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Scaling Up Energy Efficiency: The Case for a Super ESCO

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Abstract

In developing countries the implementation of energy efficiency projects has fallen far short of the potential due to a number of institutional and financial barriers. The concept of performance contracting implemented by ESCOs has been recognized as a mechanism to overcome some of these barriers. However, despite the fact that the potential for application of performance contracting in developing nations is enormous, the growth of the ESCO industry has been rather slow. In particular, performance contracting and ESCOs have played a very limited role in implementation of energy efficiency projects in the public sector. This paper identifies barriers to the development of a viable ESCO industry in developing countries and identifies the need for and the potential role of a "Super ESCO" as a means of facilitating large-scale implementation of energy efficiency projects.

A Super ESCO is an entity that is established by the Government and functions as an ESCO for implementing projects in public facilities and supports capacity building and project development activities of existing private ESCOs, as well as creation of new ESCOs. The Government capitalizes the Super ESCO with sufficient funds to undertake public sector performance contracting projects and to leverage commercial financing. The Super ESCO may also act as a financing or leasing organization to provide private ESCOs and/or customers financing for EE projects or leasing for EE equipment. The paper identifies examples of existing and proposed Super ESCOs and defines how Super ESCOs may address some of the barriers to large-scale implementation.

INTRODUCTION

Energy Efficiency is being increasingly recognized as the most cost-effective option in the short to medium term to meet the energy requirements of increased economic growth and while minimizing the impact of global climate change. Energy efficiency can be particularly important in developing countries that are experiencing high economic growth. Efficiency options can reduce the need for expensive new electricity generation capacity and, since much of the generation is coal-based, reduce the greenhouse gas (GHG) emissions from energy production and use. Governments in developing countries are placing emphasis on developing regulations, policies and incentives to encourage and promote increased energy efficiency in all energy consuming sectors, and are developing

and implementing a wide range of energy efficiency and demand-side management (EE/DSM) programs.

Unfortunately, despite the very large potential for improved energy efficiency, and the substantial interest and government activity related to EE/DSM, the actual implementation of energy efficiency projects has fallen far short of its potential. The large-scale implementation of energy efficiency is constrained by a number of important barriers.[1] The concept of performance contracting implemented by energy service companies (ESCOs) is being increasingly considered as a mechanism to overcome some of the barriers hindering and discouraging the large-scale implementation of energy efficiency projects.[2] However, despite the fact that the potential for application of performance contracting in both the public and private sectors in developing nations is enormous, the growth of the ESCO industry has been particularly slow in these countries. Also, due to a number of regulatory and institutional barriers, performance contracting and ESCOs have played a very minor role in implementation of energy efficiency projects in the public sector.[3] This paper identifies barriers to the development of a viable ESCO industry in developing countries and identifies the need for and the potential role of a "Super ESCO" as a means of facilitating the implementation of energy efficiency projects. The concept of the Super ESCO[4] has evolved over the course of the last few years and a number of developing countries are considering the establishment of such organizations.

WHY ENERGY EFFICIENCY?

Energy efficiency (EE) has become one of the most critical policy tools around the globe. EE is instrumental in meeting the world's growing demand for energy and plays an important role in mitigating the environmental impacts of this growth. To national governments, energy efficiency is an excellent strategy as it provides substantial benefits to the governments, as well as to utilities, energy consumers, and the environment. With their high cost-effectiveness, low financial risk, and high potential for energy savings and GHG reduction, energy efficiency programs provide nations with an excellent near-term option. Unfortunately, despite the promise of substantial benefits, achieving significant and sustained energy efficiency gains has proven immensely challenging in both developed and developing countries.

