal environmental initiatives or as a luxury rather than a *tool for responsible fiscal management*.

In nearly every instance where public money is spent for government operations, there is good potential to improve energy efficiency. There is also significant potential to reduce energy consumption where governments oversee utilities that provide communal services. Furthermore, the potential for savings is not unique to high-income countries: in lower-income countries, governments must also manage facilities and procure equipment.

Even governments that are relatively efficient energy users see significant potential for energy savings in the public sector. In the EU-15, the 2003 PROST study estimated that public administrations in EU member states could save up to 20% of their energy use (defined as heat and electricity) by 2020.² The report also found that through procurement, investment, management measures, countries could yield up to €12 billion in savings per year with annual investments of €80 million.³ In newer member states, one assessment listed the potential in the public sector as “HIGH,”⁴ and all EU member states have now committed to an overall annual reduction in energy consumption of 1.5% per year.

For the CIS, the potential is at least as large. Russian federal government facilities spent 70 billion rubles for energy in 2005, or approximately USD 2.1 billion. When regional and local governmental facilities are included, the total tops USD 10 billion. While the potential for saved energy could total USD 700 million annually, it would be necessary to invest 500 billion rubles overall into the modernisation of these facilities to realise these gains.⁵ Across the CIS, interventions in public sector facilities have consistently resulted in energy savings of at least 25-30%.

Countries in other regions can also realise significant efficiency gains in nearly all areas of the public sector. In all Energy Charter member countries, efficiency gains in the public sector carry the additional benefits of providing more effective public services and promoting the public welfare in areas such as environmental protection and energy security. In addition, energy savings in the public sector can also serve as benchmarks

² PROST, *Harnessing the Power of the Public Purse: Final Report from the European PROST Study on Energy Efficiency in the Public Sector*, Borg & Co. AB, Stockholm, 2003, p. x.

³ *Ibid.*, p. ix.

⁴ Renewable Energy and Energy Efficiency Partnership (REEEP) and the Regional Environmental Centre (REC). REEEP Regional Action Plan..., REC, Szentendre, 2006, p. 2.

⁵ Igor Bashmakov, *Increasing energy efficiency in budgetary organisations...*, CENEf, Moscow, 2005, p. 1.

for performance in other sectors and can stimulate the market for energy efficient technologies and energy efficiency services.

The following cross-country study in public sector energy efficiency was commissioned by the Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA)⁶ because of the strong potential for energy efficiency improvements where governments and other public authorities are in charge. The objective of the report is to analyse approaches to improving energy efficiency in the public sector in PEEREA countries with a view to identifying good practices and success factors. The report is designed to help public authorities at various levels to select policies and measures to reduce energy use, save money, and to promote and raise public awareness on the benefits of energy efficiency; in short, to perform an “exemplary role” as energy users.

In summary, the benefits and potential of public sector policies and measures for PEEREA member countries are substantial. While individual governments have different strategic objectives and socio-economic development targets, energy efficiency measures can be used almost universally to support them.

Definitions

This working paper addresses two types of public sector energy efficiency programmes:

- Programmes involving as the principal beneficiary public administration; i.e., the apparatus of the government. This includes efficiency in government office buildings at all levels of government, procurement for government offices, and efficiency in government vehicle fleets.
- Programmes involving economic and most non-economic services of general interest. These include public infrastructure that is publicly owned and/or regulated (roads, public lighting, waste removal, water supply and treatment, electricity, and heat and natural gas distribution, public housing) and facilities for public services (schools, hospitals, other social and healthcare establishments, and cultural and sport facilities).⁷

Overall, the working definition of “public sector” for the purposes of this report is taken as bodies governed by public law.⁸ Therefore, public-private partnerships and other

⁶ The Energy Charter and the Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA) entered into force in April 1998. A specialized Working Group involving 51 countries was subsequently established as a forum for dialogue and exchange of information among the participating countries. PEEREA carries out country reviews and studies on specific areas of interest to its members.

⁷ It should be noted that in many transition economies, the state sector is divided into two slightly different categories: 1) *budgetary organisations* (a category that covers public administration and non-economic services of general interest); and 2) the *communal services sector* (which covers economic services of general interest). Economic and non-economic services of general interest are treated separately in this paper because of the different principal-agent problems they face.

⁸ By this definition, “A body is considered to be governed by public law where it: “is established for the specific purpose of meeting needs in the general interest, is not of an industrial or commercial nature, has legal personality, and is financed for the most part by the State, or regional or local authorities, or other bodies governed by public law, or is subject to management supervision by those bodies, or has an administrative, managerial or supervisory board more than half of whose members are appointed by the State, regional or local authorities, or other bodies governed by public law” (PROST, p. 5).

arrangements to provide utilities are included in the analysis. Utility management, even if the utility has been privatised, is considered in this study.

It is important to note that the size and influence of the public sector varies across Energy Charter member states. There are member countries in which some part of the industrial or commercial base is still publicly owned. This is true particularly in economies in transition, although the overall share of such enterprises has decreased over the past fifteen years. Energy efficiency measures in these industries and services can yield substantial gains for the governments that operate them by reducing operating costs and increasing competitiveness, which in turn strengthen privatisation efforts. However, this subset of state-owned industrial enterprises will not be dealt with in the analysis.

Improving energy efficiency in the context of PEEREA and this report implies acting to maintain the same amount of output (of goods or services) without reducing the quality of performance of the output, while reducing the amount of energy required to produce that output.

Structure

This paper is the result of the use of three different tools: 1) a desk review of public sector energy efficiency programmes; 2) member country data on energy efficiency; and 3) selected interviews. The report also includes case studies of selected policies and measures and provides conclusions and recommendations for further possible contributions for PEEREA.

For the purpose of this review, Energy Charter member countries are grouped into five clusters as follows:

Table 1: Country Grouping

Group name	Group short name	Countries
European Union Member States until 30-04-2004	EU-15	Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom
New EU Member States (from 2004)	EU-NM	Bulgaria, Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Romania, Slovakia, Slovenia
South East Europe	SEE	Albania, Bosnia and Herzegovina, Croatia, Liechtenstein, FYR of Macedonia, Turkey
Other OECD	Other OECD	Australia, Iceland, Japan, Norway, Switzerland
Commonwealth of Independent States (former Soviet Union) and Mongolia	CIS and Mongolia	Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyzstan, Moldova, Mongolia, Russian Federation, Tajikistan, Turkmenistan, Ukraine, Uzbekistan

In some areas, the many differences between member countries in economic profile, climatic conditions, and other factors influencing energy consumption can make it

difficult to compare the relative effectiveness of policies and measures. For example, climatic differences influence country needs: district heating is a way of life in Russian Federation, but in Malta, CHP initiatives have not been pursued because of a lack of applications for the heat produced.⁹

However, all PEEREA member country programmes have the following common bases for comparison:

- the cost-effectiveness of measures
- the amount of energy saved with respect to the total amount of energy consumption in the reference year
- the reach and market impact of the intervention
- the magnitude of other benefits; e.g., environmental, social, etc.

This paper is not an in-depth review of the energy efficiency policies and measures of a particular country or region of those listed above. Nor is it meant to be an exhaustive list of the thousands of policies and measures that have been implemented and are under implementation in PEEREA countries. Instead, it discusses general trends in public sector energy efficiency among the member countries and identifies both barriers and best practices that can inform decision-making. It also pinpoints issues requiring more analysis and provides recommendations for further work in this sector by PEEREA.

⁹ Government of Malta, First National Communication to the UNFCCC, 2004, p. 32.

Sector Overview

When “public sector energy efficiency” is being discussed, three areas may be involved: 1) public administration; 2) non-commercial services; and 3) commercial services. The first area is the apparatus that is necessary to carry out governing: town halls, ministries, regional bureaus, etc. The second and third areas can be grouped under the term “services of general interest,” meaning “market and non-market services which the public authorities class as being of general interest and subject to specific public service obligations.” They include road and rail transport, electricity, water and gas supply, hospitals and other important public services. In public administrations, the government acts as a purchaser. In non-commercial services, the government is a purchaser and an investor. In commercial services, the government is both an investor and a regulator. In all three areas, governments manage energy, and they may also serve as a source of knowledge and capacity on energy efficiency.

While the scope and patterns of energy consumption in the state sector may vary, effective public sector energy efficiency projects produce common benefits. First, they generate direct savings in government energy use and in costs. Second, they provide the indirect benefits of market leadership, encouraging the dissemination of energy-efficient products and services. And, finally, they provide the benefit of “leadership by example,” which assumes a relevant weight above all at the regional and local level.

Energy Consumption in the Public Sector

It is difficult to compare overall consumption and relative consumption in the public sector across PEEREA countries. One challenge is a lack of readily-available statistics on energy consumption in public administration. Fuel and electricity consumption data for public administration and services are often subsumed into broader categories, such as the “commercial” or “services” sectors, or the “tertiary” sector, which can include public sector, education, health care, services, and commerce. These aggregated data do not give an indication of public sector efficiency, particularly in transition economies, where the commercial and service sectors may be growing quite rapidly relative to other sectors of the economy.¹⁰

In addition, as a European Commission report noted,¹¹ there are “much less data available for individual electricity uses” in the tertiary sector than for residential use. In other cases, even overall data on the tertiary sector can be difficult to obtain.¹²

¹⁰ However, an ODYSSEE report covering the EU-15 countries (ODYSSEE *Trends...* 2006) found that public administration led energy consumption in the services sector with more than a 20% share of energy consumed. The survey sampled 7-9 countries covering three quarters of energy consumption.

¹¹ Bertoldi and Rezessy, *Energy Service Companies in Europe: Status Report 2005*, EC, Luxembourg, 2005, p. 41.

¹² The PEEREA In-Depth Review of Energy Efficiency Policies and Programmes for Georgia in 2006 provides a case in point.

Even when there are statistics on public administration consumption, it would be difficult to reach conclusions about energy usage patterns from overall statistics without some background analysis. For example, the energy intensity in the public administration sector may be relatively high because of inefficient equipment, or it may be relatively high because public administration is more highly computerised, as with the emergence of electronic data centres.

When putting together a public sector energy portrait, it is also necessary to look beyond the tertiary sector and draw data from different areas. For example, public transportation falls under “transport” statistics, utilities can be located under “heat industry” or “power consumption,” and municipal housing is considered “residential.”

A further issue influencing the shape of this “energy footprint” is the fact that the scope of the public sector varies across countries. For example, certain countries have a much higher percentage of public housing stock than others. Countries may have extensive heating networks, or they may have climatic conditions that make cooling issues more relevant.

Nonetheless, this “energy footprint” is more than an academic exercise, and the lack of good data should be of serious concern to public officials. Without an accurate picture of energy use and energy intensity, governments face the following problems:

- Difficulties with identifying sectors with the greatest potential for savings
- No means of prioritising investments on the basis of cost-savings
- No means of measuring overall performance in energy efficiency, or even performance relative to the private sector, given the lack of a baseline
- Lack of data for supporting the argument of “leading by example” or for assessing the overall influence of the government both as an energy consumer and as a purchaser of goods and services.

Table 2 shows the results of a study commissioned by the German Ministry of Economy to determine the country’s public sector energy profile.¹³ It provides an example of an “energy footprint” for the public administration and non-economic services of general interest in the country.

As Table 2 indicates, the largest amount of consumption in the public sector takes place at the local level. This type of profile also indicates trends that are useful for policy-makers; for example, the largest share of public administration in consumption is at the regional level, and elementary and secondary schools form the end-use group with the single biggest energy consumption.

¹³ Presentation by Marc Ringel to the PEEREA meeting in November 2007.

Table 2: Public Sector Energy Consumption in Germany (PJ)

	Energy	Heating	Electricity
<i>Public Sector (total)</i>	221.68	167.68	53.99
Federal Level (total)	38.86	30.73	8.13
Administration	13.86	9.96	3.90
Defence	25.00	20.77	4.22
State Level	41.00	27.44	13.56
Administration	24.96	17.83	7.13
Universities	16.04	9.61	6.43
Local Level (total)	141.82	109.51	32.31
Administration	7.78	6.29	1.49
Buildings other than schools	6.00	3.92	2.08
Kindergartens (public)	7.18	6.36	0.82
Advanced training facilities	11.13	9.60	1.53
Sporting Facilities	13.45	11.33	2.12
Swimming baths (public)	15.77	11.95	3.82
Street Lighting	11.88	0.00	11.88

Source: Ringel, 2007.

The following summary of end-use sectors that comprise the “energy footprint” of the public sector. The discussion of each end-use sector covers ownership issues, relevant energy efficiency measures and technologies, and issues unique to each sector.

Public Buildings

➤ **Offices**

Governments at all levels build, own, and rent office space, and offices are an increasing focus of attention in public sector energy efficiency initiatives. While there have been efficiency gains in the construction and management of office buildings, there has also been major growth in the amount of office space that governments use. This growth has led to an increased demand for heating, cooling and lighting.

In addition, there are more energy-consuming appliances in offices, many of which were not commonly found in offices just two decades ago; computers, copiers, and printers, modems and digital lines all contribute to energy consumption. Higher-income countries have seen the most growth in this area. In Sweden, for example, “The use of electricity for public and commercial building services has increased. Electricity consumption for lighting, computers, cooling and ventilation has increased by 45% since 1990, despite of efficiency gains due to new and improved light sources, more sophisticated operational control, and correct sizing.”¹⁴ Countries with economies in

¹⁴ PEEREA, In-Depth Review of Energy Efficiency Policies and Programmes: Sweden, Energy Charter, Brussels, 2006, p. 22.

transition have also seen growth in energy consumption from office equipment as public administration systems have become increasingly computerised.

Ownership issues surrounding office buildings and equipment are relatively straightforward when buildings at each level of government (local, regional, national, multi-national) are owned by the corresponding administration. In the few countries where energy is subsidised, however, there may be little incentive to reduce energy use in these offices, as the central government subsidises energy costs at the local level. When government offices are rented rather than owned, the situation is more complicated, as the tenant-landlord relationship may lead to inefficiencies. For example, governments renting office space in less-efficient buildings may not have any means of undertaking improvements yet are responsible for paying the energy bills. Neither party then covers the full cost of the energy.

The most common energy efficiency measures in offices include: 1) efficient construction or remodelling to reduce the demand for heating and possibly cooling; 2) introduction of meters and controls; 3) efficient lighting or “smart lighting” to reduce the demand for power; 4) efficient procurement of appliances and labelling to reduce the amount of energy consumed by office equipment; and 5) housekeeping measures, such as programmes to encourage employees to turn off equipment and lighting when not in use. The installation of heat meters and controls in offices that do not have them can result in significant savings, because temperatures can be reduced outside of office hours. In government-owned buildings, common regulations that promote energy efficiency in government offices include building codes,¹⁵ which may affect the energy consumption of the office space, and procurement and labelling regulations, which affect the energy intensity of office equipment. Building codes can also improve efficiency in rented offices, as can model contracts, codes of conduct, green lease schemes, and other policies designed to address the tenant-landlord problem. In addition, offices may appoint or have access to an energy manager, who can assist with identifying, prioritising, and implementing efficiency measures.

Increasing energy efficiency in offices is not necessarily a priority in national and local planning. To national policy-makers, consumption in this sector can seem small when compared to consumption in the industrial sector, or even when compared to the residential sector.¹⁶ At all levels of government, officials may not make the connection between reduced energy consumption and budgetary savings. Finally, there may not be proper incentives to reduce energy use in these facilities due to the way that energy is purchased and how the money saved is directed. However, offices provide a visible means of leading by example, and many measures are a matter of channelling existing investment funds for procurement and facilities management into more efficient practices that save money in the longer term.

¹⁵ These codes include both national building codes and multinational codes such as the EU Buildings Directive or the CIS Model Building Code.

¹⁶ In FYR Macedonia, institutional buildings represent approximately 4.4% of national electric energy consumption, approximately one tenth of the consumption in residential buildings (PEEREA, FYRoM 2006, p. 12).

➤ **Educational Facilities**

Schools, which range from kindergartens to universities and post-graduate institutions, are potentially attractive areas for investments in energy efficiency. The fact that schools often belong to a single entity can simplify investments in energy efficiency. Jurisdiction for schools can be local (as in the case with preschools and elementary schools), regional (as can be the case with secondary schools), or national (including both state universities and other post-secondary training institutions). In some cases, schools may be affiliated with a particular branch of government, as with military colleges.

Direct measures such as metering and controls and the management of heat consumption can be quite effective in generating savings because overheating is then minimised, and – like offices – it is possible to reduce temperatures at night and on weekends when buildings are not occupied. Upgrading old, inefficient boilers can reduce energy use. Where district or mini-grid heating is used, and where they do not already exist, the installation of ‘heating points’ (or heat exchanges) can result in significant energy savings. Lighting, thermal insulation, use of thermostatic valves and window replacements can also reduce energy consumption substantially. As with offices, building codes and procurement regulations can promote efficiency in schools indirectly.

Schools are also a promising sector for energy efficiency measures because of the variety of benefits in addition to reduced operating costs. Improved comfort and indoor temperature, which are common benefits of school retrofit projects, support an improved learning environment. In addition, school-based projects provide a convenient opportunity for students to learn about energy issues and increase awareness in a highly-visible setting for students, parents, and teachers (Case Study #2 on the Russian education sector describes one such project).

Disincentives surrounding school-based investments in efficiency are primarily related to financing. For example, municipalities may require multi-year funding for retrofits but lack the authority to designate funds beyond a single annual operating budget. Another disincentive occurs in certain countries where savings in energy use do not accrue to the municipal budget but remain at the central level of government. This leaves little incentive to invest in savings measures.

➤ **Health Care Facilities**

As with educational facilities, there may be health care facilities under the jurisdiction of municipal governments (clinics), regional governments (hospitals), or the federal government (military hospitals and health care facilities for employees of federal ministries). Budgeting issues related to energy efficiency are also similar to those in schools.

