89387

ESMAP
Energy Sector Management Assistance Program

Knowledge Series 017/14

Driving Energy Efficiency Markets through Municipal Procurement

Energy Efficient Cities

MAYORAL GUIDANCE NOTE #1

For more information related to public procurement and EE in cities, please visit ESMAP's website at: www.esmap.org/esmap/eeci.

For more information on EEP, please see "Public Procurement of Energy Efficient Products: Lessons from Around the World" (available for download at: www.esmap.org/node/2052).

For more information on ESPCs, download "Public Procurement of Energy Efficiency Services: Lessons from International Experience" at: www.esmap.org/node/270.

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Many of the most successful municipal energy efficient procurement programs around the world—London, Mexico City, New York City, and Vienna—have been undertaken without any action at the national level. Forward-looking cities can be champions for energy efficiency initiatives today, showing other cities and their national governments how such measures can save money and drive markets. As other cities follow their example, opportunities grow for joint purchasing, strengthening negotiating power to demand lower cost and better quality products. Two strategies have been particularly effective in this area—**energy efficient purchasing** initiatives and **energy savings performance contracts**. This guidance note outlines the opportunities and barriers to adopting these procurement strategies, provides global lessons and examples, and offers step-by-step guidance on how cities can get started with energy efficient purchasing policies.

Energy efficient purchasing initiatives are ideal for new equipment purchases and simple replacements. Under such schemes, cities require or encourage municipal agencies to apply energy-efficiency requirements or preferences for purchases of energy-using products like lights, office equipment, and vehicles. Energy efficient purchasing programs give preference to products that offer the **best value over their lifetimes**, even if the initial purchase price is higher. Since most public procurement legislation encourages or obligates government agencies to seek the best value for money, energy efficient purchasing initiatives seldom require changes to rules, making it easy for local governments to mainstream energy efficiency into their purchasing programs, immediately reducing energy, replacement, and maintenance costs.

Energy savings performance contracts are more appropriate for renovations of energy-intensive public facilities, like buildings, water pumping stations, wastewater treatment plants, and street lighting. In this approach, an energy efficiency service provider (sometimes called an energy service company) offers municipal clients turnkey services—from engineering design through implementation and commissioning—to improve the energy performance of existing facilities. Energy service companies often arrange for financing of these improvements, so that cities put up little or no capital. Typically, an energy service company's compensation is based on measured energy savings, allowing the city to pay for the energy efficiency project at minimal risk from the resulting energy savings. Procuring energy service company services is typically more complex than energy efficient purchasing, but it can often be done under existing procurement rules due, in part, to recent innovations in public procurement, such as performance-based contracts, output-based procurement, and public-private partnerships. Several countries, including Germany, Japan, and the United States, and a number of cities, like Berlin, New York, and Rivne (Ukraine) promote energy savings performance contracts, fostering the growth of local energy service companies and capturing large-scale energy and cost savings.

Laying solid foundations is key to harvesting the substantial benefits that greater energy efficiency offers. Strong **political commitment** is needed to drive programs and to institute changed behavior of city employees. Initiating **pilot procurement activities** to gauge the market and to test new approaches has also proven effective. Once refined, energy efficient purchasing can be expanded to all city procurement systems, enabling impacts at a larger scale.


EMERGENCIAS

ACHIEVING SAVINGS THROUGH PURCHASING

Energy efficiency (EE) can be one of the most cost-effective instruments to help slow the global growth in energy demand. Improvements in EE contribute to enhanced energy security, increased competitiveness due to lower energy costs, load reductions on overstressed utilities, higher reliability of energy systems, reduced vulnerability to high and volatile energy prices, and lower environmental impacts, including greenhouse gas emissions. EE is a win-win-win option, providing benefits to the government, energy consumers, and the environment.

For cities, reductions in energy use—from smarter urban planning and designs to policy initiatives to retrofit programs—can lower a city's energy expenditures, freeing up scarce budgetary resources for other critical investments. Improvements in EE can also enable cities to expand and improve city services and provide important socioeconomic benefits (e.g., shorter commuting times, better air quality, more livable communities). Investments in EE in public facilities can also create local jobs, "green" existing infrastructure while lowering future operating costs, and demonstrate responsible energy management practices and environmental stewardship to all its citizens. And, in most cases, cities need not wait for changes in national procurement policies or regulations.

How a city purchases goods and services can have a substantial impact on its overall energy costs. Some products, such as indoor lighting, can cost 100 times more to operate than the initial purchase price. And since municipal procurement often represents 10 to 20 percent of a city's economic activity, local governments can save money while demonstrating leadership in EE to local businesses and residents, and to other jurisdictions. The large purchasing power of cities allows procurement in sufficient quantity to help drive down the prices of energy efficiency products and services and to influence the range of offerings from the private sector. Two strategies have been particularly effective in this area—**energy efficient purchasing (EEP)** initiatives and **energy savings performance contracts (ESPCs)**.

THE OPPORTUNITY

The municipal sector[1] represents a strategically important market for energy efficient goods and services. As a big and visible consumer, actions taken by a municipal government to become more energy efficient can influence markets and society. Typically, the public sector represents 10 to 20 percent of a country's gross domestic product (GDP), depending on the size of the state and its role in the economy, and urban centers are often a country's engine for economic growth. The emergence of megacities can mean that city economies can also be a large share of a country's GDP (e.g., Istanbul represents about 24 percent of Turkey's GDP, London about 31 percent of the U.K.'s, Tokyo almost 32 percent of Japan's).[2] And the top 600 cities account for 60 percent of global GDP.[3] Therefore, how a city allocates and spends its resources can be critically important.