Despite the energy efficiency sector's enormous potential for growth, realizing large scale energy savings has proved challenging. Determining how dispersed energy efficiency projects can be packaged and implemented effectively has proven immensely difficult. While some mechanisms, such as utility demand-side management (DSM)[5] and energy savings performance contracting (ESPC)[6] were developed to address this challenge, experience has shown that such mechanisms must be carefully adapted to fit local needs and situations. Institutional issues are particularly important in the public sector. Overcoming restrictive public regulations, poor incentive structures, limited expertise, and a lack of information requires a concerted effort on the part of both the government and the ESCO. While there are no simple measures and universally applicable policies to deliver large-scale savings, experience from a number of countries shows that the delivery of major energy efficiency gains in the public sector is possible.[7]

ENERGY EFFICIENCY IN THE PUBLIC SECTOR

Public sector energy use varies widely across countries, but generally represents a major cost for governments and competes with other economic and social development programs for the government's limited resources. As the public sector often represents the largest single energy user within a country, the bundling of many small and dispersed energy efficiency investments can be a highly attractive business opportunity and can help entice existing commercial suppliers to enter the energy efficiency market. Furthermore, public sector facilities of similar type (e.g., office buildings, schools) tend to have relatively homogeneous end-use consumption patterns, which offer great potential for project replicability. Programs designed to reduce energy use can reduce energy-related bills, creating the fiscal resource necessary to allow governments to expand social services and meet other critical infrastructure investment priorities. Such programs can also ease load demands on the nation's domestic utilities, reduce the country's dependence on imported fuels, and lower the environmental impact of energy use. Energy efficiency investments in public facilities can also help serve as an attractive economic stimulus, by creating local jobs, upgrading facilities, and lowering future operating costs.

However, implementing energy efficiency projects in the public sector, particularly in developing countries, has been very challenging. While the potential for efficiency is substantial, efforts to realize this potential have been thwarted by several key barriers. These have included:[8]

- Inadequate information about energy efficiency potential and benefits, technologies, products and practices among public sector facility managers;
- Inadequate technical expertise in the public sector on how to conduct energy audits, design and carry out energy efficiency projects, identify quality energy efficiency products, and implement best practices;
- Lack of discretionary or dedicated budgets to pay for equipment upgrades, despite attractive payback periods, and limited or restrictive access to appropriate financing;
- Mixed or divided institutional incentives for energy savings projects, which can arise from different departments paying for equipment and monthly energy bills;
- Rigid procurement practices that may not allow life-cycle costing, bundling of service/equipment/financing, and use of multi-year contracts; and
- Low or subsidized energy prices and/or inefficient collection practices.

ENERGY EFFICIENCY IN THE PRIVATE SECTOR

Private sector organizations are driven by the profit motive and therefore are interested in energy efficiency options to the extent that they can provide a more attractive bottom line. As industrial firms in developing countries are now competing internationally, they are realizing the importance of being more efficient in their operations. Despite

recognizing the need for improved energy efficiency, the implementation of energy efficiency technology, products, and equipment in the private sector has been somewhat limited.

Typical barriers to large-scale implementation of energy efficiency in the private sector in developing countries include the following:

- In many cases, there is limited knowledge and awareness of energy efficiency technologies such as variable frequency drives, energy storage technologies, efficient controls for compressed air systems, etc.
- Decisions regarding energy efficiency projects generally do not receive high management priority, because management is often more concerned with other aspect of their business operations.
- While some private sector organizations have invested their own funds in energy efficiency measures, such investments are limited to very short payback measures.
- Internal investment funds face many competing demands and investments in increased production, marketing, research and development, etc. are considered more important then energy efficiency projects.
- External organizations such as energy service companies (ESCOs) have not yet developed credibility with industrial and commercial decision-makers and therefore have difficulties selling energy efficiency projects.
- The concepts of "project financing" are not yet common with respect to energy efficiency projects and limited funding is available from private financial institutions for such projects.