The potential for savings in health care facilities can be significant because of 24-hour use. Improvements in lighting, heating and cooling, thermal insulation, special medical equipment, zone control, and “housekeeping” measures are most common. In some cases there is also a significant benefit when using CHP, because these facilities can have a high demand for heat as well as power.

➤ **Housing**

The role of government in public housing is one of the most diverse in PEEREA member countries. This role ranges from a provider of limited social housing (for low-income residents or for young families) and shelters in some countries to a significant provider of housing in countries where there was little or no private housing before the 1990s. In these countries, municipalities also inherited housing stock that was divested from state-owned enterprises. There have also been great changes among these countries in the past decade. In CIS countries, for example, 20-60% percent of housing stock was privatised from 1991 to 1999.¹⁷ Home ownership has increased 12% in Poland since 1990 and 49% in Latvia.¹⁸

Ownership can be complicated. In a few countries, housing has been partially privatised, resulting in buildings where some residents own their units and others rent from a municipal owner. Energy efficiency measures in common areas of residential buildings can be difficult to undertake and finance in these situations, although there have been some innovative approaches to overcoming this obstacle. In Russia, for example, an initiative to establish an association of utility customers was able to provide a critical mass of building tenants to undertake common area retrofit projects without requiring the 100% participation from the housing cooperative that would otherwise be required.¹⁹

Thermal insulation, appliance efficiency, and more extensive reconstruction of deteriorating housing stock are all measures used in the public housing sector. In some countries, programmes have also supported the construction of energy-efficient municipal housing by using passive design measures and technology to reduce energy demand, including the use of renewable resources.²⁰

While most governments rely on housing plans or strategies to prioritise spending in the social housing sector, these plans may not necessarily mention energy efficiency or the need to reduce energy consumption in government-owned housing stock. However, some residential energy efficiency programmes have successfully involved public housing, and building codes provide a regulatory framework for managing energy.

Transportation and Transportation Infrastructure

Transportation-related energy consumption in the public administration sector can take several forms. First, government employees consume energy when commuting to their jobs. Very few initiatives in PEEREA countries have covered this sub-sector despite the

¹⁷ Ruslan Yemtsov, *Housing Privatisation and Household Wealth in Transition*, UNU-WIDER, Helsinki, 2007, p. 3.

¹⁸ Martin Lux, *Housing Systems' Change on the Way to EU – Similarities and Differences, Integration or Convergence*, presented at the ENHR Conference “Housing in an Expanding Europe: Theory, Policy, Participation, and Implementation” in July 2006, p. 5.

¹⁹ Presentation by Igor Bashmakov to an IEA/OECD conference in February 2004.

²⁰ In the Czech Republic, for example, a UNDP-GEF project supported the design of multi-family residential buildings for two municipalities. The municipalities and the tenants paid for the construction, which were no higher than traditional multi-unit buildings. More information on these activities is available at <http://www.svn.cz/en/budovy.htm>.

fairly large number of people employed in the public sector. One programme in Belgium supports modal substitution: government commuters have been able to ride trains for free when they are commuting to and from work.²¹ And in Austria, the Austrian Energy Agency studied the transportation patterns of its own employees such as commuting and business travel and made recommendations on how to reduce energy consumption in this sector.

Second, transportation programmes can target government vehicle fleets. In Sweden, for example, policies support the procurement of biofuels and hybrid vehicles.²² While these types of programmes are less common, procurement rules have the potential to change vehicle purchasing patterns significantly.

Government vehicle fleets used to provide services of general interest have a greater impact on consumption because they are larger and more expensive. Vehicles for the postal service, waste collection, and for public transportation in and between cities can have a substantial impact on energy consumption. Depending on transport patterns and population density, mass transport can be an important key to energy management. In all government vehicles, maintenance can affect fuel efficiency. In the European Commission's Action Plan for Energy Efficiency, for example, tyres and tyre pressure are identified as a potential source of reducing fuel use in vehicles by 5%.²³

There are a variety of forms of ownership of "public transportation," which can include municipal corporations, public private partnerships, concessions, and other arrangements. These systems may be publicly or privately operated. Other transportation infrastructure – roads, rails, track, and mass transit facilities – is often overseen by local or regional government. However, large financial outlays for construction (a highway tunnel, a metro, or an airport) may require national or international funding.²⁴ Non-motorised transport infrastructure (designated paths for cycling and walking) most often relies on municipal funding.

While the transport sector is a major contributor to the growth in energy consumption across PEEREA countries, it has not been a major focus of interventions beyond the local level.²⁵ While there have been successful vehicle maintenance programmes, particularly those focusing on tire pressure, in several countries, they have not been visible in PEEREA countries. "Smart roads" and road quality/design initiatives are still largely experimental. Most policies affecting energy efficiency in transportation are indirect: governments apply a motor vehicle tax to the purchase of a vehicle.

²¹ The World Bank also provides financial incentives for headquarters staff to use public transportation and has improved conditions for bicycle commuters (see World Bank, 2006).

²² PEEREA, In-Depth Review of Energy Efficiency Policies and Programmes: Sweden 2006, Energy Charter, Brussels, 2006, p. 38.

²³ European Commission, Action Plan for Energy Efficiency (2007-2012), EC, Brussels, 2006.

²⁴ One interesting example of a public-private partnership that resulted in effective energy management is that of the Oslo airport at <http://www.aboutbioenergy.info/Oslo.html>.

²⁵ Data can also be difficult to obtain: only 6 of the new EU member states measure trends in energy intensity of the overall fleet (Bosseboeuf, 2007, #19).

Utilities

Utilities may be the single largest contributor to energy consumption (and the largest source of potential energy savings) of any end-use sector in the public sector. Utilities also have an enormous impact on environmental quality and climate protection.

For this reason, there is an extensive body of literature on energy efficiency in utilities that spans the traditional functions of utilities:

- centralised heat and hot water supply
- centralised cooling (to a lesser extent)
- power and light
- water supply and wastewater removal and treatment
- waste removal and disposal

Ownership of “public” utilities is a complex and changing picture. Over the past two decades, two trends in PEEREA countries have had an important impact on utility management: privatisation and decentralisation. Under privatisation, a number of member countries have fully or partially privatised district heating/cooling and power networks (including generation sources and transmission and distribution networks), water companies, and waste management companies.

These trends have been particularly visible in countries with economies in transition, which have seen a transformation from centrally-managed, state-owned utilities (or utility facilities owned by state-owned enterprises) to entities that are divested to local governments and then owned or operated through public-private partnerships.

In higher income countries, privatisation has led to a serious discussion of how to provide utilities with sufficient incentives to improve energy efficiency. In lower income countries, governments have struggled to privatise companies that require major investments in infrastructure, have debts, and face continual revenue shortfalls linked to non-payments.

At the same time, municipalities in economies in transition have gained various degrees of autonomy in spending their revenues. When divestiture, privatisation and decentralisation have been synchronised, the results can be positive. For example, a more autonomous municipality can choose to spend its maintenance budget to undertake efficiency improvements, can undertake a performance contract with an ESCO, and can take on debt to finance more efficient street lighting. However, when services are divested before cities can dictate their spending, cities face huge financial burdens from inefficient utilities with operating losses.

Ownership issues in the utilities sector can be among the most complex of any end use sector, depending on where improvements are targeted in the supply and end-use chain. Boiler houses, transmission pipes, substations, and institutional buildings may all offer significant potential for efficiency measures, but multiple owners are involved. Cogeneration issues further complicate this picture as increasing numbers of heat generation companies are selling to the power grid.

Utilities are still primarily regulated at the national level. For EU countries, directives on issues such as the promotion of co-generation and the urban wastewater treatment also regulate utility behaviour.

Heat: Heat utilities are obviously more significant in countries with cold climates and longer heating seasons (CIS, Mongolia, Scandinavia, Baltics). In the CIS, usage patterns are now divided between countries where district heating demand has remained constant or has grown (such as Russia and Ukraine) and countries where once-extensive systems have deteriorated and are operating at a small percentage of their previous levels (such as countries in the Caucasus). At the same time, replacement heating from less-efficient electrical sources is straining the power grid. Major issues in the CIS region include meters and controls, the need for an independent regulator, “cost +” tariff regulation, the need to eliminate producer subsidies, and the need to address non-payments.²⁶ Non-payments have been a more serious issue in heating utilities than in power utilities in part because of the difficulty of disconnecting users from the grid. Across member countries, governments are looking at the optimal balance of heating sources across fuels. In Denmark, for example, the Electricity Saving Trust is tasked with supporting public buildings that can switch from electrical heating to district heating. In addition, the focus in member states on heating has evolved from looking exclusively at heating networks to promoting integrated planning that combines this attention to fuel mix with demand-side management.²⁷

Power: Electric utilities provide energy, but they also consume significant amounts of energy as well. Common efficiency measures include improving the efficiency of power plant technologies, particularly increasing the combustion efficiency of fuels in boilers by reducing air inflows in boilers or eliminating the practice used in some areas of mixing fuels during combustion. Other technologies, such as combined-cycle units or co-generation, can also reduce overall energy demand. Finally, increasing the efficiency of transmission and distribution networks or reducing losses can improve overall efficiency.

Public lighting: Public lighting is a special category in the area of power utilities. Many cities could realise significant savings by changing lighting design and modifying inefficient lamps. In FYR Macedonia, for example, street lighting represents 1.42% of the total national power consumption, but over 86% of the total street lighting systems are equipped with inefficient lamps.²⁸ Public lighting improvements can also generate a number of spillover benefits, such as improved safety and visibility and increased commercial activity in evening hours. Finally, improved lighting design that accompanies investments in efficient lighting can address “light pollution” in countries where this is an issue.

Traffic lights present a small sub-category of public lighting. Nonetheless, there is significant potential for energy savings from replacing traditional bulbs in traffic lights with light-

²⁶ Elena Douraeva, IEA, Press conference for the report *Coming in from the Cold: Improving District Heating in Transition Economies*, February 2005, slide #11.

²⁷ Presentation by Jiri Zeman to the IEA District Heating Roundtable in December 2002.

²⁸ PEEREA, In-Depth Review of Energy Efficiency Policies and Programmes: FYRoM, Energy Charter, Brussels, 2006, p. 12.

emitting diodes (LEDs). A study commissioned by the Ministry of Economy in Germany estimated that conversion to LEDs would reduce energy use in traffic lights by 72%.²⁹

Water: Water utilities can be a major source of energy savings because of their size. They may be the second largest municipally-owned energy consumer in a given town or city behind a heating network, if not the largest energy consumer. Water utilities also have clear incentives to save energy, because energy is an operating cost to be reduced rather than a product being sold. Energy demand in water utilities can be reduced through efficient pumps, system automation (particularly pressure regulation), regular monitoring, leak management (including improved flow metering to identify leaks), replacement of poorly performing water mains, and an increase in the use of recycled water. Water utilities face many of the same issues as heat and power utilities, but they also have health and hygiene requirements that must be taken into consideration (see Case Study #4 on Sydney Water).

Waste Removal and Disposal: Waste collection and treatment are not particularly common targets for energy efficiency measures in the countries studied, although there is potential for energy savings in waste collection (vehicle fleet efficiency) and in waste disposal (waste heat usage in incinerators).

Cross-cutting Issues: Overall, it can be difficult to manage utilities in small municipalities given the increasing complexity of ownership, operations, and financing. In particular, municipalities may have difficulty working with the private sector. Even large municipalities may grapple with managing a certain degree of conflict of interest (i.e., a municipally-owned utility can increase revenues by increasing energy sales). While there is currently discussion on how to frame utility products as services, such as selling “light” rather than power or “comfort” rather than heat,³⁰ there is still a need to actualise this discussion.

Other

The above list of end-use sectors is not exhaustive. There are numerous other institutions that have mixed energy management needs and present the potential for energy savings. For example, postal services include vehicle fleets and many buildings. Municipalities or regional governments may manage park facilities, prisons, museums, animal shelters, and a variety of other facilities. Finally, military installations may include buildings and housing (four PEEREA member countries have more than 300,000 active service personnel each). In Germany, for example, a Ministry of Defence initiative is targeting 5% annual reductions in energy use over the next five years. The programme includes audits, retrofits, and awareness raising in cooperation with one of the country’s regional energy agencies.³¹

While these types of facilities may not always be numerous enough in a given country to merit a specific national initiative such as the kinds developed for schools or

²⁹ Presentation by Marc Ringel to the PEEREA meeting in November 2007.

³⁰ Interview with Luc Werring, European Commission, July 2007.

³¹ Presentation by Marc Ringel to the PEEREA meeting in November 2007.

residential buildings, they are the types of facilities that can be addressed by an integrated energy efficiency programme, whether it be at the local or national level.

Potential for Energy Savings in the Public Sector

Potential in Public Administration

An important component of the potential for energy savings in public administration is the public buildings sector. The EU Commission considers that savings in office buildings, for example, have a savings potential of 30% (even higher than residential savings, which are estimated at 27%). One survey of the expanded European Union countries, found that best practice office buildings could achieve energy consumption of 50-150 kWh/m², compared to an average of 400 kWh/m² for new offices and 591 kWh/m² for pre-1990 offices.³² Individual country studies have supported estimates of significant savings. One review of public buildings in Luxembourg found potential savings of 30-50% in public buildings.³³

One feature of office buildings with large potential is lighting. Currently, approximately 1% of EU offices and buildings use lighting controls of any kind. Movement detectors, for example, can generate savings of up to 30%, and the potential for energy savings in public and private offices has been estimated at 3 billion euros worth of electricity per year assuming energy costs of 0.1 Euro Cent p/kWh.³⁴ Lighting controls can also achieve substantial savings in schools and hospitals.

In Russia, audits conducted in 1998-1999 indicated that low-cost measures in federal buildings could potentially save 30-60% of heat and 17-40% of electricity³⁵ (the project described in Case Study #2 realised savings of more than 30% in each of the demonstration school building retrofits). Most CIS countries experienced a sharp drop in public sector energy consumption in the early to mid-1990s due to overall economic difficulties, followed by a rebound in recent years. For example, Kazakhstan experienced a 57% decrease in the state sector from 1992 to 2003 overall, but a 43% increase from 1999 to 2003.³⁶

Another area with significant potential savings is public procurement. Public procurement in the EU-15, for example, totals around 3% as a percentage of GDP.³⁷ Globally, public procurement can average approximately 10-15% of GDP.

³² Bertoldi and Atanasiu, *Electricity Consumption and Efficiency Trends in the Enlarged European Union: Status Report 2006*, European Commission, Italy, 2007, p. 29.

³³ ODYSSEE, *Energy Efficiency Profile: Luxembourg*, 2006.

³⁴ Royal Philips Electronics press release from June 2007.

³⁵ Svetlana Sorokina in Laura Van Wie McGrory, *Market Leadership by Example: Government Sector Energy Efficiency in Developing Countries*, ACEEE, Washington, DC, 2002, p. 8.

³⁶ PEEREA, *Kazakhstan: Regular Review of Energy Efficiency Policies*, Energy Charter, Brussels, 2006, p. 19.

³⁷ PROST, *Harnessing the Power of the Public Purse: Final Report from the European PROST Study on Energy Efficiency in the Public Sector*, Borg & Co. AB, Stockholm, 2003, p. ix.

Potential in Services of General Interest

Non-commercial services such as schools and hospitals also offer opportunities for savings that reflect the large potential in the buildings sector generally. Government vehicle fleets and mass transit concerns also offer opportunities; overall potential reductions in the EU transport sector, for example, are estimated at 26%.³⁸

Some of the largest scale reductions, however, are located in the utilities sector. In part this is because of the potential to reduce energy use significantly in countries where previous systems were fairly inefficient. For example, district heating energy efficiency programmes in Russia and Ukraine have consistently achieved energy savings of upwards of 20-25% following the introduction of more efficient equipment and management practices. More recently, a municipal heat management programme in Atyrau, Kazakhstan, achieved savings of 26% in the city during the 2004-2005 heating season.³⁹

Effective energy management in the heating sector is particularly significant because it plays such an important role in the energy balance of countries with significant heating networks. In Denmark, a country with a 60% connection rate to district heating network that provides 80% of its heat from waste heat, one summary found that “The substantial increase of the national energy efficiency provided by the district heating is the major reason that the energy consumption in Denmark is constant despite the increase in GDP.”⁴⁰

In Russia, district heating consumes 40% of all energy consumed in the country, and residential district heating comprises 6% of the country’s GDP.⁴¹ On the whole, one study found that improving district heating efficiency in transition economies to western levels would save over 80 bcm per year; to place this figure into perspective, Germany uses 90 bcm per year.⁴²

While projections of technical potential specifically for the public sector are not common, Table 3 below attempts to provide a simple overview of the types of estimates that are available and a comparison in a few end-use sectors with data from internal government programmes or technical assistance projects. While these data provide only an initial profile of the range of potential, they do indicate that there is great room for improvement in most end-use sectors. On the estimate of overall potential for energy efficiency in the public sector, it should be noted that the EU new member states are on average three times as energy intensive as the EU-15, indicating very high potential for improvement. A similar conclusion can also be reached about the relatively energy-intensive economies of the CIS.

³⁸ Bertoldi and Atanasiu, *Electricity Consumption and Efficiency Trends in the Enlarged European Union: Status Report 2006*, European Commission, Italy, 2007.

³⁹ USAID, *USAID’s Key Achievements in Kazakhstan since 1992*, 2007.

⁴⁰ Hans Jorgen Koch, DBDH, “EU, District Heating, and Security of Supply,” Danish Energy Authority, 2006, p. 2.

⁴¹ Elena Douraeva, IEA, Press conference for the report *Coming in from the Cold: Improving District Heating in Transition Economies*, February 2005, slide #4.

⁴² *Ibid.*, slide #3.