In a city, the government is often the largest single user of energy. Cities are generally responsible for the operating costs of many public facilities even if they are owned by the national governments. Public facilities—from municipal office buildings to water and heating utilities to institutional facilities (e.g., schools, hospitals) to street lighting—tend to have: (i) outdated equipment; (ii) 24-hour loads in facilities such as universities and hospitals; and, (iii) chronic underinvestment in repair and maintenance due to budgetary

constraints. In municipal office buildings, for example, 20 to 40 percent energy savings can typically be achieved through simple retrofits of existing equipment.[4] In street lighting, cities often can save 30 to 60 percent if they upgrade their systems to the latest technologies and designs.

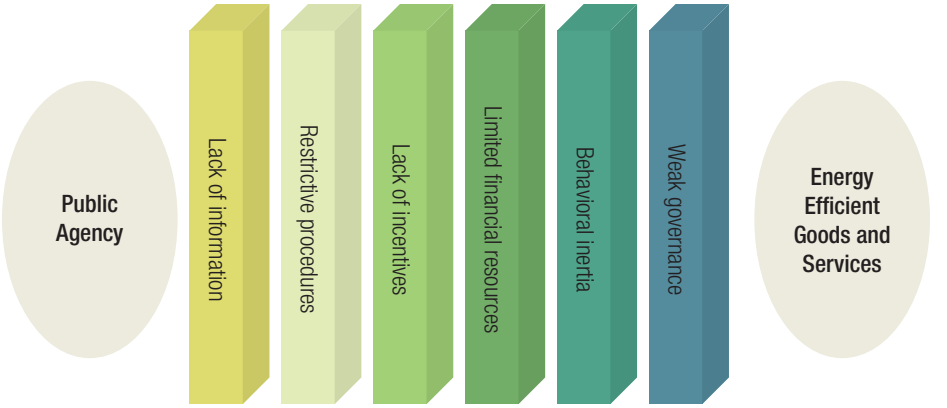
The common ownership and homogeneous nature of many of the facilities, particularly those with common functions (e.g., schools, hospitals), also offer unique opportunities for bundling smaller projects or purchases together and allow financing and deployment at a large scale. Large procurements can, in turn, bring down the costs for the city. In this way, municipal governments can have a catalytic effect on local supply chains by offering consistent and stable demand for new and emerging technologies, while encouraging new suppliers to enter the market and, thereby, fostering increased competition.

PREVAILING CHALLENGES

Despite these promising benefits, achieving significant EE gains through purchasing initiatives is often constrained by rigid procedures and an overreliance on the initial purchase price. Identified barriers with municipal EE procurement programs include (Figure 1):

- **No or poor access to information and institutional knowledge** about EE opportunities, implementation options, equipment certification, lifecycle cost (LCC) analyses, ESPCs, energy service companies (ESCOs), and others
- **Restrictive policies and procedures**, which make procurement (e.g., LCC analyses, multi-year contracts), budgeting, and innovative approaches more difficult
- A **lack of incentives** due to budgetary restrictions (i.e., inability to retain energy savings), split incentives, and a lack of commercial orientation
- **Limited financial resources** needed to pay for the higher upfront cost of more energy efficient equipment or to finance contracts to amortize these costs
- **Behavioral inertia** of a risk-adverse public sector used to the status quo
- **Weak governance**, which can introduce new risks when cities undertake more complex procurement arrangements or encourage their departments to pay a premium for energy efficient products

Figure 1 | Barriers for Energy Efficient Procurement



PART I: ENERGY EFFICIENT PURCHASING

For simple equipment replacement and ongoing operations and maintenance (O&M), energy efficient purchasing (EEP) or product procurement policies are recommended. EEP policies can require or encourage public agencies to include EE requirements or preferences when they specify and/or purchase products that use energy or affect energy use, such as lighting equipment, heating and cooling systems, pumps and motors, office equipment (e.g., computers, printers, copiers), vehicles, windows, etc. Some cities also include water conservation, renewable energy, recycled products, etc., in their EEP programs. Several governments go further, by specifically identifying the minimum EE levels public agencies must meet when they purchase energy-using products. In most cases, EEP programs are designed to give preference to products that offer the best value to the city over a product's lifetime.

Although most EEP policies strongly encourage public agencies to procure energy efficient products, a smaller (but growing) number of policies mandate it. City or national governments that mandate it generally see larger impacts in terms of energy cost savings. There are a range of EEP approaches and policy types, such as overall EEP policies (covering all energy-using products), product-specific policies or bans, obligations to ensure best value for money (which often incorporate LCC analyses), and broader green procurement policies (which may cover green buildings, sustainable procurement, etc.). For example, New York City banned municipal agencies from purchasing incandescent light bulbs in 2005; the City of Madrid adopted a policy for

procuring energy efficient products in 2005; and the City of Portland adopted a sustainable procurement policy in 2009. Increasingly, EEP criteria are becoming subsumed in broader green public procurement (GPP) guidelines.

COMMON STRATEGIES

Based on a global review of EEP programs, several common strategies and approaches to facilitate government EEP policies have been identified, including: energy efficient product labeling, catalogues of technical specifications, LCC analyses, product preferences, and qualified product lists (Table 1). While EE labeling has been the more common approach for national governments (Figure 2), city governments often specify labels when locally available (e.g., New York City, Vancouver). Where labels are not available or do not cover certain products, many cities have developed and used catalogues of technical specifications (e.g., Vienna, Portland) or qualifying products (e.g., Hannover, San Francisco) to guide city purchases. It is also common for governments to use more than one approach at a time, given the range of products a city typically purchases and variety in product applications.