PERFORMANCE CONTRACTING AND ESCOS

Some barriers to energy efficiency implementation can be addressed by using the performance contracting approach in which the customer engages a commercial service provider to design and implement an energy efficiency improvement project with guarantees of energy savings. The service provider can offer a range of services to the customer, such as an energy auditing, project identification and design, equipment procurement, installation and commissioning, measurement and verification (M&V), training, and operations and maintenance (O&M). In this way, private sector expertise and capital can be deployed, allowing technical risks to be transferred away from the customer, facilitating equipment procurement and offering flexible financing options. More importantly, the project development and implementation can be outsourced to an entity that has the skills and incentives to overcome any short-term barriers and help realize the significant energy efficiency potential. The basic features of Energy Savings Performance Contracts (ESPCs) offered by an energy services provider (ESP) or an energy service company (ESCO) are:[9]

- ESPCs can offer a complete energy efficiency service, including design, engineering, construction, commissioning, and O&M of the energy efficiency

measures, as well as training, and M&V of the resulting energy and cost savings;

- ESPC services also include providing or arranging financing, often with a link between payments to the ESCO and the project performance, under which customers pay for the energy services from a portion of actual energy cost savings achieved (additional discussion of performance contracting business models is provided below);
- ESPCs typically provide performance guarantees, based on the level of energy and/or energy cost savings, for the entire project (as opposed to individual equipment guarantees offered by equipment manufacturers or suppliers); and
- Most of the technical, financial, construction and performance risks are borne by the ESCO under the ESPC.

ESCOs can be an important institutional mechanism for the delivery of energy-efficient investments. In recent years, many ESCOs have been established in developing countries.[10] These newly formed ESCOs strive to develop and implement energy efficiency projects for energy users around the globe. Under an ESPC, an ESCO develops, implements and finances (or arranges financing for) an energy efficiency project or a renewable energy project (at the end user level), and uses the stream of income from the cost savings, or the renewable energy produced, to repay the costs of the project, including the costs of the investment.

PERFORMANCE CONTRACTING BUSINESS MODELS

The concepts of ESPC and ESCOs were originally developed in North America and have now been increasingly adopted in developing countries. While there are many different variations in the specific approaches to ESPC, these can generally be characterized into two basic types of agreements - "*Shared Savings*" and "*Guaranteed Savings*."[11] In both models, the ESCO provides the complete range of implementation services and generates energy and cost savings. The differences are in the manner in which the project is financed, payments are made from the host facility to the ESCO, and energy and cost savings are allocated between the ESCO and the host facility.

In the *Shared Savings* model, the ESCO generally provides or arranges for most or all of the financing needed for the implementation of the project and assumes the customer credit risk. The ESPC specifies the sharing of the cost savings between the ESCO and the host facility over a period of time. The sharing of the payments is structured such that the ESCO will recover its implementation costs and obtain the desired return on its investment within that period. In a *Guaranteed Savings* agreement, the customer generally takes the loan on its own balance sheet. The ESCO guarantees certain performance parameters (such as efficiency, energy savings, cost savings, and/or other performance parameters) in the ESPC, which specifies the methods for M&V, and payments are made once the project performance parameters have been confirmed.

Over the last 20 years, ESCOs have been recognized as one of the most promising mechanisms to implement energy efficiency measures in both the public and private sectors. As the ESPC concept has evolved the term ESCO has been used to designate

many different types of organizations that may implement the ESPC approach, including energy suppliers, equipment manufacturers, vendors, construction management companies, engineering firms, mechanical/electrical contractors, and other related businesses. Furthermore, in developing countries, where full service ESCO models may be overly complex or impractical, more simplified models may be preferable to the complex ESCO model prevalent in more industrialized countries. Also a number of different ESCO business models have been implemented, as illustrated in Box 1 below from a 2005 World Bank report.[12]

LIMITATIONS ON GROWTH OF ESCOS IN DEVELOPING COUNTRIES

Despite the opportunities to create a thriving energy services business in many countries, the growth and development of the ESCO industry has often been constrained by a number of barriers. [13]

- Most independent ESCOs have a small capital base and have difficulties accessing project funding from commercial financial institutions (FIs) because they can only provide limited equity financing.
- Due to the immaturity of the energy efficiency market in developing countries, the costs of project development are relatively high, and most small ESCOs find it difficult to finance project development costs.

BOX 1 - EXAMPLES OF DIFFERENT ESCO BUSINESS MODELS

(The list ranges from the full-service/high risk contracts to low service/risk)

Full-Service ESCO: The ESCO designs, finances and implements the project, verifies energy savings and shares an agreed percentage of the actual energy savings over a fixed period with the customer. This is also referred to as the 'Shared Savings' approach in the U.S.