Table 3: Potential for Energy Savings in the Public Sector: Selected End-Use Sectors and Regions

	Estimated Potential	Demonstrated Potential
Transport	22% improvement in efficiency from vehicle procurement (EU) 5% improvement from tire pressure maintenance in vehicle fleet (all countries)	
Public Buildings	20-30% improvement (Denmark) 20% improvement (Germany) 17% by 2010 relative to 2002 (Japan: for commercial and tertiary sector)	30% + in schools (Russia) 40% in schools (Bulgaria) 25-50% (Kyrgyzstan)
Procurement	21% improvement (Germany)	
Office Equipment	34% improvement (EU)	
Public Lighting	33% improvement in street lighting (Germany) 72% improvement in traffic lights (German)	
Heat Sector	Potential savings of 80 bcm annually; 26% of Russian DH boilers operate at less than 60% efficiency (Russia)	25-35% (Russia)
Electricity	28% improvement (Denmark)	
Overall Public Sector Potential	20% (EU-15) 7% (Russia, public administration)	

Sources: PROST, 2003; Bashmakov, 2004 and 2007, Nielsen 2007, Ringel 2007, Dahlsveen 2005, EBRD 2007, UN Foundation 2007, Murakami 2006.

Weighing the Merits

Governments implementing energy efficiency policies and measures should be aware that they can leverage many other benefits. The most visible benefit is usually economic savings. Energy efficiency measures reduce expenditures for fuel, and this benefit extends across the lifetime of the equipment or facilities. Programmes in the public sector can also reduce expenditures for fuel in other sectors of the economy by creating markets for efficiency technologies. For example, a performance-based building code or a labelling initiative for office equipment will generate benefits well beyond the public sector. Markets for energy efficiency products and services can in turn create jobs.

Furthermore, energy efficiency programmes can support government policies in several other areas. The environment is usually used as an example of this phenomenon. Energy efficiency measures in the water sector also save significant amounts of water. Projects that reduce the use of mazut or coal in older heat-only boilers can produce visible improvements in air quality. Energy efficiency projects reducing the use of fossil fuels also reduce the emission of greenhouse gases.

However, policy-makers may not be aware that energy efficiency measures can support other national programmatic priorities. Improvements in affordable public housing, the health sector, and education can all be supported by energy efficiency measures. These measures reduce costs and improve comfort levels.

Another factor that policy-makers use when assessing the potential for energy efficiency measures is cost. Energy efficiency can range from very inexpensive “housekeeping” measures to large-scale investments in heat and power generation. While no country has unlimited financing to undertake energy efficiency improvements, some countries are in a position to spend more at one time on public sector measures. In countries where the investment climate is more difficult, it may be difficult to obtain government or commercial financing that will support energy projects that may generate large savings but have longer pay-back periods.

In some cases, it may make more sense to focus on areas where money is already being spent (e.g. construction, reconstruction/renovation, procurement) rather than on areas where it would be necessary to generate investment capital specifically for energy efficiency improvements. In countries where third-party financing is uncommon, national and municipal budgets may be forced to limit investments to those with very quick payback periods, i.e., within a single fiscal year.

Another question is the mix of investment between a government agency’s own operations and in those it oversees, such as utilities. In the private sector, the analogy would be the mix of cost-cutting or investments between headquarters, branch offices, and at manufacturing facilities. An effective government manager needs to know what the national policy priorities are, where the potential efficiency gains are the biggest, where the programmes are most cost-effective, and how much capital is required to see a return on investment.

Priorities in the Public Sector

Effective priorities imply an understanding of a common baseline of energy consumption in the public sector and some common criteria for evaluating investment needs. More often, priorities can result from “firefighting,” or addressing a crisis in a particular sector. Moreover, it can be difficult to establish and implement priorities when the scope of investments and necessary reforms are daunting, as in the heating sector in CIS countries. Unfortunately, targeting and benchmarking public sector energy efficiency has not been a common practice in the past. Fortunately, overall energy efficiency targeting and benchmarking has started, and there are countries that can provide examples of how to apply these practices successfully in the state sector.

Targets for reducing overall energy consumption are far more common than specific targets for public sector energy consumption. For example, targets for overall energy consumption have now been set by all EU member states in National Energy Efficiency Action Plans for member states. In at least three cases – Denmark, Romania, and Latvia⁴³ – countries have

⁴³ Latvia’s Energy Efficiency Strategy from 2000 already contained the target of reducing primary energy consumption per unit of GDP 25% by 2010. Romania’s strategy includes a 3% annual reduction.

set targets that are above the annual suggested figure of 1.5%. The overall EU target is a 20% reduction in energy consumption by 2020, or a 1.5% reduction per annum. The Commission considers that it should be possible to adopt and transpose most of the measures it proposes by 2012. A mid-term review will be carried out in 2009.

In Australia, the government has set specific targets for its operations that include a 20% reduction in energy intensity in central services for office buildings and a 25% reduction in energy intensity in tenant light and power in office buildings by 2011.⁴⁴

In the Balkans, with the exception of Croatia, most non-EU countries have not established either energy efficiency targets or specific public sector targets.

Among CIS countries, the Republic of Belarus has set a series of energy efficiency targets for the state sector through a decision of the Council of Ministers in December 2002.⁴⁵ These include a 4.5 % annual reduction in total energy consumption per unit of GDP in the state sector⁴⁶ and a reduction of energy use per unit of GDP by 31% over the period 2006-2010 (with target of 7-8% reductions in the year 2007 alone).⁴⁷

In some cases, countries may not have set an energy efficiency target but have related targets that indirectly support increases in energy efficiency. In Switzerland, for example, “The only legally binding target, insofar as it is derived from the Kyoto target, is the -10% CO₂ emissions reduction target laid down in the CO₂ Law and its two sub-targets for stationary fuel emissions (-15%) and transport fuel emissions (-8%).”⁴⁸ Other countries may state official priorities in their National Communications to the United Nations Framework Convention on Climate Change (UNFCCC). For example, Turkmenistan has a stated priority of increasing efficiency in the municipal services sector. A few PEEREA member countries have neither direct nor indirect targets or strategies, but these countries are in the minority.

Multi-country initiatives, be they global (such as the UNFCCC and Agenda 21 processes) or regional (PEEREA, the E4E process, REEEP) can provide support and incentives to prioritise energy efficiency.

Establishing priorities and targets requires solid planning and the identification of barriers that prevent the efficient use of energy. And while the barriers to increasing energy efficiency may vary from country to country, the need for prioritising and targeting is a common one.

⁴⁴ Australian Government, Energy Efficiency in Government Operations (EEGO) Policy, Australian Greenhouse Office, Canberra, 2006.

⁴⁵ Regulation 1820 (December, 27, 2002) on “Additional Measures on the Economical and Effective Utilisation Of Fuel And Energy Resources.”

⁴⁶ Government of Belarus and UNDP, Removing barriers to energy efficiency improvements in the state sector in Belarus, UNDP, Minsk, 2006.

⁴⁷ Presentation by A.V. Minenkov, for a UNDP-GEF project seminar on overcoming barriers to increased energy efficiency in state sector enterprises in December 2007.

⁴⁸ PEEREA, Switzerland: Regular Review of Energy Efficiency Policies, Energy Charter, Brussels, 2006, p. 23.

Barriers

The literature on barriers to improved energy efficiency classifies barriers in several ways. Some studies include broad categories such as policy-related, legal and regulatory, institutional, and financial barriers. Others divide barriers into supply-related and demand-related. Yet others emphasise capacity development and see barriers on three levels: institutional, organisational, and individual. Another way of looking at barriers is to start from the other end: what needs to happen in order for a public sector programme to be implemented successfully? Model programmes tend to follow a certain path. A law enacts a national strategy, an action plan provide specific guidance and funding, budget allocations fund the implementation of the programme (with sufficient funding and expertise to support oversight and uptake), and monitoring and evaluation feed back into the policy-making process.

In reality, few countries have energy efficiency policies and measures that meet all of these criteria. In reality, there are many examples where a municipal programme has achieved success in a country even when support for energy efficiency is absent at the national level. In other countries, there may be little public sector activity at any level. The difference seems to lie with two types of difficulties. There are countries where problems are related to a **lack of enabling conditions** (lack of strategy, lack of commercial financing), and there are countries with actual **barriers** (pricing, lack of control over revenues), which are fewer but more serious. Local actors can achieve energy savings in spite of a lack of enabling conditions, although the scope and magnitude of programmes may be limited. Actors in countries with barriers may find it much more difficult to do so.⁴⁹

Insufficient or Absent Policies and Targets

Policies and the supportive framework and funding for them are some of the most important enabling conditions for successful public sector programmes.

Energy efficiency becomes a stated priority→

A national policy on energy efficiency, law on energy efficiency or a section on energy efficiency in the law on energy is drafted→

The legislation is passed→

A supporting regulatory framework⁵⁰ is approved→

Funding (which may require additional legislation) is approved.

When links in this chain are missing, it is not possible to develop a comprehensive public sector programme. Countries that are struggling to implement energy efficiency policies and measures are generally missing one or more links in the chain. Specific problems found in member countries in this review, most frequently in the Balkan countries and the CIS, included the following:

⁴⁹ See “Roles of Actors” section for more discussion.

⁵⁰ Note that this framework is not limited to public entities and should include provisions for private sector involvement in the form of public-private partnerships, voluntary agreements, etc.

- Lack of priority: the government did not perceive energy efficiency to be a priority, or the government did not perceive related areas, such as environmental protection, to be a priority.
- Lack of awareness: the government does not make a connection between energy efficiency and improved energy security and economic benefits.
- Incomplete policies: energy policies underestimate the potential for demand-side improvements.
- A lack of policies addressing principal-agent (PA) problems in the many situations when the government is an overseer, an owner, or a purchaser of energy services.⁵¹
- An absence of clear policies and targets for energy efficiency.
- Insufficient political support: laws do not have enough political support to pass through parliament.
- Lack of follow-through: legislation, when approved, is not followed by implementation plans or is too ambitious for an existing energy department or office on energy efficiency to implement (the “implementation gap”).

As a CIS governmental report noted, qualitative indicators such as the existence and scope of legal frameworks, regulations, and standards for energy efficiency are “extremely important.”¹⁵

Capacity Shortages

Two types of capacity are needed to implement public sector energy efficiency programmes. At the decision-making level, there needs to be sufficient funding and expertise to manage and monitor the programme. At the level of the beneficiary, there needs to be sufficient funding and expertise to understand the programme and implement its activities.

Problems experienced in some of the countries in this review included the following:

- Lack of a designated department, either in line ministries or in branch ministries, that would handle energy efficiency.
- Insufficient staff to develop policy and manage programmes at the national level
- Insufficient support to municipalities in carrying out municipal-level initiatives.
- Lack of planning and M&E of policies and measures
- Lack of training at all levels
- Lack of equipment

⁵¹ A comprehensive treatment of PA problems is provided in IEA, *Mind the Gap: Quantifying Principal-Agent Problems in Energy Efficiency*, OECD/IEA, Paris, 2007.

Financial Barriers

“Lack of funds”, which is often reported by countries as a barrier to investing in energy efficiency, is at times a misdiagnosis. In fact, countries are already spending money on operations and maintenance, procurement, and energy for their facilities. However, it is true that the overall economic circumstances in a country can affect the availability of commercial financing, with financing limited to expensive, short-term loans. In addition, the banking sector may lack experience in lending for energy efficiency investment projects, and in some transition economies there may also be a general lack of experience with commercial lending to municipalities or municipally-owned facilities.

A shortage of investment funding can also occur because heat or water utility facilities have reached or exceeded their planned lifetime and need very large investments. In the heat sector in Russia alone, estimates of these necessary investments total USD 70 billion.⁵² In some cases, there is a vicious circle: the scarcer the financing, the longer the facilities and equipment deteriorate, and the more expensive it becomes to repair them (or there is a need for total replacement or reconstruction).

However, countries where energy is still subsidised and tariffs are not set to reflect the true cost of energy may face the most serious barrier. In such countries energy tariffs or pricing are a disincentive to investment. Fortunately, this problem is much less frequent than it used to be, with widespread phasing out of subsidies for heat and other energy.

Municipalities: a Case in Point

Municipalities and municipal utilities in certain countries may also face additional barriers to financing:

- Lack of budgetary autonomy: some municipalities lack control of their revenues, which are paid into the central government. This results in cities with little control over their budgets and little incentive to reduce operating expenses. This condition also means that municipalities may not be able to retain their savings from energy efficiency measures, effectively removing their incentive to reduce energy use.
- Financing restrictions: municipalities may be restricted by caps on the amount of debt they can assume or a ceiling on debt repayment as a percentage of municipal budgets. They may also face restrictions in how they can write off investments in energy efficiency.⁵³ This can make investments in energy efficiency more difficult to finance, particularly larger investments that will ultimately yield larger savings.

These conditions can also occur simultaneously. One example of this is in Belarus, which is currently undertaking a public sector energy efficiency programme that is designed to address the following problems: “To make autonomous decisions and address local problems, such as making energy efficiency investments, municipalities must rely mainly on resources generated locally from taxes, permits and business

⁵² Elena Douraeva, IEA, Press conference for the report *Coming in from the Cold: Improving District Heating in Transition Economies*, February 2005, slide #8.

⁵³ PROST, *Harnessing the Power of the Public Purse: Final Report from the European PROST Study on Energy Efficiency in the Public Sector*, Borg & Co. AB, Stockholm, 2003, p. 37.

activities. However national law limits the amounts local government can raise from local levies on taxes, permits and public services municipalities charge for. National laws also caps municipal deficit and budget rules require local municipalities to return unutilised funds at the end of each year. On average, municipalities are able to generate 10% of their expenditures from local sources of revenue, which gives them little autonomy in reality.⁵⁴

When municipalities do have control over their finances, however, there are still problems that can occur. Frequently, these can include the lack of capacity to plan and manage energy use. This can be a particular problem in small municipalities, where the energy manager is not a full-time paid position, but rather a person who may oversee fuel purchase – perhaps even the mayor. It is unrealistic to expect that all municipalities should be able to acquire the type of specialised knowledge necessary to handle planning, utility restructuring, contracting with the private sector, feasibility studies, and performance contracting. However, municipalities may find themselves without appropriate support during these activities. Even in larger municipalities, procurement complexities can hinder the promotion of efficient technologies.⁵⁵ At specific municipal facilities, such as schools or hospitals, operations staff faces similar need for support in planning, financing, and implementing energy efficiency measures.

⁵⁴ Government of Belarus and UNDP, Removing barriers to energy efficiency improvements in the state sector in Belarus, UNDP, Minsk, 2006, p. 15.

⁵⁵ PROST, Harnessing the Power of the Public Purse: Final Report from the European PROST Study on Energy Efficiency in the Public Sector, Borg & Co. AB, Stockholm, 2003, p. 22.

Issues and Policy Instruments

This chapter first examines coordinated energy efficiency programmes designed to capture energy savings in the public sector and then considers policies and measures in four specific areas: procurement, buildings, energy management, and capacity development. It also includes four case studies of good practice in these areas. This section is *not* intended to be a complete list of public sector energy efficiency interventions in PEEREA member countries. Multiple databases already exist with programme inventories and case studies, and a list of these databases is provided in Appendix 1.

Coordinated Energy Efficiency Programmes

Coordinated energy efficiency programmes are, as it were, the most efficient approach to promoting public sector energy efficiency. Public sector efficiency may be an explicit component of these programmes, or it may be addressed implicitly in different programme areas, such as procurement or buildings efficiency. Programmes that group policies and measures under common management can address barriers, prioritise financing, determine the relative effectiveness of measures, replicate successes, and incorporate feedback.

Trends

On a positive note, there has been movement toward coordinated energy efficiency initiatives in several countries across the groups studied during 2007:

- European Union member states submitted National Energy Efficiency Action Plans
- Croatia developed an Energy Efficiency Master Plan and launched a national public sector Energy Efficiency initiative explicitly designed to lead by example
- Turkey adopted a law on energy efficiency in February 2007 and established an Energy Efficiency Coordination Board
- Ukraine opened the National Agency of Ukraine for Efficient Use of Energy Resources, a central authority with special status
- Armenia endorsed a national strategy on energy efficiency and is in the final stages of developing an action plan

However, some regions have lagged behind in the development of coordinated programmes and governments may still underestimate the potential for the public sector to serve as a market leader and to channel existing expenditures for operations and maintenance into energy and economic savings.

Scope

For EU member states, the Directive on Energy End Use and Energy Services, which was adopted in December 2005, covers the residential, tertiary, industry and transport sectors. Article 5 of the Directive explicitly states that member states should ensure that the public sector fulfils an “exemplary role” in the context of the directive.⁵⁶ Countries with energy efficiency programmes may already be implementing public sector energy efficiency initiatives but may not be labelling them as such. For example, Denmark’s National Energy Efficiency Action Plan addresses buildings and utility management – both public sector topics – but does not mention the public sector per se. Furthermore, the public sector may be implementing integrated policies and measures that affect its energy consumption indirectly, including climate change mitigation policies and programmes, other environmental programmes, particularly clean air programmes, “ecodesign” programmes, heat laws, power sector laws, and other utility-related policies. Germany, for example, supports public sector energy efficiency through an integrated energy and climate programme endorsed by the cabinet.

One advantage of a comprehensive programme is the ability to gather data on performance. In Australia and Denmark, public reporting on energy use and energy intensity in government agencies is an important feature in national programmes. Furthermore, comprehensive programmes can monitor and evaluate different measures to fine-tune policies and interventions. For example, Sweden conducted a mid-term evaluation for its 2002 programme using external consultants, and the European Union will review its action plan for member states in 2009. However, this type of evaluation is not common, meaning that many opportunities to quantify the results of programmes and improve them are lost. And in spite of the wide variety of government programmes in operation, there is still a dearth of data on the cost-effectiveness of various interventions with a few notable exceptions.