While EE labels are simple, cities generally have less control over their use and how efficiency levels are set, since labels are generally done at a national or even regional (e.g., EU) level. Coordination with national labeling programs, thus, is recommended. Catalogues of technical specifications or qualifying products are generally easier to use, but often require substantial resources to develop and update, particularly for those products that have seen frequent technological advances (e.g., TVs). Partnering with other cities to develop or share specifications can help lower these development costs. LCC analyses generally ensure the best value for a city, but are not practical to do for

Table 1 | Key Energy Efficient Purchasing Approaches

Instrument	Description	Examples
EE Label	Requirement of products purchased to have an existing EE label in tender documents, when available	Australia, China, City of Vancouver (Canada), European Union (EU), Japan, Mexico, South Korea, Cities of Portland and New York (US)
Technical Specification Catalogue	Catalogue of technical specifications/ EE standards for commonly purchased products, which are then used in tender documents	City of Vienna (Austria), EU, Japan, Mexico, Sweden, United Kingdom (UK),
LCC / Best Value Award	LCC analysis to inform purchasing decisions about which products offer best value over useful lifetimes	Australia, City of Vancouver (Canada), EU, UK, US, Cities of Portland and San Jose (US)
EE Preference	Extra points or price preferences in bid evaluation for qualified products	Australia, China, Japan, EU, South Korea, US, City of Portland (US)
Qualifying Product List	Database of products that qualify with EE specifications	City of Vienna (Austria), China, EU, City of Hannover (Germany), South Korea, UK, US, City of San Francisco (US)

Source | ESMAP. 2012. *Public Procurement of Energy Efficient Products: Lessons from Around the World.* (ESMAP Technical Report 003/12). Washington, DC: World Bank.

Figure 2 | Examples of Energy Efficiency Labels

From left to right: US ENERGY STAR, EU Energy label, China EE Label, India Bureau of EE Label, Korean EE Label, Mexico Sello FIDE, Thailand EGAT EE Label, Brazil Selo Procel

each purchase. Encouraging the use of LCC calculators for commonly purchased equipment can help. Product preferences, while allowing higher efficiency products to be favored through higher scores, may be more difficult to monitor to ensure transparency and fairness. In summary, each approach has certain advantages and drawbacks, so cities should consider these mechanisms and local conditions carefully during the planning process. Box 1 provides an example from an EEP program in Mexico launched by a municipal association.

USING AVAILABLE RESOURCES

For EEP programs, high- and middle-income countries have a wealth of resources and experiences available for cities just getting started, which can dramatically lower the time and resources needed to launch such efforts—from LCC calculators and testing protocols to catalogues of technical specifications and training materials. Therefore, while cities should define their own procurement goals and programs, it is highly recommended to make use of existing resources to build off the experiences of others and avoid "reinventing the wheel." Working to align municipal initiatives with those of the national government can also help in combining resources and tools. (Links to additional resources are included at the end of this note.)

Box 1 | Energy Efficient Purchasing in Mexican Cities

In 2003, the *Asociación de Municipios de México* (AMMAC—a Mexican municipal association) initiated a voluntary program to promote EEP among its members, with support from the US Agency for International Development (USAID), Lawrence Berkeley National Laboratory (LBNL), and Local Governments for Sustainability (ICLEI). The program involved several fronts, including: (i) development of an initial list of products (e.g., lighting, computers), with technical specifications; (ii) delivery of training and tools (such as energy savings calculators, guidebooks, vendor lists); (iii) drafting of policy statements, or *normas*, for cities to enact to allow for such purchasing; and (iv) provisions for on-site technical support.

Over a four-year period, AMMAC was able to successfully recruit nearly 70 cities to participate, representing about 30 percent of the country's population. By 2007, 15 cities had enacted the *normas*, 22 had *normas* under development, and 12 had successfully completed product procurements. The program resulted in US$ 21 million in aggregate procurements, resulting in 20 million kWh in energy savings and 15,500 tons of CO_2e emissions reduction each year.

Source | Lawrence Berkeley National Laboratory (LBNL). 2007. Promoting an Energy-efficient Public Sector. Mexico Progress Report; USAID PEPS Mexico Project Data Sheet, 2007; www.pepsonline.org; Coleman, Phil, and Laura Van Wie McGrory (LBNL), Personal Communication, 2008.

MONITORING PURCHASES AND TRACKING RESULTS

While EEP programs can be difficult to monitor, regular tracking helps ensure that such policies and programs are meeting their intended objectives. Tracking both participation (or compliance) and impacts can also provide valuable information to city officials, procurement staff, and the public about program activities, effectiveness, and impacts. Periodic evaluations are also recommended to identify common issues so that training materials and other tools to facilitate EEP can be enhanced over time. A number of jurisdictions have begun recording results (Table 2) and many more plan to do so.

EEP IMPLEMENTATION GUIDELINES

EEP initiatives need to be supported with sound procurement policies, informed and trained procurement and technical officers, and supporting programs with sufficiently-resourced institutions. Strong policy statements, robust incentives and flexibility can also help create a fertile basis for such programs to succeed. Other guidelines for program implementation include:

- **Enact EE procurement policies or programs** with clear institutional accountability, targets, and sufficient resources
- **Create tools** (e.g., catalogues, LCC calculators, sample language for bidding documents) to facilitate city agency EEP efforts
- **Provide training** and intensively disseminate policies, tools, case studies, "how to" guidebooks, etc., to managers, procurement and technical officers, and other city employees

Table 2 | Energy Efficient Purchasing Results in Select Jurisdictions

City or Country	Procurement Policy	Impacts
Vienna, Austria	Mandatory GPP policy in 1999, includes EE criteria Guidelines cover 23 goods and services categories	Annual savings of €17 million and 30,000 tons of CO_2 emissions
China	EEP policy enacted in 2004, mandated to all government levels in 2006 Guidelines covered 28 product categories (2011)	Total EEP volume reached RMB 15.72 billion (US$2.3 billion) in 2009 Covered 70% of products in target categories
Mexico City, Mexico	Mandatory GPP policy in 2011, includes EE criteria Covers 8 product categories	Energy savings of 340 GWh/year 6,500 tons of CO_2 emissions avoided
South Korea	Voluntary GPP policy in 2004, includes EE criteria Covers 11 product categories	Total GPP volume reached KRW 1.12 trillion (US$1.0 billion) in 2009

Source | ESMAP. 2012. Public Procurement of Energy Efficient Products: Lessons from Around the World. (ESMAP Technical Report 003/12). Washington, DC: World Bank.