End-Use Outsourcing: The ESCO takes over operation and maintenance of the equipment and sells the output (e.g., steam, heating/cooling, lighting) to the customer at an agreed price. Costs for all equipment upgrades, repairs, etc. are borne by the ESCO, but ownership typically remains with the customer. This model is also sometimes referred to as Chauffage or Contract Energy Management.

ESCO w/ Third Party Financing: The ESCO designs and implements the project but does not finance it, although it may arrange for or facilitate financing. The ESCO guarantees that the energy savings will be sufficient to cover debt service payments. This is also referred to as Guaranteed Savings in the U.S.

ESCO Variable Term Contract: This is similar to the full-service ESCO, except that the contract term can vary based on actual savings. If actual savings are less than expected, the contract can be extended to allow the ESCO to recover its agreed payment. A variation is the 'First Out' model, where the ESCO takes all the energy savings benefits until it has received its agreed payment.

Equipment Supplier Credit: The equipment supplier designs and commissions the project, verifying that the performance/energy savings matches expectations. Payment can either be made on a lump-sum basis after commissioning or over time (typically from the estimated energy savings). Ownership of the equipment is transferred to the customer immediately.

Equipment Leasing: Similar to supplier credit, the supplier receives fixed payments from the estimated energy savings. However, in this case the supplier owns the equipment until all the lease payments, and any transfer payments, are completed.

Technical Consultant (w/ Performance-based Payments): The ESCO conducts an audit and assists with project implementation. The ESCO and customer agree on a performance-based fee, which can include penalties for lower energy savings and bonuses for higher savings.

Technical Consultant (w/ Fixed Payments): The ESCO conducts an audit, designs the project and either assists the customer to implement the project or simply advises the customer for a fixed, lump-sum fee.

Source: The World Bank "*Energy Efficiency Portfolio Review and Practitioners' Handbook,*" 2005.

- The ESCO model is new in developing countries and, due to the limited experience with successful ESCO projects, ESCOs have not yet developed good credibility with energy users.
- The concept of project financing for ESCO projects is not commonly accepted by financial institutions (FIs) in developing countries. A major reason for this is that FIs require collateral and are generally unwilling to accept the savings stream generated by the project as appropriate collateral. Energy efficiency projects are generally small relative to other investment projects being considered by the FIs, and they also have a relatively large proportion of "soft costs" that cannot be easily collaterized.
- The FI's staff typically has limited knowledge and understanding of energy efficiency projects and the ESPC concept.
- FIs also perceive energy efficiency projects as inherently more risky than other investments, and generally require a large proportion of equity funding from the ESCO for a project.

The combination of high project developments costs, limited access to long-term, low-cost project financing, high equity requirements for project financing, and lack of credibility with customers, has led to what may be considered a "market failure"[14] with respect to the ESCO industry's ability to implement energy efficiency on a large scale.

OTHER BARRIERS TO LARGE-SCALE IMPLEMENTATION OF EE PROJECTS

Public Sector

Large-scale implementation of energy efficiency projects in the public sector is constrained by a number of barriers:

- Facility managers in public buildings generally do not have a good understanding of the opportunities, costs and benefits of energy efficiency options.
- There is very limited technical capacity in public agencies for conducting energy audits, designing and engineering projects, and/or contracting with and managing ESCOs or other energy service providers to implement projects
- There is generally little or no incentive to staffs of public facilities to save energy as the resulting cost savings may simply lead to reduced operational budgets in future years (which may actually represent a disincentive to save energy).
- Public sector contracting and procurement rules are often rather restrictive; for example, they require the selection of the low bidder which makes it difficult to adopt the performance contracting approach.
- Responsibilities for capital and operating budgets in public agencies are often dispersed, making it difficult to deploy funds from capital budget to reduce operating costs.
- Commercial banks are generally unwilling to provide project financing to public agencies.
- Private sector ESCOs often find it difficult to do business with public agencies.