Lessons Learned

- 1) The public sector can play a leadership role in implementing energy efficiency policies, particularly when it acts as a purchaser.
- 2) An energy efficiency law is not sufficient to ensure that public sector energy efficiency is a priority. While a law represents progress, it cannot be implemented or enforced without the underlying regulations and budgetary appropriations. Regulations and action plans should deal specifically with the public sector at the state, regional, and local level.
- 3) Governments should consider all of the indirect policies that affect energy efficiency when evaluating the impact of policies on energy efficiency.
- 4) Monitoring and evaluation are very important for fine-tuning programmes, but they are often overlooked or fail to ask the right questions about programme impact and cost-effectiveness.
- 5) The public sector is not homogeneous, and good coordination among different public bodies is needed under a designated leader, such as a state energy agency.

⁵⁶ European Commission, Directive 2006/32/EC of the European Parliament and of the Council..., EC, Brussels, 2006.

Table 4: Selected Examples of Coordinated Energy Efficiency Programmes

Group	Selected Examples
EU-15	<p><i>EU: national EE plan required</i></p> <p>Denmark: Ministries appoint EE officers and must set EE targets</p> <p>Germany: Energy agencies at the regional level</p> <p>Ireland: Energy centre to coordinate policy research, advocacy</p> <p>Sweden: Sustainable municipality programme</p> <p>UK: Energy Saving Trust; establishment of targets (predating EU targets)</p> <p>Italy: “Industry 2015” innovative projects for energy efficiencies led by Ministry for Economic Development</p>
EU-New Members	<p><i>EU: national EE plan required</i></p> <p>Czech Rep.: EFEKT programme to support EE</p> <p>Estonia: National policy programme (EE target programme)</p> <p>Hungary: Energy Efficiency Action Programme</p> <p>Slovakia: National programme to support EE; Slovak Energy Agency mandated to work on EE</p> <p>Romania: State agency with regional branches for energy efficiency. Municipalities of more than 20,000 must develop their own EE programmes.</p>
Other Europe	<p>Croatia: “Own House” public sector EE programme (based on the concept of the government putting its own house in order); programme for energy management systems in pilot municipalities and counties</p>
Other OECD	<p>Australia: Energy Efficiency in Government Operations (EEGO) programme established in 2006 focusing on buildings, appliances, and transport; includes targets and public reporting</p> <p>Japan: Action plan for greening government operations</p> <p>Switzerland: Quality label for policies, Swiss Energy federal office to coordinate all policies, Energy City (EEA) municipalities, 2001-2005 focus on public sector efficiency</p>
CIS-Mongolia	<p>Armenia: National, target-oriented energy saving programme</p> <p>Belarus: National energy saving programme, including public sector energy efficiency project</p> <p>Kazakhstan: State energy saving programme</p> <p>Russia: “Energy Efficient Russia” federal programme including specific measures for the public sector, programmes in social ministries (e.g. education), audits and development of methodologies</p> <p>Ukraine: National level energy efficiency programme, new state agency, with grant-making mechanism for budgetary organisations</p> <p>Uzbekistan: Energy Efficiency Commission, Law on Rational Use of Energy</p>

Case Study 1: SwissEnergy

Objectives

The main objective of SwissEnergy, a federal programme, is to promote energy efficiency and the use of renewable energy in Switzerland. Since its establishment in 2001, SwissEnergy has worked actively to improve energy efficiency in nearly all aspects of the public sector through voluntary measures, and the effectiveness of these measures has grown annually. SwissEnergy continues to provide support for energy efficiency at all levels of public administration through the second phase of its programme (2006-2010). In so doing, it has become a force for innovation in the Swiss economy in addition to offsetting fossil fuel use and related greenhouse gas emissions.

Partners

SFOE (The Swiss Federal Office of Energy): manages the programme.

DETEC (Department of the Environment, Transportation, Energy, and Communications): develops energy and environment action plans for national priority-setting.

Cantons: Switzerland's 26 regional governments partner with SwissEnergy in all of its programmes. The cantons are in charge of enforcing legislation, introducing and implementing building standards, and managing their own promotion programmes and advisory centres.

Municipalities: Municipalities participate in the programme through various initiatives on efficient cities and energy advisory services.

How it works

The SwissEnergy programme is notable in three respects: 1) It offers a variety of energy efficiency programmes to all levels of public administration across end-use sectors; 2) It aims to mainstream energy efficiency into government operations; and 3) It uses rigorous programme analysis and management techniques.

Variety: SwissEnergy initiatives have some of the broadest coverage of any state programme. In *procurement*, the programme has supported an interest group for environmental purchasing and has produced an on-line guide for federal procurement. In *buildings* efficiency, SwissEnergy works with efficiency labels for new and remodelled buildings (MINERGIE and MINERGIE-P). Energy performance is the sole criterion for the label.⁵⁷ SwissEnergy also works with canton-defined standards for public buildings and has been working on a model code that cantons can use. In *energy management*, the programme has analysed office equipment and also used logistical analysis to use office space more efficiently and reduce the area needed in Zurich and at the federal level. It has also targeted large government energy consumers such as the railways and postal service for cooperation on energy management. The government also provides support for transport-related programmes, and energy-efficient and low emission mobility is one of five priorities for the 2006-2010 programme. Activities

⁵⁷ 15 kW/m² electricity and 50kWh/m² heat.

include analysing travel-related energy consumption and promoting vehicle efficiency labelling and incentives for biofuels and highly-efficient vehicles in government fleets. In the *utilities* sector, SwissEnergy works with Swiss Energy for Infrastructure Systems, a programme that encourages energy efficiency in heat and power utilities and also in water, wastewater treatment, and waste disposal.

In addition, SwissEnergy runs a cross-cutting programme for local governments – Swiss Energy for Municipalities. This programme provides support and advice to municipalities that want to receive an Energy City (Energierstadt) label. The Energy City label certifies professional energy efficiency management at the municipal level. Applicants must meet certain benchmarks related to planning, organisation, and traffic/transport, and other aspects of energy management. More than 70 cities have earned this label, and the programme hopes that 200 municipalities will be certified by 2010. Other services to municipalities include information, seminars, and monitoring. Furthermore, municipalities can also participate in Energho – an association of government entities that focuses on systems optimisation and information exchange. The association offers its 175 “subscribers” a guaranteed 10% reduction in energy use in 5 years.

Mainstreaming: SwissEnergy has already integrated energy efficiency into procurement and facilities management. At present, DETEC is currently proposing an energy impact study of all new federal activity and legislation. This would provide more information on how to maximise programme impact. In addition, SwissEnergy has identified coordination with other energy and climate policy instruments as one of its five strategies.

Proactive Management: Rigorous programme management that sets SwissEnergy apart from many other state programmes. Strong features include the following:

- *Monitoring and Evaluation:* SwissEnergy compared the relative effectiveness of its programmes for the public and private sectors and was able to show that that its public sector and building efficiency programme increased in cost-effectiveness over time. The same study also noted that these programmes were more cost-effective than private-sector programmes, and that leveraged financing and jobs creation were greater in the buildings/public sector programme than in the agency’s private sector programme.
- *Documentation of benefits:* As a result of its coordination with other programmes and its close cooperation with beneficiaries, SwissEnergy has been able to document both traditional programme benefits (energy saved) and other important benefits that include reductions of greenhouse gases and criteria pollutants, job creation, and investment leveraged through its initiatives. For example, in 2006, Swiss Energy and its partners and target groups used the programme budget of CHF 42 million to leverage investments of CHF 1,085 million.

Could it be repeated?

This type of state programme is applicable to any country, particularly because Swiss Energy management has shown the ability to monitor results and to adjust activities to meet current needs. State programmes may not be able to replicate the scope of the programme, individual measures may be relevant. The proposed study on energy impact of government laws and regulations is an example of a low-cost measure that could have important policy implications and identify savings. And while public management techniques do require a

certain expertise and staff capacity, the cost of this capacity is relatively small (and in lower-income countries may be supported by technical assistance), and the evaluation techniques could be applied to programmes that are far less extensive.

Contact

Swiss Energy

<http://www.bfe.admin.ch/index.html?lang=en>

Energy Cities Website

<http://www.energiestadt.ch> (in German)

Source: Prost 2003; SwissEnergy; PEEREA 2006; SFOE.

Public Procurement

Trends

Efficient procurement has some of the largest differences among regions. EU member states and OECD countries have a high degree of participation in green procurement programmes, such as Energy Star. These efforts continue to move forward; in December, 2007, the European Commission approved a regulation that requires that EU institutions and the central authorities of member states purchase office equipment that meets or exceeds Energy Star standards.⁵⁸ While EU procurement legislation and Energy Star have driven much of the work on green procurement, there were also countries working aggressively on procurement prior to union-wide legislation and guidelines, such as the Netherlands with its national-level procurement programmes.

In the non-EU Balkans and the CIS, even countries with new public procurement laws, such as Kyrgyzstan and Tajikistan, have regulatory gaps, a need to interpret the laws more progressively, and a need to build capacity to carry out procurement according to guidelines. The general lack of “green” procurement legislation in CIS countries is all the more unfortunate because of the relatively large share of GDP in public sector spending.

Scope

Procurement is an area that could potentially yield large benefits for public administrations without the large scale of financing required in facility upgrades. When governments are procuring goods or services, they have already allotted funding for those activities. And the significant share of public procurement in overall government spending means, that there can be sizable markets for more efficient equipment and services. In Latvia, for example, 20% of government spending goes to procurement (the EU-15 average in 2003 was 16.3%). Offices upgrade IT equipment on a regular basis, leading to ongoing purchasing; one example provided in a recent ICLEI study was the city of Stuttgart, Germany (17,776 public employees in a city of 550,000), which procured 1190 desktop computers, 162 notebooks, and 1,224 monitors in 2004 *alone*.⁵⁹

⁵⁸ European Commission Memo IP/07/1943, EC, Brussels, 2007.

⁵⁹ I. Rudenauer et. al. Costs and Benefits of Green Public Procurement in Europe, ICLEI, 2007, p. 111.

Even in countries with a well-established public sector energy efficiency programme, such as Sweden, there is big potential for procurement to influence energy consumption.⁶⁰

One study of green procurement in Europe found that desktop computers meeting the Energy Star 4.0 criteria for efficiency would reduce energy consumption by 34% percent in EU countries. Life cycle cost analysis for 3 countries (Germany, Spain, and the Czech Republic) showed potential economic savings of 2-7% when purchasing these more efficient models.⁶¹

Procurement spans performance-based contracting and value-for-money assessment of goods that are purchased. For example, in EU, procurement directives allow for performance-based technical specifications.⁶² Other policies can affect procurement indirectly, such as the EU Directive on Ecodesign, which could actually be used to ban highly-inefficient products).⁶³ The Energy Services Directive requires that member states apply at least two of the eligible energy efficient public procurement measures in Annex VI of the directive. These options include purchasing or renting energy efficient buildings, requiring efficient vehicle and equipment purchasing, and using life-cycle cost in the government procurement process.⁶⁴

At the intersection of procurement and buildings efficiency, office rental is beginning to receive attention as a procurement issue, particularly in Australia, where the government leases more office space than it owns. This issue is discussed further in the following section on construction and retrofitting of public facilities.

Finally, vehicle procurement is an area that can have a significant impact on fuel consumption. The EU is currently considering legislation that harmonise the methodology for calculating the costs of fuel and pollution when considering the life cycle costs of public vehicles. This legislation would promote more energy-efficient vehicles with lower operating costs that are nonetheless at a disadvantage in the current procurement process due to higher up-front costs.⁶⁵

⁶⁰ PEEREA, In-Depth Review of Energy Efficiency Policies and Programmes: Sweden, Energy Charter, Brussels, 2006, p. 38.

⁶¹ I. Rudenauer et. al. Costs and Benefits of Green Public Procurement in Europe, ICLEI, 2007, pp. 119-120.

⁶² European Commission, Buying Green! A Handbook on Environmental Public Procurement, EC, Luxembourg, 2004, p. 17.

⁶³ Interview with Luc Werring, European Commission, July 2007.

⁶⁴ European Commission, Directive 2006/32/EC of the European Parliament and of the Council..., EC, Brussels, 2006.

⁶⁵ European Commission Memo EC/07/594, EC, Brussels, 2007.

Table 5: Procurement Case Studies for Further Reading

<i>Sustainable Procurement Case Studies</i>
<p>Buying Green! A Handbook on Environmental Public Procurement http://www.european-fair-trade-association.org/FairProcura/Doc/Brochures/Buying%20Green!.pdf <i>A handbook for member states.</i></p> <p>Costs and Benefits of Green Public Procurement in Europe Available from www.iclei.org <i>Part 3 of the report includes case studies.</i></p> <p>UK Sustainable Procurement Case Studies http://www.sustainable-development.gov.uk/what/best-practice/procurement.htm <i>Includes central, local and regional government examples</i></p>

Table 6: Selected Examples of Procurement Programmes

<i>Group</i>	<i>Selected Examples</i>
EU-15	<p><i>EU: value for money procurement policy, 3 relevant directives, Energy Star</i></p> <p>Austria: local level and national level programmes; procurement guide for public administrations</p> <p>Denmark: Electricity Saving Trust supports purchasing agreements for efficient technologies in the public sector</p> <p>France: procurement programme</p> <p>Germany: inter-ministerial group on procurement; procurement programme</p> <p>Ireland: procurement programme, labelling programme</p> <p>Netherlands: procurement at all levels</p> <p>Sweden: labelling, procurement for biofuels and hybrid vehicles</p> <p>UK: procurement (central government and some municipalities independently)</p>
EU-New Members	<p><i>EU: value for money procurement policy, 3 relevant directives, Energy Star</i></p>
Other Europe	<p>Norway: Energy Star</p> <p>Iceland: Energy Star</p> <p>Leichtenstein: Energy Star</p>
Other OECD	<p>Australia: Energy Star (Energy Allstars procurement programme)</p> <p>Australia: Green Lease Scheme for procuring rented office space</p> <p>Japan: Energy Star, efficient purchasing</p> <p>Switzerland: “A” label procurement for vehicles, pending biofuels procurement</p>
CIS-Mongolia	<p>Russia: roundtable on procurement; proposed standards initiative</p>

Lessons Learned

- 1) There is still a great deal of potential to use public procurement to obtain more efficient goods and services, but this potential is largely untapped in non-OECD Europe and in the CIS.
- 2) Even in existing “green procurement programmes,” there is potential to strengthen the ability of administrators to contract energy efficiency facilities and purchase more efficient equipment.
- 3) A successful public sector procurement programme requires both institutional capacity, such as mandatory energy-efficiency performance standards, and individual capacity, such as specialised technical assistance and trained purchasing agents.⁶⁶ Capacity needs can be substantial in larger countries; in Germany alone, there are 30,000 procurement entities.
- 4) Participation in international labelling initiatives, such as Energy Star, can be very efficient, as they simplify the procurement process both for the customers and industry.

Construction and Retrofitting of Public Facilities

The buildings sector is an excellent example of the opportunities to integrate energy efficiency into public sector investment decisions. While governments choose to build or modernise facilities for many reasons, mainstreaming energy efficiency considerations can reduce costs and improve building performance.

Trends

The most noticeable trend currently influencing construction and retrofitting are regulations that mandate the energy performance in buildings. In the past several years, for example, the EU directive on energy performance in buildings and the CIS model building code have introduced standards that can significantly reduce energy use compared to older buildings. However, in EU new member states and the CIS, less efficient prefabricated building stock is presenting challenges in meeting the more efficient standards.⁶⁷

In non-OECD European countries, energy performance standards are largely absent. Where there may national energy conservation programmes for buildings, as in Albania, there is usually an emphasis on residential buildings. However, in Croatia, a registry of public buildings and a national programme designed to improve their efficiency have been initiated.

However, at the municipal level, buildings-related measures may possibly be the most common type of energy efficiency programme. This is also the sector where the largest number of non-governmental, community-based organisations are involved.

⁶⁶ Laura Van Wie McGrory et. al., *Two Paths to Transforming Markets Through Public Sector Energy Efficiency: Top Down Versus Bottom Up*, ACEEE, Washington, DC, 2005, p. 1.

⁶⁷ Royal Institution of Chartered Surveyors (RICS), *Towards an Energy-Efficient Building Stock...*, RICS, 2007.

Scope

Public buildings that may be included in energy efficiency measures include offices, schools and hospitals, and public housing. In some projects, such as the Kyiv Institutional Energy Efficiency programme in Ukraine and the UNDP-GEF municipal energy efficiency project in Bulgaria, the project will select a variety of public buildings in a single municipality for retrofits. In other cases, programmes focus on a single type of building, such as school buildings. These projects may be limited to schools within a single city, such as programmes in Vienna, Austria, and Modena, Italy. Or they may be national in scope, such as the case study below from Russia or the Carbon-Neutral secondary schools initiative in the UK.

When considering the energy performance of buildings, it is inevitable that the topic will overlap with that of operations and maintenance. For example, audits of public buildings may identify housekeeping measures that can reduce energy use. The installation of metering and controls in buildings, including public housing stock, is another example of a project that involves the energy performance and operations and maintenance.

The buildings sector also overlaps with labelling and procurement. Several countries require energy labels describing consumption and relative efficiency on certain types of buildings. In Denmark, for example, these labels are required for rental buildings as well as for those being sold. In Australia, the national Energy Efficiency in Government Operations Policy (EEGO) features a Green Lease requirement for all office space greater than 2000 m² rented by government agencies. Leases must include provisions for separate half-hourly energy metering, buildings must meet a minimum buildings efficiency standard, and parties are required to establish a Building Management Committee to review the metering data.⁶⁸ Because the government is a major tenant in Australia, these requirements are influencing the commercial property market as a whole.