- **Ensure testing regimes are credible** and conduct independent, periodic inspections to ensure integrity of certification process
- **Develop incentive strategies**, both voluntary and mandatory, to help counteract behavioral inertia
- **Seek strategic partnerships** with manufacturers, other cities, non-governmental organizations (NGOs) in areas of mutual interest
- **Monitor compliance** and track market impacts

Changing behaviors is an ongoing effort, needed to cultivate a supporting culture around energy cost cutting. Staff and agency recognition, small incentive programs, awareness campaigns, and periodic training can all help in this regard. Table 3 includes a sample checklist for city municipal officers to encourage EEP.

When initiating an EEP policy or program, the following steps are suggested (Figure 3):

1 | Gain broad political buy-in on EEP concepts, focusing on key drivers, such as ensuring best value for money, leading by example, and helping to transform markets.

2 | Develop a voluntary EEP policy first to allow the mechanism to be tested, with strong components on outreach and dissemination, and feedback loops on implementation challenges.

3 | Begin with a small set of products in order to build a reputable EEP program. Where possible, rely on existing, credible labeling schemes.

4 | Develop program infrastructure, such as institutional set-ups and targets, as well as supporting measures (e.g., tools, training, incentives).

5 | Look for strategic opportunities to partner with other cities, states, and national governments; bundle procurements to achieve better pricing; liaise with manufacturing associations; and involve NGOs to broaden impacts and improve program effectiveness.

6 | Track and monitor the EEP policy to measure participation rates, track and report results, and assess broader market impacts. Disseminate results to politicians, employees throughout the jurisdiction, and the public to gain their support.

7 | As experience is gained, make the EEP policy mandatory. Appropriate enforcement mechanisms need to be established to ensure full compliance. Consider making procurement of energy efficient products the default option.

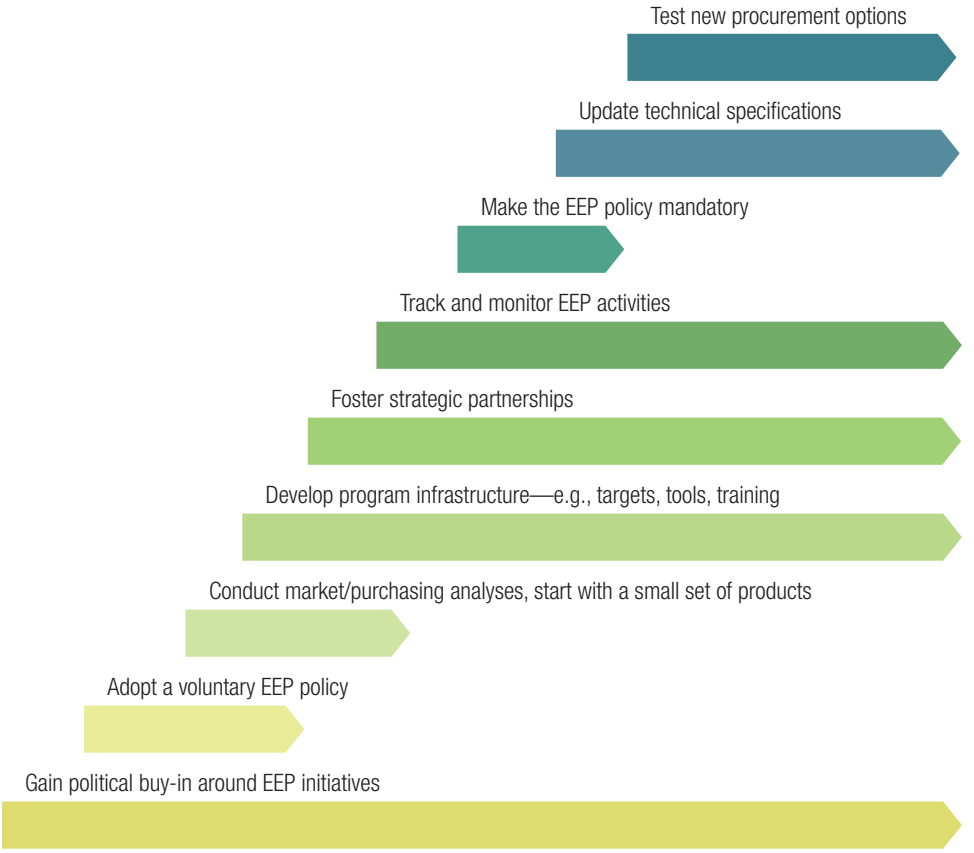
8 | Update technical specifications and introduce new products as the EEP policy matures in order to deepen impacts. Consider expanding EEP to resource-saving areas, such as water conservation, recycled content, etc.

9 | Test new procurement methods in order to further increase the impacts and improve the effectiveness of EEP efforts.

Table 3 | Checklist for Municipal Officers to Encourage Energy Efficient Purchasing

	What Can City Employees Do?
✓	Identify the main energy-using goods that your agency typically purchases
✓	Develop minimum EE performance requirements and verify that there are sufficient qualified suppliers
✓	Conduct LCC analyses to assess the cost-effectiveness of various technologies/models to select the one with the lowest overall costs
✓	Prepare bidding documents, require equipment certification, or commission testing to ensure compliance with the technical specifications
✓	Monitor the energy savings and, if satisfied, disseminate the specifications to other agencies

Figure 3 | Getting Started with Energy Efficient Purchasing



PART II: ENERGY SAVINGS PERFORMANCE CONTRACTS

Another approach to promoting EE in municipalities has been through the use of energy savings performance contracts (ESPCs), a type of public-private partnership (PPP). An ESPC involves an energy service company, or ESCO, providing a client with a full range of services (or turnkey contract) related to the adoption of energy efficient products, technologies, or systems. Unlike EEP, which is more appropriate for simple products like office equipment, ESPCs are better suited to more complex activities such as renovating existing energy systems (e.g., municipal buildings or street lighting), which require a range of customized solutions. The services provided under an ESPC may also include the financing of the EE upgrades, so that the host facility does not require the entire budget upfront but can amortize the costs over time. In many cases, the ESCO's compensation is contingent on demonstrated performance, that is the services and equipment can be paid from the actual energy cost savings.

ESPCs have a number of inherent advantages for addressing many of the barriers that city departments typically face (Table 4). Outsourcing an EE project in its entirety—from the detailed design to implementation to energy savings measurement and verification (M&V)—allows agencies to reap the gains without the hassles of completing each step of the project on their own, often with multiple procurements that can take months, if not years, to complete. The ability of ESPCs to allow for off-budget financing and to pay for themselves from the energy savings also makes the mechanism attractive to municipal agencies that have small discretionary and capital improvement budgets, or none at all, and a low tolerance for risk. And ESPCs can leverage expertise from the private sector,

Table 4 | Advantages of Energy Savings Performance Contracts

City EE Barriers	ESPCs Can . . .
High Perceived Risks	Define the benefits/costs upfront Assume some project performance risks
Inflexible Procurement	Maximize project value to city and offer turnkey services often bypassing multiple procurements
Limited Budgets for Capital Upgrades	Facilitate project financing, usually with repayments derived from project savings
Small Projects with High Transaction Costs	Allow smaller projects to be bundled Streamline audits/M&V for similar facility types
Inadequate Know-How and Information	Solicit private sector to compete based on their experience and best project ideas

Source | ESMAP, 2010; Hansen, Shirley J., 2009. ESCOs *Around the World: Lessons Learned in 49 Countries*. Lilburn, Georgia: Fairmont Press.

allowing city governments to select from a range of technical solutions in order to maximize their benefits.

Global experience demonstrates that ESPCs can be a very effective mechanism at realizing EE gains, since ESCOs have a business interest in ensuring that an EE project is actually implemented and saves energy. Many municipal and national governments have also been able to take advantage of their ability to bundle, finance, and implement public sector EE projects on a larger scale using ESPCs, while reducing the administrative burden on them from having to develop, procure, and implement retrofits one facility at a time. Bundled projects also allow ESCOs to benefit from economies-of-scale and lower their transaction costs, bringing additional benefits to the tendering agency. Experience with utilizing ESPCs with many governments has been positive, as shown in Table 5.

COMMON STRATEGIES

A number of approaches have been used around the world to promote and facilitate ESPC use in the municipal and public sectors. These have included indefinite contracting[5] (e.g., Hungary, USA), public or municipal ESCOs[6] (e.g., Stuttgart, New York City and Rivne, Ukraine), and procurement agents[7] (e.g., Berlin). Some have promoted specific business models, such as energy supply contracting[8] in Europe, while others have worked to bundle multiple municipal agencies in single tenders to benefit from economies-of-scale and negotiating power, as in Tamil Nadu, India, and Johannesburg, South Africa. Such experiences can offer a wealth of options and reference points for other cities to use and customize based on their needs. (See Box 2 for an example from Akola, India.)

While ESPCs can be a powerful mechanism, it is more complex than traditional product or service procurement. For example, since ESPCs are a blend of goods, works, services, and (sometimes) financing, traditional public procurement methods may not be applicable. Many governments have recently adopted PPP procurement laws and procedures, which allow local government greater flexibility in this regard. ESPCs are also designed to be output-based contracts, focusing on energy cost savings, rather than typical input-based contracts which involve delivery of prespecified materials or goods. Thus, reliable

Table 5 | ESPC Results in Select Jurisdictions

Jurisdiction	Reported Results
City of Berlin, Germany	€43 million in ESPC investments 19 ESPCs covering 1,400 municipal buildings €3.4 million in guaranteed annual energy savings
State of Tamil Nadu, India	ESPC signed, covering 7 municipal water and street lighting systems Guaranteed 30% energy savings
Japan	¥10 billion in ESPCs in public sector ~50 ESCO contracts signed each year 12% reduction in energy intensity
City of Johannesburg, South Africa	Bundled 13 municipal buildings under one ESPC Requires 25% reduction in energy use
United States	US$4 billion in ESPCs 460 ESCO contracts US$7.1 billion in energy cost savings ~18 trillion BTU savings per year

Note | The US figure only includes ESPCs initiated under the US Federal Energy Management Program (FEMP).

Source | ESMAP, 2010; Hansen, Shirley J., 2009. *ESCOs Around the World: Lessons Learned in 49 Countries*. Lilburn, Georgia: Fairmont Press.

and credible upfront technical data becomes critical for ESCOs to develop quality bids, city agencies to evaluate them, and performance-based payments to be made. Public budgeting is also a critical element of ESPCs, since public agencies need to be able to retain the accrued energy savings from their operating budgets in order to compensate the ESCOs. Municipalities generally have more flexibility with respect to the allocation of

Box 2 | Using an ESPC for Street Lighting in the City of Akola, India

The Akola Municipal Corporation is located in the Indian state of Maharashtra and has a population of about 450,000. Rising electricity bills for street lighting, water pumping, and public buildings has been a growing problem, with over 5% of their budget going to the local power utility.

In 2006, Akola issued a tender to qualified ESCOs to replace over 11,500 standard streetlights with efficient (T5) fluorescent tube lamps. The selected ESCO financed the equipment replacement (est. US$ 120,000) and received payments from the city for 6 years equivalent to 95% of the actual energy savings. The project saved about 2.1 GWh (56% from baseline), representing Rs6.4 million (US$ 133,000) each year.

The project, though, has experienced several implementation challenges due to disagreements over baseline payments, initial lamp failure, and municipal payment and contractual disputes, which are being addressed. Other cities in India are now seeking to replicate this approach and avoid similar difficulties.