Lessons Learned

- 1) Performance-based codes and energy efficient buildings legislation can generate potential savings in all of the regions studied, particularly where building stock may be older and where the heating season is long.
- 2) Metering and controls are a key starting point for efficient buildings management whether the government is an owner or a tenant. The absence of metering, and subsequent lack of a baseline, seriously hinders performance-related interventions.
- 3) Low-cost measures such as siting and passive design features can reduce energy usage in new buildings for the same or less investment than in more energy-intensive buildings. Despite this, officials may still perceive low-energy buildings as a “luxury” that requires expensive technologies.
- 4) Energy efficient municipal buildings can influence techniques and marketing in the commercial real estate market either through codes or through green lease schemes.
- 5) Even in the absence of national initiatives, local governments and non-governmental organisations can use building retrofits and efficient construction techniques to demonstrate energy efficiency measures in a very visible way.

⁶⁸ More information is available in the government’s EEGO policy available at: [<http://www.environment.gov.au/settlements/government/eego/publications/pubs/eego-policy.pdf>].

Table 7: Selected Examples of Policies and Measures in the Buildings Sector

Group	Selected Examples
EU-15	<p><i>EU: Directive on the Energy Performance of Buildings</i></p> <p>Austria: Vienna schools project; EE universities project; third-party financing for buildings measures</p> <p>Finland: Buildings efficiency programme</p> <p>France: Buildings efficiency programme; Local energy management agencies</p> <p>Germany: Schools efficiency programme; Benchmarking performance of municipal buildings in Frankfurt am Main</p> <p>Greece: Buildings programme</p> <p>Portugal: Energy labelling for buildings</p> <p>Ireland: Building management systems</p> <p>Italy: Municipal school incentive split (Modena, Balzano)</p> <p>Luxembourg: Municipal buildings efficiency programme</p> <p>Sweden: Investment programme for public buildings, “Energy Smart” buildings programme</p> <p>UK: Carbon-neutral secondary schools</p>
EU-New Members	<p><i>EU: Directive on the Energy Performance of Buildings</i></p> <p>Czech Rep: schools, health care facilities, and municipal DH eligible for EPC project support; low-energy schools</p> <p>Estonia: metering, building codes</p> <p>Lithuania: Education Improvement Project retrofits in basic schools.</p> <p>Poland: National Environmental Fund loans and grants</p> <p>Poland and Romania: EU-funded energy audits in schools</p> <p>Romania: energy audits and certificates for buildings</p> <p>Slovakia: Structural funds for improved insulation and modernisation of building services; Energy Efficiency Fund supports buildings labelling</p>
Other Europe	<p>Croatia: Manual for EE in public buildings and national registry of buildings; Energy Brigades</p> <p>FYRoM: Programme in public buildings; Energy Brigades</p>
Other OECD	<p>Australia: Green Lease Scheme</p> <p>Japan: buildings management</p> <p>Switzerland: MINERGIE buildings labelling programme</p>
CIS-Mongolia	<p><i>CIS: Performance-based, efficient building code legislation</i></p> <p>Armenia: Strategy to adapt the CIS code to national conditions</p> <p>Belarus: Social Infrastructure Retrofitting Project (supported by the World Bank) focusing on education and healthcare facilities</p> <p>Kazakhstan: Energy performance-based building codes</p> <p>Russia: Schools efficiency programme, model building codes, ministry building audits</p> <p>Ukraine: Kyiv public buildings energy efficiency project; Energy Brigades</p>

Case Study 2: Russian Educational Sector Project

Objectives

The overall objective of the project, which started in October 2002, was “to contribute to the abatement of greenhouse gas emissions by improving the energy efficiency of Russian educational facilities.” Specifically, the project aimed to reduce energy consumption by about 20 to 25 percent in participating schools in Northwest Russia.

The immediate objective of the project was to develop replicable models for low-cost energy efficiency measures in both municipal secondary schools and Federal educational buildings (including universities, technical and vocational schools). Supporting activities included curriculum development, training and capacity building, demonstration projects, and the development and testing of financial mechanisms for realising energy efficiency improvements in schools.

Partners

The Government of Russia: The *Ministry of Education* served as a project focal point, and it became involved with the project as a means of building on its “Energy Saving in the Ministry of Education” programme (1999-2004), which also included 27 energy efficiency centres at Russian universities and matching contributions from Russian regional governments. Local governments of the pilot territories also provided co-financing.

Global Environmental Facility: The GEF provided co-financing for capacity development activities and support for the development of financial mechanisms under the Energy Efficiency Operational Programme (OP5) in its Climate Change focal area. *UNDP* served as the GEF implementing agency for the project.

NEFCO provided co-financing for project activities.

Norwegian Ministry of Foreign Affairs provided co-financing and its expertise in regional cooperation in Northwest Russia, building on a Norwegian-Russian educational programme on energy efficiency in the building sector

Norwegian Society for the Conservation of Nature: This organisation contributed the SPARE curriculum for energy efficiency in schools. Local NGOs were also involved in participating regions.

How it worked

The project essentially worked in two parts. First, it supported an education programme on energy efficiency in secondary schools targeting grade 8, mainly addressing awareness barriers at school and household levels. Both curriculum development and training for educators was successful: several universities launched diploma and certificate programmes in energy efficiency. Schools with the pilot curriculum reduced their utility bills by an average of approximately 7%. Savings also extended to the homes of the pupils. For example, families of the pupils from pilot schools in Karelia reduced energy consumption by 3-15 kWh per week, and the share of families using energy-saving techniques and equipment reached 50%.

Second, the project demonstrated energy-saving projects and models for financing them in participating schools and universities. Under the demonstration activities, the project completed 8 school retrofits and 3 university retrofits, with EUR184,000 from GEF, €221,900 from NEFCO, €528,500 from the Ministry of Education, and €163,200 from regional administrations.⁶⁹ All investments resulted in energy savings of over 30%.

For the financial demonstration, the project established territorial “revolving funds” to finance these energy efficiency measures in schools. Given institutional constraints in surrounding establishing a revolving fund for schools that would issue loans and collect payments, the demonstration funds served instead as multi-year savings accounts from which schools could draw down funds for improvements. These funds were the only way in which municipalities could maintain budget allocations for energy at pre-investment levels for a period following the investment and keep the savings the difference received in a sub-account (“fund”) for future use in additional investments in efficiency. Results of all of the activities were distributed across Russia at the *okrug* (group of regions) level.

Could it be repeated?

The Russian programme managed to fulfil its objectives despite the large number of stakeholders and broad geographic region thanks to clear terms of reference. Several elements of the project could be replicated. First, a ministry-wide initiative to reduce energy consumption in schools proved to be a good focus for project activities, and it allowed for the dissemination of the project results and practices across the country. Second, the curriculum development was quite effective in building capacity and in influencing behaviour of both the schools and the students’ households. The SPARE project lends itself to use in other countries.

The “financial mechanisms” tested in the project show less potential for replication, but they provided some very important lessons for countries considering how best to finance energy efficiency improvements in schools or other municipal buildings. First, while the Russian Budgetary Code allows for targeting savings for re-investment in energy efficiency, there are still few incentives to offset the risks and uncertainties that these projects may bring. More pro-active policy could mitigate risk or strengthen incentives. Second, the concept of a true revolving fund for budgetary entities may not work in countries without the legal and institutional precedents. Other financing models or investments with a one-year payback may be easier to replicate in these circumstances.

Contact

Ministry of Education: Energy Efficiency Programme Website (in Russian)

<http://www.energy-efficiency.ru/>

International SPARE Project Website

<http://spare.net.ru/inteng/>

UNDP Russia Energy-Environment Division

<http://www.undp.ru/index.phtml?iso=RU&lid=1&cmd=programmes4>

Source: UNDP-GEF project documentation; Ballard-Tremeer 2006.

⁶⁹ Total project size was approximately USD 2.7 million, with USD 1 million from the GEF and USD 1.7 million from other sources.

Energy Management (Operations and Maintenance)

While energy efficiency measures in buildings can be mainstreamed into existing expenditures, energy management typically involves audits to identify potential savings, investment in measures, and monitoring and benchmarking energy savings (and in some cases re-investing economic savings into further measures). There is also some overlap with measures involving buildings and procurement, particularly where lighting is involved.

Trends

One important trend in PEEREA member countries has been an increase in the support for energy audits in public sector facilities. This support has expanded in recent years from limited grant support for energy audits to programmes that provide loans or cost-sharing for audits or – in several countries – policies that mandate energy audits in public facilities.

All levels of government are facing increasingly complex forms of financing for energy efficiency projects. While there are energy efficiency measures that can provide short payback times (i.e., within a single year), projects with large savings may require a long investment period, increasing risk for lenders and complicating public budgeting.

Another trend has been an increase in the role of the private sector in public sector energy management. In the public administration sphere, this involvement includes energy service companies and public-private holding companies to manage energy consumption in offices buildings. In services of general interest, these types of companies may manage energy efficiency in non-commercial facilities, or a private company may own or lease a utility and be responsible for energy management in all of its operations. The variety of legal and regulatory arrangements that now exists has made decision-making more complex, particularly in smaller government bodies where energy decision-makers may not be familiar with all options or have long-term experience in working with the private sector on an ongoing basis. In smaller municipalities, for example, the “energy manager” may simply be purchasing fuel and may have a relationship with vendors that is limited to procuring hardware. Opportunities to bundle projects within a municipality or with other municipalities may go overlooked.

While it does not involve facilities per se, the transport sector has continued to comprise a growing source of energy consumption (and carbon intensity) over the past decade. At the same time, there have been few policies and measures that can be considered strong successes in the area of improving vehicle fleet efficiency and curbing the shift away from mass transport to passenger cars, particularly in the new EU member states, the Balkans, and the CIS.

Scope

➤ ***Energy Audits and Facilities Management***

Support for auditing and energy efficiency measures in public facilities can take several forms. In Russia, the central government has paid directly for audits in several ministries,

and individual ministries have also paid for audits in their own facilities. In Belarus, the central government is in the process of establishing a revolving fund that will be co-financing energy efficiency measures in public facilities. In Hungary, the central government has provided cost-sharing for audits and feasibility studies in municipalities. In the Czech Republic, all facilities over a certain size, both public and private, are required to undertake energy audits, and some of them may receive financial assistance.

Cities such as Vienna have undertaken their own programmes to reduce energy consumption. In Germany, municipalities have paid for audits and efficiency measures using a special fund for energy management within the city's own budget (see the Performance Contracts section of this paper). In Finland and certain German cities, local governments have established management companies for public buildings that assume the responsibility for energy management.

➤ **Public Lighting**

While public lighting may be provided by a utility, it is not a commercial service, and it is funded entirely by public budgets. As noted in the discussion above, public lighting can be a significant source of energy savings in municipalities and can provide multiple external benefits.

Efficient public lighting can be encouraged in several ways. First, procurement programmes that emphasise life-cycle costs can promote the use of efficient street lighting. Second, public lighting may be covered in comprehensive municipal energy audits. In one study of public lighting in municipalities in Spain, the authors concluded that the form of ownership of the public lighting utility did not have a statistically significant impact on the efficiency levels.⁷⁰

➤ **Transport**

In the transport sector, there are two types of measures: those having to do with vehicle fleets and those having to do with modal shifts (i.e., promoting mass transit). General fuel efficiency standards and in some cases motor vehicle taxes may influence government purchasing decisions. In a few cases, governments have policies that encourage the use of biofuels and hybrid vehicles. For example, in Sweden there are public procurement requirements that promote these vehicles.⁷¹ In the Czech Republic, there are not specific requirements on biofuels, but there are state subsidies for municipalities that purchase natural gas-powered buses. While most countries do not have explicit policies and measures on improving vehicle fleet efficiency, all have motor vehicle taxes that could be used to influence purchasing behaviour. Existing procurement legislation could also form the basis for more efficient vehicle fleets with adequate training and awareness for purchasing agents.

⁷⁰ Prado Lorenzo and Sanchez, "Efficiency Evaluation in Municipal Services: An Application to the Street Lighting Service in Spain," in *Journal of Productivity Analysis* Vol. 27 No. 3 (June 2007), pp. 149-162.

⁷¹ PEEREA, *In-Depth Review of Energy Efficiency Policies and Programmes: Sweden*, Energy Charter, Brussels, 2006, p. 38.

Policies involving modal substitution and promoting mass transport are an important potential component of energy management in areas where the local or regional government owns, operates, or regulates mass transport. Finding business models and internalising the costs of private transportation has been a complex, ongoing process. Individual initiatives have included free transport for civil servants commuting to and from work by train in Belgium and congestion taxes imposed in London and Stockholm on private cars travelling in the city centre.

Lessons Learned

- 1) National policies and measures that require and/or fund audits can create a strong “market pull” for energy service companies or contractors providing energy management services. They may also provide the necessary motivation for larger cities to develop “in-house” expertise in auditing and energy management.
- 2) In auditing and energy management programmes, countries need to consider capacity needs. For example, accreditation programmes can certify auditors and ensure that government institutions end up with high-quality audits that will allow them to make investment decisions. In addition, facilities or local administrations may need access to support, as certain sectors may require knowledge that is fairly specialised; i.e., street lighting or transport.
- 3) More research is needed on transport because of the growth in energy consumption and because of its complexity.

Table 7: Selected Examples of Energy Management Programmes

<i>Group</i>	<i>Selected Examples</i>
EU-15	<p>EU: Greenlight programme (public and private)</p> <p>Austria: In-house mobility management programme at EWA</p> <p>Belgium: Modal shift programme for govt. employees</p> <p>Germany : EE programme for military facilities</p> <p>Finland: Audit programme</p> <p>France: Energy management programme; vehicle fleet programme; water management programme</p> <p>Germany: Public Internal Performance Contracting in German cities (PICO, or the “Stuttgart model”); Berlin/Aachen traffic light contracting</p> <p>Greece: Training energy auditors in the building sector</p> <p>Italy: Energy management for public institutions</p> <p>Spain: Street lighting programme</p>
EU-New Members	<p>Czech Republic: Certification for energy auditors; mandatory auditing programme that includes large municipalities</p> <p>Estonia: Boiler efficiency programme, transport development plan</p> <p>Hungary: EE credit guarantee, energy auditor certificate revolving fund for cost-sharing energy audits in municipalities</p> <p>Latvia: Improvement of public transport system in Riga</p> <p>Poland: Thermal Modernisation Fund</p> <p>Romania: Railroad and metro efficiency programmes</p> <p>Slovakia: Minimum standards for public lighting</p>
Other Europe	<p>Croatia: Development of ESCO model of EE in public healthcare facilities</p> <p>FYRoM: Programme in street lighting</p>
Other OECD	<p>Australia: Defence Bases Metering, Monitoring, and Management Programme</p> <p>Switzerland: Co-financing, climate investment programmes</p>
CIS-Mongolia	<p>Kazakhstan: Street lighting efficiency</p> <p>Russia: Ministry of Education efficiency programme</p> <p>Ukraine: Programme to improve efficiency in the Kyiv metro</p> <p>Ukraine: Kyiv Institutional Buildings Project</p>

Utility Management

Trends

Utility management across member countries shares three common trends: 1) an increasing complexity of management arrangements; 2) an increasing role for the private sector; and 3) a search for the appropriate incentives for utilities to reduce

energy consumption. All of these trends require more, specialised skills for public officials managing and overseeing the utility sector.

At the same time, these trends play out differently in different regions. In the EU 15, policy-makers are grappling with how to maintain incentives for utilities not to abandon demand-side management of energy in the face of increasing liberalisation of energy markets.

EU new member states have had their spending in the utilities sector over the past several years influenced by the pre-accession process, such as in large amounts of spending in the water sector to comply with the directive on water treatment.

In the non-OECD Balkans, there has been some investment in the form of reconstruction efforts, but the sector is not well developed and may lack sufficient clarity in issues of regulation and jurisdiction.

In the CIS, there is increasing privatisation and restructuring of utilities in various public-private arrangements, but restructuring has not been enough to offset an overall lack of investment and some persistent non-payments problems in countries where economies are performing below the regional average.

Scope

Management has been an important component of restructuring, and it directly involves the municipality in issues such as integrated resources planning. Several countries, Hungary among them, have provided funds or technical support for their municipalities to develop energy plans. This can be particularly important when utility ownership has devolved to a municipality, as in Romania, where 19 co-generation plants have been transferred to municipalities from the national utility in the past 5 years.⁷²

In the area of financing, heating companies face very different issues depending on the economic environment in which they are operating. The overall economic situation is more important than the form of ownership. In higher income countries or in wealthy municipalities, governments may finance efficiency improvements through commercial financing, whereas in lower income countries financing is primarily available through a combination of soft loans and technical assistance.

Policies in the heating sector have focused primarily on commercialisation, such as tariff reform, privatisation, and market liberalisation. Specific measures in the heating sector have focused on restructuring (as a necessary precursor to privatisation), management, and financing. Even when investment funds are limited, however, heat sector projects have identified means of financing energy efficiency improvements. First, cities have identified energy efficiency projects with a payback period of less than one year in order to use money from the budget line for operations and maintenance for these measures. The Russian city of Chelyabinsk used funds that were targeted as subsidies to the heating company and shifted them into energy efficiency projects. In Rivne, Ukraine, the local government restructured the heating company as a public-

⁷² PEEREA, Romania: Regular Review of Energy Efficiency Policies, Energy Charter, Brussels, 2006, p. 1.

private partnership and then established a municipal energy services company (ESCO) to undertake energy efficiency measures in the city's heating network. In FYRoM, an IBRD project is creating a utility-based ESCO with support from the Global Environment Facility. Financing elements of utility projects are discussed further in the section on financing.