Source | ESMAP, 2009. "Performance Contracting for Street Lighting Energy Efficiency in Akola Municipality, India." ESMAP Energy Efficient Cities Initiative Case Study, October 2009. (See http://www.esmap.org/esmap/sites/esmap.org/files/CS_India_SL_Akola_020910.pdf)

budgets and allowing for municipal departments and budget centers to keep associated cost savings accrued from EE improvements. Upfront planning and consultations across municipal departments, thus, is very important to identify potential issues and seek appropriate resolutions prior to bidding.

A common concern raised by local governments is the limited or lack of ESCOs operating in their city or country. Without experienced and interested ESCOs, municipal ESPC tenders cannot succeed. In fact, this is where municipalities can make a substantial difference. By issuing a series of bundled tenders, municipalities can send a powerful signal to the market that there is a stable demand for EE services, thereby bringing new EE service providers into the ESPC market. A recent ESPC tender in the City of Cairo, Egypt, found only 4 of the 19 firms in attendance at the pre-bidding conference were registered ESCOs; the rest included equipment suppliers, engineering firms, utilities, leasing companies, universities, and construction firms. Therefore, while there may be few or no active ESCOs in a city, related EE service providers almost always exist and often have very strong technical and managerial capacity to undertake EE improvements in municipal facilities. Of course, upstream consultations with potential EE service providers is always recommended to identify the types of services and risks they can and are willing to provide. Properly designed tenders and contracts tailored to local markets can often generate strong interest and have a catalytic effect at helping to foster EE service and ESCO markets.

As with EEP, there are a rich set of experiences, lessons, and resources from around the world to support ESPC use in developing countries and cities.[9] Multiple approaches have been successfully used to overcome some of the typical challenges and unique features of ESPCs from which others can learn and build upon. By looking at the range of models and experiences from others, cities can find solutions that may be appropriate or easily adapted to suit their local context. Resources, from training materials to sample tender documents to guidance notes, can collectively help inform cities just getting started on such EE procurement initiatives and allow them to avoid common pitfalls and help ensure successful outcomes.

ESPC IMPLEMENTATION GUIDELINES

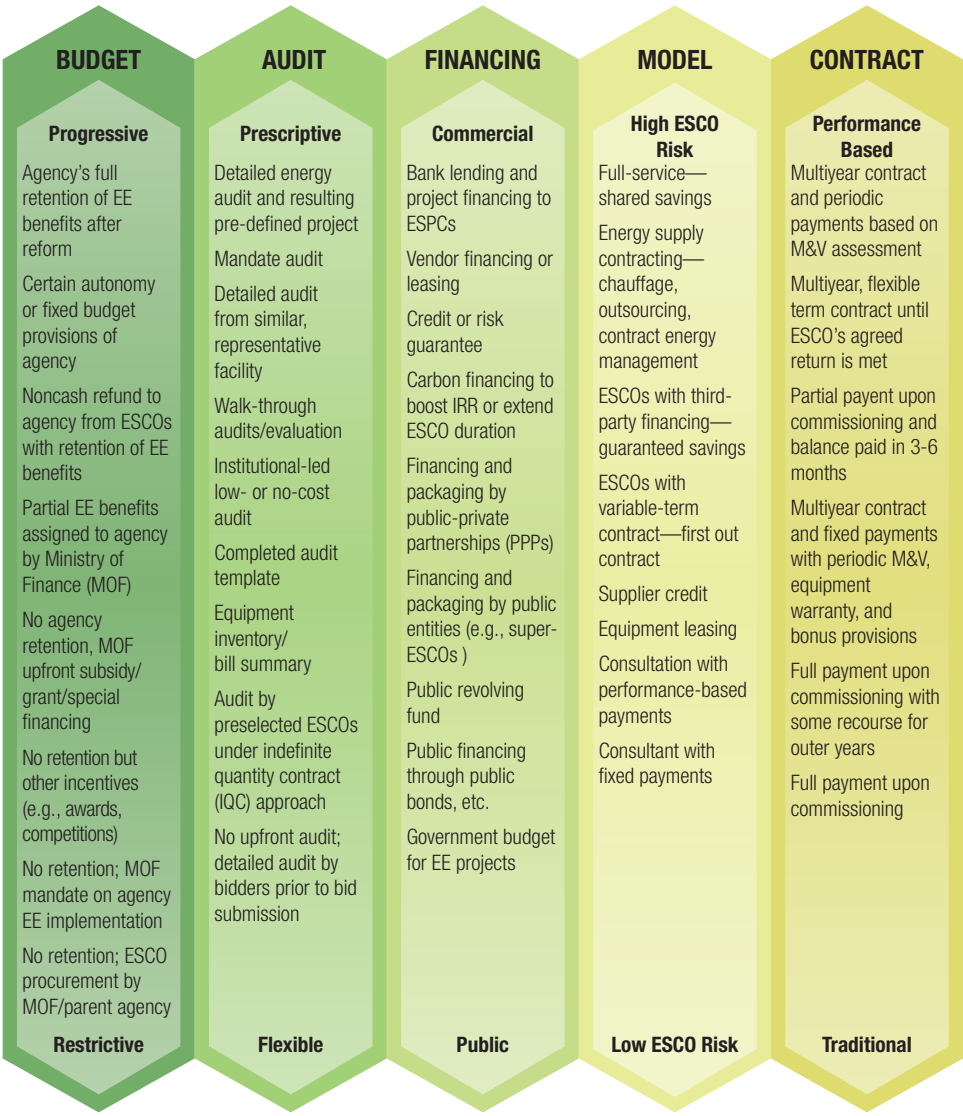
For each of the steps in ESPC procurement (Figure 4), international experience reveals a continuum of solutions and options for countries to consider. This creates a robust set of options which cities can tailor to meet their needs. One example of this is the need for an upfront energy audit. Many governments believe a detailed energy audit is required prior to the tendering process. This is not the case. While some countries do require them, most ESCOs will conduct their own audit after the contract is awarded, as they need to be sure the baseline energy use is accurate since it is on this basis that their payments will be made. Therefore, countries with more experience often do not require an energy audit as part of the ESPC tender. Some require only a completed audit template to be filled in; some request an equipment inventory and energy bill summary; others suggest providing a representative audit from a similar facility. In this way, a city government can actually lower their costs of developing the bidding documents while selecting

Figure 4 | Energy Savings Performance Contracts Procurement Steps

requirements that best meet its situation. Similarly, a variety of options for developing suitable budgeting, financing, and contracting solutions are available (Figure 5).