While many municipalities have hoped that privatisation would attract the necessary capital to make improvements in their heating systems, reality has been more complicated. In lower-income countries, the shift away from subsidies has not always been accompanied by targeted support for low-income households, leading to the kinds of affordability problems and non-payments that followed electric utility privatisation in Kyrgyzstan. In other cases, there can be difficulties with partial privatisation, where a more profitable power company is privatised and then faced with municipal heat company as a customer in arrears. In Chisinau, Moldova, the new foreign owners of the power company (Union Fenosa) found themselves faced with two major customers – the heating company and the city's public lighting concern unable to make payments. In another instance, the foreign owners of a heat network in Karaganda, Kazakhstan, purchased the power utility to gain leverage with non-paying customers, who could be disconnected from the latter.

Water utility programmes have included training for managers on energy efficiency topics and large-scale investments to audit facilities, detect leaks, and undertake improvements. Energy efficiency programmes in the waste collection and disposal sector have received relatively little attention, although there has been some discussion of the potential to increase waste heat recovery from incinerators.⁷³

Lessons Learned

- 1) Policy-makers must address the potential for conflicting incentives for utilities (i.e., selling more energy to make more money). There is a need to develop the concept of contracting for services (light or comfort) versus commodities (power or heat).
- 2) Effective utility oversight requires planning at the municipal level. There is a clear role for a municipality as a strategic planner regardless of the ownership structure of municipal utilities.
- 3) Municipalities should be aware of and able to capture the potential for savings in water utilities and in co-generation, particularly in the CIS.
- 4) Utility management requires that municipalities have access to expertise in the legal and financial aspects of working with the private sector.

⁷³ Laurent Bontoux, *The Incineration of Waste in Europe: Issues and Perspectives*, ECSE-EEC-EAEC, Brussels, 1999, p. 4.

Table 8: Selected Examples of Utility Management Programmes

Group	Selected Examples
EU-15	<p><i>EU: CHP directive</i></p> <p>Germany: Saarbrücken “Energy for the Future” initiative; CHP</p>
EU-New Members	<p><i>EU: CHP directive</i></p> <p>Hungary: EE credit guarantee</p> <p>Romania: Divesiture of CHPs to municipality; regulate duties of heat supply companies to reduce thermal losses</p> <p>Romania: Regional SAVE agencies in 3 municipalities work to find solutions for rehabilitation of urban utilities</p>
Other Europe	<p>BiH: Training for managers of water utilities (NGO-led)</p>
Other OECD	<p>Norway: Programme to increase use of waste heat and heat pumps in district heating systems</p> <p>Switzerland: Proposed energy efficiency quotas and tariffs for utilities; Swiss Energy for Infrastructure Systems programme</p>
CIS-Mongolia	<p>Kyrgyzstan: IBRD sectoral loan with utility reform component</p> <p>Mongolia: IBRD loan for district heating energy efficiency programme in two cities</p> <p>Russia: Municipal “subsidy-shift” programme</p> <p>Ukraine: EBRD lending and non-profit initiatives to improve efficiency in water utilities</p>

Case Study 3: Sydney Water

Objectives

Sydney Water is a utility that provides drinking water, recycled water, and wastewater services to more than four million people in the city of Sydney, Australia, and surrounding areas. The utility has three stated goals: 1) To protect public health; 2) To protect the environment; and 3) To be a successful business. The utility is using an array of energy and water efficiency measures to support its environmental and commercial goals. Currently, greater Sydney is using the same amount of water as it did in 1974 even though its population has grown by more than one million inhabitants.

Partners

Sydney Water: A corporatised utility owned by the New South Wales Government. The utility has more than 3,000 employees, more than AUD 20 billion in assets and capital expenditures of more than AUD 1 billion planned in 2007-08.

IPART: The independent economic regulator in the state of New South Wales. IPART oversees regulation of water, gas, power, and public transport utilities. One of its tasks is to regulate the maximum prices charged by Sydney Water. Since 2003, it has also monitored power consumption and benchmarked performance at Sydney Water as the

administrator of the mandatory greenhouse emissions trading scheme (GGAS) for New South Wales.

Sydney Water Board: The board oversaw the water utility until 1995, when it was corporatised.

Private sector: Three consortia signed buy-own-operate (BOO) contracts with the water board in the early 1990s for sewage treatment plants: Australia Water Systems, North-West Transfield, and Wyuna Water.

How it worked

Sydney Water is one of the largest energy users in the state of New South Wales, and it uses almost one per cent of all energy consumed in the state. The utility has a stated goal of becoming “carbon neutral” in terms of energy consumption by 2020. Reduced demand and energy efficiency are components in its strategy to achieve carbon neutrality. Another strategy is to develop co-generation in wastewater treatment plants; the utility has two such plants and six more are under development.

Sydney Water is required to prepare Energy Savings Action Plans (ESAPs). These plans are already in place for four sewage treatment plants and two pumping stations. Energy management measures include installing power factor correction across sites, load shifting, and the use of standby generation to feed into the power grid when levels are critical. The utility has also been able to reduce energy demand by reducing water losses – it has a highly advanced leak management programme and spends AUD 100 million to stop leaks, resulting in daily savings of more than 56 million liters.

Sydney Water offers a rebate for schools installing rainwater tanks, and they require an audit in order to qualify for the rebate. They have also produced a DVD for schools on developing a school water-saving action plan, and they also offer other curriculum support materials to schools related to water conservation.

Sydney Water also has a five-year environmental plan, and it must develop and share detailed demand estimates with the privately-operated water treatment plants in the system as specified in contracts with them.

Could it be repeated?

The trends of “corporatisation” of utilities and the privatisation of some services are increasingly common. Several lessons from the Sydney Water experience could be relevant for other cities and regions. First, many of the measures undertaken to manage energy at Sydney Water stem from awareness on the part of the government that utilities are also major energy consumers. Second, an active regulator (in this case IPART) can stimulate energy efficient behaviour and ensure that energy efficiency is a priority for the utility by requiring audits and planning and by monitoring consumption and performance closely. Third, privatisation arrangements within a utility system can present the opportunity to negotiate energy and environmental performance, but they require careful oversight in order to protect the public interest.⁷⁴ Fourth, policies and measures within the utility (Energy Savings Action Plans, rebates and outreach for schools) would be relevant to most other water utilities. Finally, climate change

⁷⁴ Sydney Water received scrutiny after a series of “boil-water alerts” in the city in 1998 due to the detection of harmful micro-organisms in water treated at the privately-owned plants, leading to a discussion of oversight.

mitigation programmes can provide an impetus for energy efficiency investments. In this case, the GGAS state-level trading programme led Sydney Water to identify energy-related mitigation projects, some of which are already being implemented under the programme.

Contacts

Sydney Water website

<http://www.sydneywater.com.au/>

IPART website

<http://www.ipart.nsw.gov.au/welcome.asp>

Sources: Sydney Water; IPART; Chapman and Cuthbertson 1999.

Capacity Development

Any energy efficiency policy or measure implies a certain need for capacity. At the organisational level, there need to be appropriate organisations that can implement these policies and programmes at all levels of government, and they need a sufficient number of professionals to staff them. At the individual level, professionals require the necessary skills and time to put the policies and measures into practice. This section discusses programmes or programme components designed to develop the capacity to implement public sector energy efficiency policies and measures.

Trends

A number of capacity development programmes are part of a comprehensive programme of policies and measures. In other cases, they may proceed (and succeed) in the absence of a national programme or legal and regulatory framework. They are found in every type of public sector energy efficiency initiative, but they are most common in projects focusing on housing, institutional buildings, and utilities.

Often, capacity development projects have arisen out of the desire to replicate a successful energy efficiency programme in a new location. Other times they have arisen in response to a gap in a programme; for example, a financing mechanism is underutilised, an energy efficiency fund is not receiving projects that are sufficiently well-developed, or a programme is experiencing implementation delays. While there is now a huge amount of information related to public sector energy efficiency, there is still a need for it across governments.

While these programmes have at times been considered “soft” assistance (as opposed to equipment or direct investment), capacity programmes have proven to be some of the most cost-effective, particularly when they are designed to help participants identify and leverage financing for energy efficiency projects. A common element of capacity development projects across PEEREA member countries has been increasing capacity to identify and leverage financing for energy efficiency using traditional and more recent investment mechanisms.

Scope

Capacity development measures address the ability of the government to plan, prioritise, procure, manage, monitor, and evaluate its work regarding energy efficiency.

Capacity development measures that have been used in PEEREA member countries at all levels of government include training, awareness raising, development and dissemination of materials, joint research initiatives, exchanges and study tours, and twinning. In fact, most energy efficiency programmes include at least one element of capacity development.

In countries with comprehensive energy efficiency programmes, national or regional energy agencies can provide training and information to develop capacity among local governments and other energy end-users. In Slovakia, for example, E², an educational programme, is targeted at public administration. At the same time, they may have specialised skills or resources (ranging from the ability to do specialised energy audits to a library of publications) that these end-users can draw upon when necessary. Energy agencies and non-governmental energy centres work with municipalities in countries including Austria, Bulgaria, the Czech Republic, Georgia, Hungary, Romania, Russia, Sweden, Switzerland, and Ukraine. In Iceland, the energy agency Orkusetur focuses on households and on industry, but there are planning materials for municipalities. Support for municipalities can be especially important in smaller towns, where a regional energy agency can assist with energy planning and procurement without having to develop this expertise in each locality. Both national governments and organisations such as the EU support the development of regional energy agencies.

Action plans form an important step in determining what type of capacity will be needed in a given country. At the national level, the national energy efficiency action plans (NEEAPs) required of EU member states are focusing discussion on how to allocate resources. At the regional and local level, energy plans are also important in this respect.

Many national initiatives related to technology transfer have included capacity development activities. Programmes promoting metering and controls, efficient boilers, co-generation, efficient motors, and efficient pumps have included training, the establishment of information clearinghouses, and study tours. While the capacity to monitor and evaluate public sector energy efficiency initiatives is of key importance to their success, this area is perhaps the least common focus of capacity development measures.

Lessons Learned

- 1) When elected officials or their political appointees leave office, their successors may not be familiar with projects or even the issues the projects cover. Capacity development plans should include contingencies such as refresher training for new appointees or leaders and minimise risks by familiarising many people in relevant agencies about the project and its benefits.
- 2) Networks are most successful when used broadly and early on in capacity development projects. Network participants should also be eligible for specialised training rather than merely receiving information about the project's activities.

Countries should be aware of the large number of existing networks for municipalities as a good basis for increasing knowledge.

- 3) Public sector measures must include sufficient time and funding for many different types of capacity development and not assume that “local” means “simple.” While local decision-makers in smaller municipalities or institutions may not have the ability to conduct a tendering process, assess investment proposals, and negotiate contractual terms with the private sector, they should know how to access independent expertise in these fields.

Table 9: Selected Examples of Knowledge-Based Initiatives

Group	Selected Examples
EU-15	<p><i>EU: Managenergy; Intelligent Energy Europe</i></p> <p>Multi-country: International professional associations, municipal alliances</p> <p>France: Information and training through local energy management agencies</p> <p>Germany: Ministry of Defence programme to reduce energy consumption that uses soldiers as change agents and educators.</p> <p>Italy: Federation of Energy Managers (public and private)</p> <p>Sweden: Capacity development for municipalities in energy efficiency</p>
EU-New Members	<p><i>EU: Managenergy, Intelligent Energy Europe</i></p> <p>Bulgaria: Municipal EE project (training, workshops)</p> <p>Czech Republic: Certification of energy auditors; continuing education for architects on low-energy buildings</p> <p>Hungary: One-stop shop for municipalities, access to energy advisory services, training, certification of auditors</p> <p>Slovakia: Concept on EE includes raising qualifications of EE personnel, Slovak Energy Agency includes training, info; E² educational programme for public administration</p> <p>Slovenia: Support for municipal energy plans</p>
Other Europe	<p>BiH: Municipal Energy Efficiency Committee with 25 municipalities for training and capacity development</p> <p>FYRoM: Certification of auditors, capacity building</p>
Other OECD	<p>Iceland: Planning materials for municipalities</p> <p>Switzerland: Training and re-training courses in energy efficiency at universities, technical schools</p>
CIS-Mongolia	<p>Belarus: Training for local authorities, partnering with municipalities, support for other partners (railways)</p> <p>Kazakhstan: Information/educational component of state energy savings programme</p> <p>Moldova: Training courses for 7 municipalities</p> <p>Russia: Energy efficiency centres in education institutions</p> <p>Uzbekistan: Institutional capacity development as part of national energy efficiency strategy</p>

Case Study 4: Two Municipal Energy Management Networks

Objectives

Two networks – one national and one international – were established to improve energy efficiency in municipalities. EcoEnergy was established as “an energy efficiency network for Bulgarian municipalities.” Energie-Cités is an association of European local authorities for the promotion of local sustainable energy policies.

Partners

Eneffect: This Bulgarian NGO developed and implemented the project that established the EcoEnergy network in the mid-1990s. It registered the EcoEnergy association as a separate legal entity in 2004.

EcoEnergy: The network now contains more than 150 members, covering 70% of the Bulgarian population.

Energie-Cités: This association was founded in 1990 in France and has over 150 members in 24 countries, representing more than 500 towns and cities. The association has a board of directors comprised of eleven cities.

How it worked

The **EcoEnergy network** in Bulgaria was originally founded as part of the capacity development component of a technical assistance project to improve municipal energy efficiency that was co-financed by the Global Environment Facility (GEF) and the US Agency for International Development (USAID).⁷⁵ The project was managed by the United Nations Development Programme (UNDP) and implemented by Eneffect, a Bulgarian NGO. The network was launched early in the project with 30 participating municipalities to provide training in energy efficiency to municipal officials and to replicate good practices in the demonstration municipality of Gabrovo.

The successes from the training and the network significantly exceeded the project objectives. As of 2004, when the network became an independent entity, 18 municipalities in the network had funded and completed public lighting project. One of these, the city of Varna, financed its project with a municipal bond, a technique introduced in a network training course. 10 municipalities also launched efficiency projects in buildings based on the experiences in Gabrovo and other European cities covered in training courses. 12 EcoEnergy municipalities also implemented other types of efficiency projects (e.g., in schools and hospitals), and 17 municipalities developed energy efficiency programmes. In 2004 a tripartite agreement was signed between the EcoEnergy Network, the National Association of Municipalities in Bulgaria, and the State Energy Efficiency Agency for cooperation and joint activities.

Energie-Cités was founded with the awareness that 75% of all energy consumption in Europe occurs in urban areas, making municipalities an important stakeholder in energy management. The association offers an annual membership to cities on a sliding fee scale that depends on the size of the municipality and whether it is an EU member. Annual dues range from €500 to €1500. Members receive access to the network of

⁷⁵ The project also built upon the United Nations Economic Commission for Europe (UNECE) Energy Efficiency Demonstration Zones initiative.

cities, many materials and publications, and invitations to events related to local sustainable energy. The association's objectives include assisting municipalities with local energy strategies, transferring know-how, and influencing EU policy in the areas of energy, environment, and urban development. The association also has the objective of organising joint projects, and it serves as a project partner in numerous European sustainable energy projects ranging from BELIEF (promoting the Sustainable Energy Communities concept) and European Mobility Week (promoting sustainable transport) to the Display™ European Campaign, which encourages municipalities to publicly display the energy, water and green house gas emission performance of their municipal buildings.

The two associations have several common elements:

- Training
- Information sharing and networking
- Project replication
- Project implementation and research⁷⁶
- Lobbying

Could it be repeated?

Networks of municipal officials have numerous benefits. The relationships built through training and network membership support the transfer of energy-efficiency know-how and provide expertise that might not otherwise be available to municipalities. The EcoEnergy network demonstrates that a project network to disseminate the results of a technical assistance project can be effective if the network is started early in the project and if sufficient time and funding is available for training and network building (as opposed to establishing a “network” at the end of the project that merely serves as a distribution list for project results). The experience of Energie-Cités shows that networks as a whole can be used to implement projects and conduct research rather than merely serving as a channel for information dissemination. National networks may be able to share more specific experience given the common legal and regulatory environment shared by their members. International networks, on the other hand, may generate more varied experiences that can be applied in new settings. Both types of networks can be effective instruments for lobbying governments. The only caveat to the applicability of networks is whether an existing network might be most effective for involving municipalities rather than “re-inventing the wheel” with a new network.

Contact

Eneffect

www.eneffect.bg

Ecoenergy network website

<http://www.ecoenergybul.com/>

Energie-Cités website

www.energiecites.eu

Sources: UNDP, GEF, Eneffect, Energy Cités

⁷⁶ In fact, Energie-Cités and Eneffect have served as partners on a programme promoting Class-A standard municipal buildings.

Roles of major actors

The diversity of energy efficiency policies and measures is matched by the diversity of actors in public sector energy efficiency programmes. They include actors at all levels of government, the private sector, and civil society.

Intergovernmental Actors

The European Union is probably the most significant actor at the intergovernmental level in terms of public sector energy efficiency among the countries in this study. First, it can influence policy and regulatory frameworks through relevant directives, both in energy end-use efficiency and energy use in buildings and in areas such as combined heat and power and ecodesign. Second, it can leverage financing by influencing spending priorities and by providing matching funds energy efficiency programmes and projects. These projects include support for national programmes to promote public sector energy efficiency, support to regional energy efficiency agencies, and support for energy savings programmes in municipalities.

Other groups have contributed, albeit to a lesser extent, to the promotion of public sector energy efficiency. For example, the CIS approved a model building code that has the potential to reduce energy consumption in buildings markedly, although it must rely on member countries to fund implementation and enforcement.⁷⁷ The G8, in contrast, serves more as a means of attracting visibility to the topic rather than concrete guidance or support, such as in a recent statement: “In our discussion with the emerging economies we agreed that energy efficiency and technology cooperation will be crucial elements of our follow-up dialogue.”⁷⁸

The contributions of bilateral and multilateral aid agencies and of international financial institutions (IFIs) are covered in the following section on financing mechanisms. However, it is also worth noting that they can serve to increase the visibility of energy issues and to leverage cooperation and funding from participating governments. Often, a single loan represents numerous actors in the recipient country.⁷⁹

Finally, these organisations can also lead by example. In fact, institutions that legislate and regulate energy efficiency in countries should also include energy efficiency in their own administrations. In the EU, for example, the European Commission’s internal logistics service, OIB, has several on-going programmes. “Since the launching of the EMAS (Eco-Management and Audit Scheme) project in 2002, the Commission and more precisely the five pilot services implementing EMAS have introduced various measures which have been successful in reducing energy (electricity and gas) consumption. Between 2002 and 2006 electricity consumption was reduced by 21% and gas by 14.5% in 6 EMAS certified buildings. In all new buildings the operation of lighting as well as of cooling (in summer) or heating (in winter) is centrally programmed so as to save energy outside normal working

⁷⁷ Russia and Kazakhstan are already implementing the code.