In terms of ESCO business models, there are a wide variety of approaches in use today. Developed countries have had more experience with such mechanisms, which have evolved over time and become more sophisticated. Transplanting these models in developing countries, however, has not worked well. Those emerging economies which have succeeded in fostering ESCO markets have generally started with simpler approaches first (e.g., commissioning contracts[10], leasing, vendor credit) and incrementally introduced more complex elements as experience was gained and market capacity improved. For example, commissioning contracts allow an ESCO to be paid in full after the project has been completed and energy savings verified. If the city finances the project, it could still service the debt from the expected energy savings. Such a model can be more appropriate in underdeveloped markets and ensure broader ESCO interest.

Figure 5 | Selecting the Right Procurement Process



And, a city could hold back a portion of the final payment for 6 to 12 months, or require a portion of the contract be held in an escrow account for 2 to 3 years to have some recourse should project performance decline in later years.

As with EEP, ESPC support programs must be anchored with sound procurement policies, informed and trained personnel, and resources to assist with implementation. Other guidelines for ESPC program implementation include:

- **Start with autonomous agencies** (e.g., universities, hospitals), which have more budgetary and procurement flexibility, first to test various approaches and contractual models, and then to select those interested and able to implement more complex contracting approaches such as ESPCs.
- **Assess capabilities of local ESCOs** and other potential EE service providers to determine what business models can work and services (e.g., financing, O&M) and risks they are willing and able to accept.
- **Develop bidding documents carefully** to provide essential baseline data, use broad output-based parameters (e.g., minimum energy savings), and require a single financial indicator (e.g., net present value or NPV) for the cost component of the bids, for greater simplicity and transparency in the selection process.
- **Identify viable and affordable financing sources** for ESPC, recognizing that ESCOs cannot take on risks that existing local financial institutions will not accept.
- **Define measurement and verification (M&V) requirements**, to ensure some recourse for poor performance without unduly increasing project costs or risks to either party.[11]

GETTING STARTED

One of the most critical elements is to first determine the various viable business and contractual models for ESCOs to operate in a particular city or country. Where local ESPC experience exists, efforts should seek to build upon successful transactions and to better institutionalize those aspects that have worked well. It may also be worth considering efforts to bundle projects to reduce transactions costs and make such projects more attractive to larger companies, including international ESCOs. Assessing the relative capacities of all those involved—from prospective ESCO bidders to municipal procurement and technical staff—is also critical to ensure success. While some governments have sought to enact broad changes to local laws and regulations to promote ESPCs, many developing countries have seen greater success by developing incremental adjustments to existing procedures and practices. Some recommended key steps to consider include:

1 | **Conduct an upfront market survey of ESCOs**, to gauge their level of interest and capabilities to serve the municipal market.

2 | **Hold stakeholder consultations to analyze barriers**, assess the types of constraints expected in public procurement of ESPCs, and define the nature and relative priority of the main barriers.

3 | **Formulate strategies to overcome each barrier**, working across municipal departments (e.g., budgeting, procurement, technical) towards the development of possible roadmaps to complete the procurement process and address each of the main barriers.

4 | **Develop and test small procurements**, documenting all the challenges faced, and work collectively to refine the procurement process.

5 | **Expand and replicate**, seeking options to scale-up by broadening the range of target systems and increasing the number of facilities to be bundled.

6 | **Institutionalize systems**, by developing model templates and documents, seeking longer term changes to public procurement and budgeting systems and practices, creating incentive schemes and financing programs, setting targets and M&V frameworks, etc.

CONCLUSION

Ultimately, procurement policies and programs seek to alter the decision-making processes of municipal officers, which can be difficult due to entrenched ideas, misaligned incentives, and behavioral biases. There is emerging consensus among experts that strategies to create EE options as the default—whereby a city department must use energy efficient products and services unless it can provide justification for not doing so—can be effective. This requires proper planning and reporting requirements, as well as specific guidance and supporting structures (e.g., tools, training, adequate staffing and budgets, etc.) to assist procurement and technical officers to implement EEP or undertake ESPC procurement.

City governments should use a holistic approach, from planning to tools to outreach to tracking. Equally important is setting up a suitable institutional structure to allow departments to work collaboratively to design and implement successful procurements. The adoption of a mandatory policy, development of an EE label, or drafting of a sample ESPC alone, will not guarantee successful outcomes. Some of the most critical elements relate to having established a clear policy statement by a city's mayor, supporting tools to help lower transaction costs (e.g., EE labels, LCC calculators, qualified product lists, sample tender documents, M&V protocols), and creating incentives to address financial gaps and behavioral resistance. Other program components, such as strong institutional foundation, robust testing and certification, training and outreach, strategic partnerships, and program monitoring and reporting, were also found to be crucial. It is also important to track program results and publicize them—to politicians, city staff, and the public—to demonstrate the program's successes and ensure continued funding and support in future years.

As the market develops, EE procurement initiatives and models promoted in the public sector are likely to have significant ripple effects in the private sector, as private firms seek to replicate what the public sector is doing. In fact, many corporate sustainable procurement programs were heavily influenced by government green purchasing programs over the past two decades. Similarly, a city's demand for more energy efficient goods and services will also send a signal to providers, who will respond accordingly and begin to market their services and skills to the rest of the economy, thereby bringing down costs and helping to create a more sustainable and competitive EE market.