⁷⁸ G8, Chair’s Summary, G8, Heiligendamm, 2007.

⁷⁹ For example, the Kyiv Institutional Buildings project in Ukraine involves a loan and technical assistance from the World Bank, municipal institutions that include buildings and utilities, and the city administration.

hours. Concerning new building projects, the Commission chooses wherever possible to adopt technical solutions that meet specific environmental criteria, e.g. co-generation systems, energy-efficient air conditioning (HVAC) systems, energy-efficient glazing and rain water recovery for sanitary facilities. Buildings, especially outer walls and HVAC systems, “must be designed to optimise energy management” as per the Council Directive on the energy performance of buildings, and buildings may not be renovated or constructed without an energy audit.⁸⁰

Among international organisations, the World Bank has an Environment and Social Services secretariat, which runs the World Bank Greening Programme. The Bank has what it possibly the longest running internal energy management programme, which has been in operation in its Washington, DC headquarters since 1995. The programme focuses on reducing energy consumption through space design, energy management, maintenance, and procurement. The World Bank has received the energy star designation for two of its buildings, and it is currently focusing on energy star procurement for equipment, efficient lighting retrofits, and more efficient chillers.⁸¹

The United Nations agencies do not have energy efficiency programmes in place, but the organisation has recently established an interagency Environmental Management Group. In a 2007 brainstorming exercise, the group suggested focusing on carbon-climate neutrality and green procurement.⁸² In addition, the United Nations Development Programme is in the process of identifying and implementing low-cost/no-cost energy efficiency measures as a means of reducing greenhouse gas emissions in at least seven country offices and regional centres.

State Actors

State actors, or national actors, play many different roles that influence public sector energy efficiency. A partial listing of these roles includes the following:

- They set priorities, which can include priorities for spending
- They generate laws, policies, and regulation that directly pertain to public sector energy efficiency
- They oversee the macroeconomic environment and control fiscal policy
- They establish the institutional backdrop for commercial investments
- They can provide financing for energy efficiency investments and provide sovereign guarantees.⁸³

State institutions that lead the development and implementation of energy efficiency policies and programmes tend to be organised in one of several ways. There may be an energy agency that is overseen by the Ministry of Economy or Industry (the case with most

⁸⁰ Correspondence with Gabrielle de Perignon, EC, October 2007.

⁸¹ World Bank, World Bank Focus on Sustainability 2004 (Part II), World Bank, Washington, DC, 2005, pp. 79-80.

⁸² Several UN agencies belong to the Environmentally and Socially Responsible Procurement Working Group, which also involves development banks and other international organisations (<http://sustainableprocurement.net>).

⁸³ In Belarus, the Energy Efficiency Committee is also in charge of coordinating the work of the country’s several different energy efficiency funds.

new EU member states). There may be a department handling energy efficiency within a Ministry of Energy (more common in the CIS) or a central authority reporting directly to the highest executive body (Belarus and Ukraine). And, most frequently in Western Europe, governments may delegate some authority for national energy efficiency programmes to organisations outside of the government (for example, the Energy Saving Trust in the United Kingdom, Senter-Novem in the Netherlands, and ADEME in France).

State actors also support several levels of government. They can affect municipal decision-making and investments through utility regulations, fuel pricing, or training and support to municipal officials. They can affect other agencies at the state level, through work on procurement, offices, and other government institutions. While the most prominent state actor is usually an energy department or agency, all ministries can support energy efficiency promotion (see Case Study #2). Ministries of Defence, Interior, Healthcare, and Education have missions that are grounded in other public sectors, but they are also key players in energy efficiency activities. They will oversee day-to-day implementation of state programmes in their facilities, and they also have strong channels for communicating with regional and local facilities in their sphere of activity. At the same time, these ministries may lack specialised capacity to develop efficiency programmes, and there is a need to coordinate energy planning and efficiency activities with ongoing programmes at all levels of government and with state goals and priorities in the sustainable energy sector.

Regional (Sub-state) Actors

Regional actors, or the administration of cantons, krajs, oblasts, landern, and other sub-state entities, may house their own regional energy agencies or energy efficiency agencies (as in Austria, the Czech Republic, Hungary, Italy, Romania, or the Russian Federation) and may be in charge of providing certain services to municipalities. In the Russian Federation alone, “over 40 specialised institutions were established in different parts of the country to develop and implement energy efficiency policy at the federal and regional levels” from 1992 to 1999.⁸⁴ In Germany, 18 regional agencies handle energy efficiency programmes at the state and local level. Even in smaller countries, regional agencies can provide an effective means of supporting municipalities in managing energy. In some cases, regional governments may manage utilities or co-manage them with municipalities, as in Bosnia and Herzegovina. Finally, regions across state boundaries have been able to coordinate work on energy efficiency policies and programmes through membership in non-governmental associations, such as Fedarene in Europe (see the section on Non-Governmental Actors below).⁸⁵

Local Actors

As Zeman⁸⁶ notes, municipal government roles can include the following: utility owner; energy consumer (facility owner); municipal policy maker; business planner (including demand side, market analysis); energy auditor; a source of environmentally driven

⁸⁴ CENEF (Russian Centre for Energy Efficiency), [<http://www.cenef.ru/regions.htm>], 2007.

⁸⁵ More information on Fedarene is available at <http://www.fedarene.org>.

⁸⁶ Presentation by Jiri Zeman to the IEA District Heating Roundtable in December 2002.

priorities, targets, and implementation measures; and an information provider. Municipalities may also be investors and regulators, and they may also oversee the local transportation sector.

Municipalities are also motivated to undertake public sector energy initiatives, because they are directly accountable to their constituents for the services they provide and often have strong incentives to save money and upgrade services. So, there is a strong role for municipalities in implementing virtually all of the energy efficiency end-use measures discussed in this paper. At the same time, municipalities have the least specialised capacity for designing and implementing measures. In addition, as one review remarked, “Energy efficiency at the local level is not always a local issue.”⁸⁷ Municipalities are often at the mercy of the surrounding economic and investment climate.

Because of these multiple roles, municipalities can benefit from a support system in the area of energy efficiency. This support may come from a specialised municipal office (in the case of the largest cities), an NGO, or a regional or national energy efficiency agency. Many state energy agencies provide information or toolkits for municipalities (as in Iceland and Sweden); others also assess municipalities’ performance in the energy efficiency sector, as in Switzerland, where the government developed a quality label for advanced energy efficiency planning in municipalities.

Non-Governmental Actors

Non-governmental organisations, or NGOs, have played important roles in both advocacy and programme implementation. They have worked to effect change at all levels of government. At the municipal level, the Energy Brigades programme provided energy efficiency measures to local buildings such as schools in cooperation with local residents. At the national level, non-governmental energy efficiency centres have provided policy recommendations on energy efficiency and have helped to draft laws and action plans.⁸⁸ They have also developed and implemented programmes for municipalities in countries where overarching energy efficiency policies are not yet in place.

At the international level, non-governmental associations of regional and local authorities, such as the International Council for Local Environmental Initiatives (ICLEI), Energie-Cités, and Fedarene have helped to document and share best practices in energy efficiency across countries. In some cases, these groups can be less formal networks that include government and the private sector, as in the Regional Network for Efficient Use of Energy and Water Resources for Southeastern Europe (RENEUER), which has been active in Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Romania, and Serbia and Montenegro.

Other types of associations can serve as partners or conduits for information about energy efficiency. For example, federations of local administrations such as the Council of European Municipalities and national associations of municipalities can be known

⁸⁷ MUNEE, Policy Overview [<http://www.munee.org/go.idecs?i=60>], 2007.

⁸⁸ CENEf, for example, drafted what became the Russian Law on Energy Savings, and its two-volume book on regional energy efficiency policies is now used for establishing regional energy efficiency legislation, programmes, and energy efficiency institutions.

and trusted partners for smaller municipalities who might not be as receptive to information about energy efficiency. For larger municipalities, associations of energy managers can be an effective vehicle for disseminating information about best practices and implementation quickly. Furthermore, other professional associations, such as the Architects' Council of Europe or national associations of architects and/or builders, can reach a specialised target audience quickly.

Finally, NGOs can serve as grant-makers. For example, the Eurasia Foundation recently launched seven new energy-saving projects in Ukraine as part of its programme to increase energy efficiency in public buildings with co-funding from municipal budgets or other sources from the local community.⁸⁹ The Heinrich Boll Foundation has also supported energy efficiency in public buildings through its support of the Energy Brigades programme (see above).

NGOs have a strong record of performance in public sector energy efficiency, and there is still more that they could do in policy development, programme management, and information and awareness-raising. However, governments may not necessarily consider NGOs when developing public sector energy efficiency strategies and programmes, or they may envision NGOs as limited to conducting “information campaigns.” This oversight represents a lost opportunity.

One non-governmental institution – the media – has not been a frequent topic of discussion in public sector energy efficiency initiatives, but it can be used to call attention to energy use in government and to frame the issue as one of public management. In Denmark, for example, the press plays an important role in making the government accountable for its energy use and placing pressure on ministries to use energy more efficiently.⁹⁰

The Private Sector

The private sector plays two very important roles in public sector EE initiatives: it provides equity for investments, and it provides energy-saving goods and services.⁹¹ Increasingly these roles are combined, as ESCOs provide both services and financing. In addition, a private company may be the owner, lessee, and/or operator of a public utility. Given current trends in outsourcing and privatisation, these roles seem likely to expand. Additional discussion of the private sector is provided below.

⁸⁹ Eurasia Foundation, press release: “Improving Energy Efficiency in Ukraine,” 31 July 2007.

⁹⁰ Presentation by Peter Nielsen to the PEEREA meeting in November 2007.

⁹¹ The role of the private sector in financing is discussed in the following section on financial mechanisms.

Financing Public Sector Energy Efficiency Projects

Financing for energy efficiency at present is a story containing both good news and bad news. The good news, a recent survey of OECD and developing countries commissioned by UNEP's Sustainable Energy Finance Initiative determined that global investments in energy efficiency increased from USD 710 million in 2005 to USD 1.1 billion in 2006.⁹² The bad news: the same report described investments in efficiency as an almost "invisible" part of overall investments in sustainable energy, which totalled USD 70.9 billion in 2006.⁹³

Investment in public sector energy efficiency tends to fall into two categories.

- 1) *Expenditures where energy efficiency has been "mainstreamed" into ongoing government expenditures.* Examples include procurement of energy-efficient products, the construction of new governmental office buildings "to code," and service agreements with utility operators that include savings targets.
- 2) *Expenditures that are explicitly designed to support energy efficiency and can be used in the public sector.* Examples include loans or grants for heating system upgrades from an extra-budgetary "ecofund," a grant/loan programmes that form part of a national energy savings programme, "carbon finance," and multinational matching funds for energy efficiency initiatives in the public sector.

In some cases, such as work with municipalities and utilities, similar financing mechanisms can be considered in each category. This section provides a brief overview of the following finance mechanisms: performance contracting, utility service contracts, public-private partnerships, carbon finance, direct financing, and "soft" financing.

Performance contracts

Performance contracts are the basic means by which governments (and private entities) structure agreements with companies that provide energy efficiency products and services. The table below summarises several forms of arrangements that involve performance contracting such as ESCO and PICO (Public Internal Performance Contracting) units.

⁹² Chris Greenwood et. al., *Global Trends in Sustainable Energy Investment: 2007...*, UNEP, Geneva, 2007, p. 10.

⁹³ *Ibid.*, p. 8.

Table 10: Energy Efficiency Financing Mechanisms in the Public Sector

<i>Type of Arrangement</i>	<i>How it works</i>	<i>Prerequisites</i>
Vendor: Sales	The contractor conducts an audit, identifies potential savings and then signs a contract to implement energy-saving measures with the relevant government entity. The contract covers sales and installation but guarantee of savings is not included (is that correct?). The work can be financed by combination of vendor financing (usually quite limited) and municipal financing (usually a budgetary allocation or a loan assumed by a municipality). The company implements the project and makes a profit from the sale of its equipment (e.g. boilers, lights) and services (auditing, and in some cases maintenance). Energy savings accrue to different government entities depending on how budgeting is structured.	Municipality needs sufficient financing or debt ceiling. Legislation must be sufficiently clear to determine to which entity the government's savings will accrue (to ensure there are incentives to invest).
Vendor: Sales and Energy Management	The contractor conducts an audit, identifies potential savings and then signs a contract to implement energy-saving measures with the relevant government entity. The contract is an EPC, wherein payments for the work are linked to the achievement of targeted savings from the project (sometimes described as guaranteed savings and expected savings). The company implements the project, recoups its investment (and some profits) from the sales of equipment and services <i>contingent on energy savings</i> , and the client continues to save energy after the contract has been concluded.	Municipality needs sufficient financing or debt ceiling. Legislation must be sufficiently clear to determine to which entity the government's savings will accrue (to ensure there are incentives to invest).
ESCO	The Energy Services Company (ESCO) first identifies potential savings and then signs an EPC with the government entity. As with an energy management vendor, the ESCO agrees to reduce energy use, and the client agrees to pay them a certain amount of the savings from the project. The ESCO also structures the financing for the project. Most ESCOs seek third-party financing (TPF) to undertake these projects. When the ESCO then implements the project, recoups its investment (and some profits) from the savings, and the client continues to save energy after the contract has been concluded.	Need access to third-party financing Need strong rule of law to limit risks Need appropriate public procurement legislation
PICO	Under the Public Internal Performance Contracting (PICO) model, the ESCO is an in-house government department. One department (e.g. the Environment Department) offers energy services to other departments. The departments sign an EPC involving shared savings. Payments are handled through cross-budget transfers, and additional savings accrue to a revolving fund. The department is reimbursed for its services and the savings accrue the government agency that has established the fund. ⁷⁰	Strong commitment to energy savings on the part of the government unit (e.g. ministry, municipality). Supporting operations and budgetary legislation to permit reimbursement and accrual of savings to the fund.
Other PICO-related models	A profit centre with its own budget is created as a government agency. It is responsible for identifying, implementing, and financing projects. The profit centre is a private agency that is 100% municipally owned.	Regulatory support.

Performance contracting has grown greatly in popularity across PEEREA member countries over the past decade, but the type of mechanism used most often depends most on the overall investment climate.

In the EU-15, for example, ESCOs are relatively common, as access to financing, economic stability, and the legal framework for contract law are all present. Municipalities or other government agencies may use a combination of PICO to finance smaller projects and ESCOs to finance larger investments.

One potential role for the government here is as a provider of information. For example, EWA, the Austrian energy agency, provides impartial information on different ESCOs, which can help municipalities to select the best partner.

In newer EU member states, ESCOs entered local markets as subsidiaries of their Western European counterparts and have been active since the mid-1990s.⁹⁴ In newer EU member states, bilateral and multilateral lenders and aid agencies also supported ESCO development through the provision of loan guarantees, risk insurance, and equity investments. While PICO financing is not common, there has been some evidence of utilities providing consulting services to other utilities on a fee-for-service basis.⁹⁵

In the CIS, ESCOs have not seen much market penetration in the public (or private) sector. While Ukraine has a state-owned ESCO (UKR-ESCO), which includes the EBRD as a shareholder, it has been limited to private sector projects in industry. The ESCO market overall has been a victim of instability in the investment climate in the region, although there is hope that this situation may improve. An attempt to establish a municipal ESCO in the Ukrainian city of Rivne was able to finance some upgrades in the city's district heating system, but it was unable to attract sufficient equity to be able to finance projects in other municipalities as planned. The investment climate in Ukraine and the problem of providing sufficient collateral for loans (in the absence of a sovereign guarantee) both contributed to this outcome.

Two initiatives in CIS countries might be described as PICO-type financing. First, the Russian Schools Efficiency project (see Case Study 2) involved payments into a revolving fund for energy efficiency projects in schools. In practice, however, these funds served more as multi-year savings accounts for the participating facilities. Second, a public sector energy efficiency programme in Belarus involves a revolving fund to allow for the provision of PICO-type services. In both cases, the establishment of a revolving fund that is independent and yet administered by the government has been a complex process. Many economies in transition may not have the precedent of a revolving loan fund that can lend to budgetary organisations.

⁹⁴ The best known example is probably Prometheus, which was owned by Generale de Chauffe (France) and used an equity investment from EBRD to implement projects in public facilities, such as schools and hospitals, in Hungary.

⁹⁵ For example, the district heating company in Debrecen, Hungary, has advised other heating companies in Hungary and Romania on management and service provision.

Utility service contracts

Utility service contracts, which govern the services, provided to the population by a utility, offer the potential to exercise control over energy consumption through regulation rather than through a specific programme. Utilities may be operated by a private, municipal, or public-private entity. They may also in some cases be leased on a long-term basis or sold to a public-private or wholly private entity.

Utility service contracts are of increasing importance as the privatisation of various utilities is on the increase in member countries. EU policies have supported this trend among its members, and international lenders have also supported utility privatisation in economies in transition. In many cases, privatisation can streamline management and provide an inflow of investment capital where municipal sources may be very limited.

However, while there is a critical need to provide incentives for utility operators (regardless of their composition) to invest in efficiency, there may not be any guarantees. Unlike ESCO investments, privatisation of utilities may not include specific agreements about energy consumption. There are certain incentives for companies to save money by using less energy to provide the same amount provision of heat, power, or water. However, other opportunities to save energy, particularly on the demand side,⁹⁶ may be overlooked because of their payback period or failure to add sufficiently to the company's revenues. Furthermore, as previously mentioned, independent owner-operators may actually face incentives that counter energy efficiency if they receive more income for producing and selling more energy.

Public-Private Partnerships

Like performance contracting and service contracts, there have been big expectations and potential surrounding public-private partnerships, but with a varying rate of penetration and success among the countries studied. Public-private partnerships are defined by the involvement of the private sector in performing government services. Definitions vary, but most understandings of a public-private partnership involve a contractual arrangement to provide services and some form of government oversight (which varies from partnership to partnership). These arrangements are most common at the municipal level. They are often used to raise equity, as in "partial privatisation," when an investor or bank buys (purchases) an equity stake in a municipal joint stock company owned by the city.

One of the difficulties in the spread of public-private partnerships, particularly in new EU member states and CIS countries, was that the utilities were not necessarily attractive investments. As one analyst summarised, "Despite the fact that, due to the backwardness and the urgent need for financing, water and sewage have been prime targets for PPP in CEE countries and international organisations provided the support trying to transfer international best practice, the overall impact has been lower than expected, and the projects in this sector faced difficulties right from the start given the

⁹⁶ In some countries, for example, there is no legal requirement for heating companies to supply on basis of metered consumption.

low commercial value. Some projects in water sector were even taken off, e.g. in Budapest, Sofia, and Tallinn. In general, the first attempt to institutionalise PPP as a key instrument for infrastructure financing of CEE countries were less successful than in other countries and than initially hoped for, mainly due to the *lack of effective institutions, shortcomings in macroeconomic policy, and unrealistic demand expectations.*⁹⁷ In short, projects with private sector involvement will have to meet private sector standards for risk management and profits.

Nonetheless, as the investment climate improves, there are increasing examples of public-private partnerships in transition economies. For example, Renova, a private company that owns IES Holding oversees assets in the Russian energy sector and partners with companies in Russian regions (primarily Sverdlovsk and Perm) in electricity, heat, water supply, and water removal.⁹⁸

Experiences across member countries have also provided a number of lessons learned from the PPP experience (see also Case Study #3). For example, PPPs can be very complicated: one EBRD project involving a PPP in the wastewater treatment sector involved indicators that totaled 40 spreadsheet pages and extensive legal documentation between the bank, the private investor, and the municipal authorities. In addition, for secondary investors, it can be very difficult to introduce design features in the project, and so it is important to include them as early in the negotiating process as possible. Finally, it is necessary to harmonise expectations about what the partnership will achieve.⁹⁹

Tochitskaya also lists several lessons learned from public-private partnerships in transition economies: “First, public authorities do not have sufficient funds and expertise for preparation of long-term investment programmes, thus leading to the lack of well-developed projects, which might be interesting for PPP. Second, since public property is not adequately registered quite often significant up-front investments are needed to settle the differences in order to make it work within a PPP. Third, there remain problems with risk sharing and coverage in PPP. Fourth, the shortcomings in regulation (insurance, tariffs, and etc.) create some additional barriers to proliferation of PPP.”¹⁰⁰

There is increasing attention to building capacity, particularly at the local level, to support effective PPPs that best serve the interest of communities. For example, UNDP has introduced a pro-poor public-private partnerships toolkit for its recipient countries,¹⁰¹ and the World Bank has produced a toolkit specifically for municipalities preparing water sector PPPs.¹⁰² In Europe, the NGO Climate Alliance has used the PRIME (**P**rivate **I**nterests **M**ove **E**copower) programme to develop an action package for municipalities on how to raise private capital from citizens and local

⁹⁷ Irina Tochitskaya, Public-Private Partnership, German Economic Team in Belarus, Minsk, 2007, p. 8.

⁹⁸ Renova, http://www.renova.ru/eng/businesses/bus_dir_3/bus_3_1/, 2007.

⁹⁹ European Bank for Reconstruction and Development (EBRD), Privatisation of wastewater services: Summary of the Operation Performance Evaluation Review (OPER), EBRD, London, 2003, pp. 2-3.

¹⁰⁰ Irina Tochitskaya, Public-Private Partnership, German Economic Team in Belarus, Minsk, 2007, p. 9.

¹⁰¹ The UNDP toolkit is available on-line at <http://pppue.undp.org/toolkit/0%7Eindex.html>

¹⁰² The World Bank online toolkit is available at <http://www.worldbank.org/html/fpd/water/wstoolkits/Kit2/frame.html>.

stakeholders for energy efficiency projects in public buildings. That project is based on a combined renewables/efficiency project in Germany, the “Solar&Save” initiative, in which students’ families became shareholders in an ESCO that, in turn, invested in energy saving measures in schools.¹⁰³

Carbon Finance

The use of “carbon finance,” or capital generated by the sale of emission reductions, for public sector energy projects is still in a very early stage. However, the sale of these reductions has the potential to raise capital for investments, particularly in the utility sector, where potential savings are quite large. There are several ways to link these projects to carbon finance. First, public sector entities can participate in emission trading systems. In fact, at least two facilities in the United Kingdom – University College Hospital in London and the Sheffield District Energy System – are listed in that country’s emission trading system registry. Joint Implementation (JI) projects have also involved municipalities as official partners, as shareholders and/or regulators of holding companies that operate local utilities, and as beneficiaries in projects involving public sector buildings. Second, facilities could benefit from a government “green investment fund,” where some portion of the sales of government-held emission reduction units and project-based allowances would capitalise a fund to support environmental investment projects. Belarus, for example, is discussing such a fund.

Direct Finance

Energy efficiency programmes in central government facilities can be financed by the budget of the facility, by a state-level energy efficiency programme, or by a combination of these resources. Municipalities may also receive funds directly from the state budget or from a state programme. In some cases, however, municipalities choose to finance energy investments directly. For example, they can issue bonds to raise the necessary funds to make energy efficiency improvements in municipal services. Varna, Bulgaria, for example, issued bonds to finance improvements in street lighting.

Other municipalities have used innovative budgeting techniques that effectively raise funds from existing line items in the budget. For example, the city of Modena, Italy, combined its investment and O&M budgets, and the city of Chelyabinsk, Russia allocated funds from its district heating maintenance funds for energy efficiency measures in the system, a “subsidy shift.”¹⁰⁴

¹⁰³ PRIME, Private Investments Move Ecopower: Final Report, Intelligent Energy Europe, 2007.

¹⁰⁴ S. Avdiushin, et. al., Climate Change Mitigation: Case Studies from Russia, PNNL, Washington, DC, 1997, p. 7.

“Soft” Financing and Incentives

Financing through grants and soft loans is used at virtually all levels of government, including in countries where energy efficiency has not been promoted by national governments.

At the level of the European Union, numerous governments and NGOs have received investment funding (from structural funds, cohesion funds, and pre-accession funds) and grants through EU programmes such as Managenergy (SAVE, Intelligent Energy Europe). EU regional development funds, such as the Central Europe programme,¹⁰⁵ which lists energy efficiency as a priority for regional cooperation, also provide support.

At the national-level, national energy savings programmes with grant-making components that include public administration and/or utilities can be found in all groups of countries studied, although they seem to be most common in EU new member states. Roles for energy agencies include providing co-financing for region-level programmes in Switzerland, leveraging private investments by industry and consumers in Sweden, and providing financial incentives for state employees who save energy in their offices in Belarus. A number of countries provided funds to train municipal officials and work with municipalities on energy efficiency projects.

Another important role for national governments has been to establish and/or oversee energy efficiency investment funds. In some cases, these extra-budgetary funds provide soft loans or a combination of loans and grants. For example, Bulgaria and Romania have independent energy efficiency funds (BGEEF and REEEF, respectively), and Belarus has an extra-budgetary “Energy Saving Fund.”

“Ecofunds,” some of which were established in central Europe in the early to mid-1990s with money from debt retirement or pollution taxes, have also been instruments for funding public sector energy efficiency projects. Poland, Lithuania, Slovenia, and Croatia have all used this mechanism. Extra-budgetary funds have had greater difficulties in countries undergoing broad based fiscal reforms, as major lenders such as the IMF may require the elimination of extra-budgetary funds as a precondition for lending. FYR Macedonia, for example, no longer has an Ecofund.

International financial institutions (IFIs), such as the World Bank Group (IBRD and IFC), the European Bank for Reconstruction and Development (EBRD), and the Asian Development Bank (ADB) all provided support to middle-income and lower-middle-income countries in the group surveyed.

¹⁰⁵ Programme materials describe the initiative as follows: “The CENTRAL EUROPE programme is part of European Territorial Cooperation 2007-2013 (“INTERREG IVB”), a policy framework that supports cooperation between regions in the European Union. CENTRAL EUROPE promotes economic, environmental and social development in Central Europe. The programme makes €246 million available to support projects involving cooperation between national, regional and local actors in the period 2007-2013. The area covered by the programme includes regions from Austria, the Czech Republic, Germany, Hungary, Italy, Poland, the Slovak Republic, Slovenia and Ukraine.” Energy efficiency is a priority under the environmental section of the initiative.

IFIs contribute to public sector projects with energy efficiency benefits using several tools:

- 1) debt (dollar- or euro-denominated or – less frequently – in the local currency)
- 2) equity investment – stake in ESCOs or municipal PPPs
- 3) technical assistance
- 4) partial guarantees on behalf of public entity

EBRD financing for Mosenergo is one example of the role that an IFI can play. In that project, “the EBRD is lending Mosenergo, the Moscow utility grid company, 2.9 billion rubles (€85 million) to modernise its existing plants and to reduce emissions.

“This is a pioneering transaction for the EBRD in terms of financing in local currency as part of the loan will be syndicated in rubles via reputable banks based in Russia. Mosenergo, which now runs 17 electrical power plants, is a long-term client of the EBRD and this loan is a continuation of ongoing support for the electricity giant.”¹⁰⁶

Finally, multilateral and bilateral agencies have provided support for public sector energy efficiency programmes in economies in transition through overseas development assistance since the early 1990s. Some of the original aid recipients are now members of the European Union.

One support mechanism for promoting energy efficiency in the public sector is the development credit authority (DCA), which was first introduced in the Czech Republic in the early 1990s under an agreement with USAID. The authority provided a loan guarantee for local banks to make loans in areas such as improving energy efficiency to municipalities. The success of the project attracted commercial lenders to the market, and after several years the programme was no longer necessary. Since then, USAID has used the mechanism in other countries; for example, it signed a USD 15 million DCA package with the Government of Kazakhstan in 2004. The DCA guarantees loans to institutions for improving energy use.

The Global Environment Facility (GEF) has also provided financing for energy efficiency in many eligible countries, such as providing technical assistance to develop and manage energy efficiency funds (Romania, Belarus), providing start-up assistance to a municipal ESCO (Ukraine), providing cost-sharing for municipal energy audits (Hungary), improving energy in municipal housing (Russia), and providing loan guarantees for municipal energy efficiency loans (Hungary). Through UNDP and the World Bank, GEF has also funded multiple municipal heating sector projects.¹⁰⁷

¹⁰⁶ EBRD, Russia: EBRD Country Fact Sheet, EBRD, London, 2007.

¹⁰⁷ The complete database of GEF projects and documentation is available at www.thegef.org. While current strategic priorities no longer support broad-based public sector initiatives, countries may apply for co-financing in areas including buildings efficiency and standards and labelling.

Conclusions

The important role of energy efficiency in both effective fiscal management and in the provision of public goods is increasingly clear. For front-runners, next steps may be analysing and fine-tuning programmes or identifying new opportunities to reduce energy consumption. For other countries, promoting public sector energy efficiency may mean laying the groundwork with energy policies and action plans. All countries, regardless of circumstances, can move forward by bringing a general commitment to energy efficiency into the public sector and mainstreaming energy efficiency into daily government operations. There is now a tremendous body of experience in public sector energy efficiency initiatives involving different regions, different end-use sectors, different policy instruments, different financing mechanisms, and different levels of expenditure. Several trends are evident:

- An integrated approach to energy efficiency can be cost-effective and offers the best potential for replication. Stand-alone initiatives in public administration, non-commercial services, and commercial services can achieve impressive savings in individual facilities, but an integrated approach that prioritises these sectors and apports financing for them can concentrate funding where the results may be the biggest and where there is the most potential for replication.
- Policy-makers should consider both direct public sector policies and policies with an indirect effect. Building codes or fuel efficiency standards are two examples of policies that will affect energy consumption in the public sector but are not “public sector energy efficiency” programmes per se.
- Public procurement, as an instrument for introducing energy efficiency in the public sector, but also as a tool for promoting energy efficiency and developing the market for energy efficient products and services, is currently underutilised in a number of PEEREA member countries. Procurement is especially important because it represents an area where governments *are already investing* their resources. Procurement programmes should also consider standards for rental office space, which have been overlooked in most member countries.
- Certain types of energy efficiency projects can succeed despite the lack of an enabling environment or a comprehensive national programme. However, true barriers in form of subsidies, improper pricing, and budget restrictions, can stifle most programmes and should be the primary policy focus. For the few countries facing these types of barriers, even the most sophisticated energy efficiency programs will not perform optimally.
- Local governments often have the most visible public sector energy efficiency projects, and they implement the largest number of energy efficiency projects. At the same time, they face the complex task of overseeing energy planning and energy management in offices, institutions, and utilities. National and regional governments must provide adequate support and expertise for local administrations, particularly in the evolving field of private sector participation, which includes drafting appropriate tender documents, conducting the tendering

process, assessing investment proposals, and negotiating contractual terms with private sector partners. In turn, local administrations should consider NGOs as potential partners in policy and programme development.

- Professional associations and networks of municipalities can be essential to addressing capacity issues, increasing awareness, and lobbying at a national or international level for support in implementing and financing energy efficiency projects. These groups make good partners for governments, yet they are often underutilised, particularly in counties that have traditionally had highly-centralised governments.
- Issues other than energy performance should be also considered when assessing energy efficiency projects. The most important are probably financial performance, non-energy benefits (e.g., environmental benefits), and the ability to obtain financing, be it governmental or commercial. These issues can play an important role in garnering support for energy efficiency programs and for documenting the full range of their benefits.
- Financing mechanisms for public sector energy efficiency investments require capacity building and training for all stakeholders: policy-makers, lenders, and potential applicants. The capacity to work successfully with private sector partners requires many skills and should be incorporated into the training and expertise provided by governmental and non-governmental energy agencies.
- There is a need for more intergovernmental organisations to model good practice in energy management. In addition to supporting highly-visible public sector energy efficiency initiatives, intergovernmental organisations should mainstream good procurement practices, buildings efficiency, and other energy management measures. Intergovernmental organisations should also mainstream the consideration of energy efficiency into the projects they finance in non-energy sectors (municipal services, public administration reform, etc.). National governments can lobby for this process as members of those organisations.

A Role for PEEREA

There is clearly a continuing role for PEEREA in the promotion of public sector energy efficiency. An effective PEEREA strategy could coordinate certain efforts in the sector without duplicating existing resources and databases.

For countries where lack of knowledge on the part of leaders, legislators, and local officials is still an obstacle to developing energy efficiency policies and measures, PEEREA has an important role to play in these countries as an advocate of the message that *public sector energy management is good public management*. PEEREA continuing reports (regular and in-depth) should make a point of including a section on public sector energy efficiency initiatives at all levels of government, including the identification of unmet needs.

While there is now a fairly comprehensive literature in municipal energy management, there is still a need for more analysis in certain areas of the public sector. These areas include:

- comparing the relative impact of projects in a single country and comparing the relative impacts of energy efficiency programmes across countries
- disseminating best practices for determining the cost-effectiveness of different policies and measures, particularly in integrated government programmes
- determining the basic capacity needs of governments in implementing energy efficiency projects
- conducting data analysis with disaggregated data to provide an accurate and complete profile of public sector energy consumption in PEEREA countries, including public administration and commercial and non-commercial services of general interest
- collecting additional information on best practices in monitoring and evaluating public sector energy efficiency programmes

It is important to continue to share information on public sector energy efficiency, and PEEREA should ensure that its members have access to existing stock-taking exercises and databases (see Appendix 1).

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Appendix 1: Databases with Information on Public Sector Energy Efficiency Policies and Measures

Austrian Energy Agency (enerCEE.net)

<http://www.energyagency.at/enercee/>

News and background information on energy use in Central Europe and the Balkans

C40 Cities (Climate Leadership Group)

<http://www.c40cities.org/bestpractices/>

Municipal best practices organised by end-use sector

Energy Charter Publications

<http://www.encharter.org/index.php?id=20>

In-depth and regular reviews of energy use in member countries

Energie-Cites

<http://www.energie-cites.eu>

502 municipal energy case studies

European Union

http://ec.europa.eu/energy/demand/legislation/end_use_en.htm#efficiency

Database of all EU National EE Action Plans

<http://www.managenergy.net/submenu/Scs.htm>

Search engine for Managenergy Case Studies

FEDARENE

<http://www.fedarene.org>

Database of municipal energy efficiency case studies

ICLEI – Local Governments for Sustainability

<http://www.iclei.org/index.php?id=1677>

Best municipal practices for energy efficiency

<http://www.iclei.org/index.php?id=1139>

93 municipal case studies from around the world

ODYSSEE

<http://www.odyssee-indicators.org/Publication/publications.php>

Country and Sectoral Energy Efficiency Profiles for the EU-25

MUNEE Database – MUNEE legislation

<http://www.munee.org/go.idecs?c=20>

Municipal energy case studies from Central and Eastern Europe

RENEUER

http://www.reneuer.com/category/?category_id=2

Information clearinghouse on municipal energy and water efficiency

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