ENDNOTES

1 The "municipal sector" refers to city-owned institutions subject to public procurement rules and regulations, including municipal buildings, universities/schools, hospitals/clinics, public lighting, municipal water and heating utilities, public transportation stations, community centers, fire stations, libraries, orphanages, etc.

2 Compiled from World Bank, McKinsey, and IMF 2010 statistics.

3 McKinsey Global Institute. 2011. Urban World: Mapping the Economic Power of Cities.

4 For more information on ESPCs in the public sector, please see: Singh, J. et al. 2010. Public Procurement of Energy Efficiency Services: Lessons from International Experience. Washington, DC: World Bank.

5 Indefinite contracting involves an umbrella agency competitively procuring one or more ESCOs (typically based on general qualifications) and then allowing public agencies to enter into direct contracts with selected ESCOs without further (or limited) competition.

6 Public ESCOs are publicly owned, so competitive procurement is usually not required by other public clients. There are many examples of public ESCOs, such as super ESCOs, utility-based ESCOs, utility demand-side management ESCOs, internal ESCOs (or public internal performance contracting, or PICOs).

7 Procurement agents, generally PPPs or NGOs, help government agencies procure ESCOs, often on a fee-for-service basis, develop tender documents and assist them through contract award. They can also act as a third party if contractual disputes arise.

8 Under energy supply contracting, or chauffage contracts, a public agency contracts out delivery of an energy service (e.g., lighting, heating), and selects an ESCO based on lowest cost per unit of service.

9 ESMAP. 2012. Public Procurement of Energy Efficient Products: Lessons from Around the World. (Technical Report 003/12). Washington, DC: World Bank.

10 Under commissioning contracts, the ESCO designs, procures, and implements an EE project and verifies the energy performance during project commissioning. If the project performs as expected, the ESCO is paid in full. A variation is a 1-year contract, where a portion (10-30%) is held for 6-12 months to ensure continued project performance.

11 Use of "deemed savings" based on engineering estimates may be an appropriate M&V option for early contracts.

ACRONYMS AND ABBREVIATIONS

€	Euro (currency)
AMMAC	*Asociación de Municipios de México* (a Mexican municipal association)
BTU	British thermal unit (1,055 joules)
CO_2e	Carbon dioxide equivalent
EE	Energy efficiency
EEP	Energy efficient purchasing
ESCO	Energy service company
ESPC	Energy savings performance contract
EU	European Union
GDP	Gross domestic product
GPP	Green public procurement
GWh	Gigawatt hours
IRR	Internal rate of return
KRW	South Korean Won (currency)
kWh	Kilowatt hours
LBNL	Lawrence Berkeley National Laboratory
LCC	Lifecycle cost
M&V	Measurement and verification
MOF	Ministry of Finance
NGO	Non-governmental organization
O&M	Operations and maintenance
PPP	Public-private partnership
RFP	Request for proposal
RMB	Renminbi (currency, China)
Rs	Indian Rupees (currency)
UK	United Kingdom
US / USA	United States of America
US$	United States dollar (currency)
USAID	US Agency for International Development
¥	Japanese Yen (currency)

ACKNOWLEDGEMENTS

The six guidance notes on making cities more energy efficient have been prepared by a multi-sectoral team led by Feng Liu and comprising World Bank staff and external experts in energy, urban, transport, and financial sectors. The authorship of the guidance notes are as follows:

- *City Energy Efficiency Assessments*, by Feng Liu and Stephen Hammer
- *Driving Energy Efficiency Markets through Municipal Procurement*, by Jas Singh
- *Financing Municipal Energy Efficiency Projects*, by Dilip Limaye and William Derbyshire
- *Improving Energy Efficiency in Buildings*, by Feng Liu
- *Planning Energy Efficient and Livable Cities*, by Serge Salat, Mansha Chen and Feng Liu
- *Toward Sustainable and Energy Efficient Urban Transport*, by Om Prakash Agarwal

The guidance notes benefited from comments from peers and practitioners, including Judy Baker, Ranjan Bose, Alexandra Le Courtois, Matt Glasser, Mustafa Hussain, Ivan Jaques, Peter Johansen, Todd Johnson, Jeremy Levin, Onur Ozlu, Monali Ranade, Hiroaki Suzuki, Victor Vergara, Christopher Warner, and Yabei Zhang of the World Bank Group, and Anthony Bigio of George Washington University, Anatolia Kopets of the Energy Efficient Cities Association of Ukraine, and Mohammed Imtiaz of the City of Hyderabad.

The team is grateful for the guidance provided by Rohit Khanna, Program Manager of the Energy Sector Management Assistance Program.

Editing and production management by Nicholas Keyes and Heather Austin of ESMAP are gratefully acknowledged.

Written by | Jas Singh

Energy Sector Management Assistance Program | The World Bank

Photo Credits

Cover - T. Georgiev / © World Bank; Table of Contents - © stock.xchng; Page 2 - G. Pesantez / World Bank; Page 5 - Page 11 - J. Hogg / World Bank. All other images are from iStock.

Production Credits

Production Editor | Heather Austin

Typesetting | Circle Graphics, Inc.

Reproduction | Master Print, Inc.

THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP

ESMAP
Energy Sector Management Assistance Program

The **Energy Sector Management Assistance Program (ESMAP)** is a global knowledge and technical assistance program administered by the World Bank. It provides analytical and advisory services to low- and middle-income countries to increase know-how and institutional capacity to achieve environmentally sustainable energy solutions for poverty reduction and economic growth. ESMAP is funded by Australia, Austria, Denmark, Finland, France, Germany, Iceland, Japan, Lithuania, the Netherlands, Norway, Sweden, and the United Kingdom, as well as The World Bank.

For more information about ESMAP's work on energy efficient cities, please visit us at: www.esmap.org/eeci or write to us at:

Energy Sector Management Assistance Program
The World Bank
1818 H Street, NW
Washington, DC 20433 USA
email: esmap@worldbank.org
web: www.esmap.org