Private Sector

Barriers to large-scale implementation of energy efficiency projects in the priavte sector include the following:

- Commercial and industrial energy users are unwilling to provide a high priority to energy efficiency projects and have limited interest in investing their own funds for such projects.
- Senior managers of many large energy users are not convinced of the benefits from energy efficiency projects
- The concepts of performance contracting and ESCOs are relatively new to many commercial and industrial energy users in developing countries.

- ESCOs in most developing countries have not yet established credibility with large energy users.
- There are few examples of successful ESCO projects that can serve as demonstrations of the benefits of energy efficiency.
- Many financial executives are unwilling to take on additional debt on their balance sheets to finance energy efficiency projects. Project financing would be a preferred approach, but FIs are not used to project financing of energy efficiency projects.
- Project financing of performance contracting projects implemented by ESCOs is limited by the risk perceptions of FIs and the difficulties in financing ESCOs that have limited balance sheets.

THE SUPER ESCO

The concept of a Super ESCO has recently evolved as a mechanism of overcoming some of the limitations and barriers hindering the large-scale implementation of energy efficiency projects. As defined in this paper, a Super ESCO is an entity that is established by the Government[15] and functions as an ESCO for the public sector market (hospitals, schools, municipalities, government buildings, and other public facilities). It also supports capacity development and project development activities of existing private sector ESCOs and helps create new ESCOs. The Government capitalizes the Super ESCO with sufficient funds to undertake public sector ESPC projects and to leverage commercial financing. A primary function of the Super ESCO is to facilitate access to project financing by developing relationships with local or international financial institutions. The Super ESCO may also provide credit or risk guarantees for ESCO projects, or act as a leasing or financing company to provide ESCOs and/or customers EE equipment on lease or on benefit-sharing terms.

The recent World Bank study[16] of the international experience in public procurement of energy efficiency services identified the Super ESCO as a potentially viable model for developing countries. A Super ESCO is uniquely positioned to overcome a number of the barriers faced by smaller ESCO companies. With their size and credibility as a public institution, Super ESCOs have the capability to support the growth of a nation's private domestic ESCO business and can have the capacity to provide financing for EE projects.

A Super ESCO has a unique ability to target the largely untapped energy efficiency market in the public sector. The efficiency potential in the public sector is substantial, but the implementation of energy savings programs is complicated by numerous factors, including a lack of commercial orientation of public agencies, limited incentives to lower energy costs, complex and strict budgeting and procurement procedures, and limited access to budgetary or commercial project financing. Many public agencies, particularly in developing countries, face severe budget constraints and often focus on the upfront cost as a matter of necessity. This, however, leads to greater operating cost liabilities in outer years, causing further budgetary pressures and creating a vicious cycle. Surmounting these barriers is a major challenge in both developed and developing countries. Traditional ESCOs in developing countries face a number of challenges in

meeting the needs of the public sector. Therefore, Super ESCOs can be structured to meet the energy efficiency needs of public agencies.

A Super ESCO can also play a major role in the private sector. It has the capacity to develop and implement projects in the private sector. However, in the long run it is desirable to build the capacity of the local private sector ESCOs, and create a competitive private market for ESCO services. Therefore an appropriate role for the Super ESCO may be to engage private ESCOs as contractors for parts of the implementation (such as installation, commissioning and performance monitoring), thereby helping to build their capacity. The Super ESCO may also be in a position to arrange financing for small private ESCOs to help them implement projects and build their capacity and credentials.

EXAMPLES OF SUPER ESCOS

While the concept of the Super ESCO is still in its infancy, several countries have already adopted the idea of a Super ESCO and have created a Super ESCO to help encourage their domestic energy services market. Other nations are now considering the establishment of Super ESCOs. Some examples are provided below.

Belgium - FEDESCO

In 2005, the Belgian federal government created FEDESCO, a public but independent energy services company to encourage the development of a domestic energy services industry. The primary mission of FEDESCO is to study, facilitate and coordinate energy savings projects in public buildings through the use of third party financing. Phase 1 of FEDESCO's objectives focuses on 1800 buildings occupied by ministries, federal public services (administrations) and other governmental organizations with a floor area of over 8 million m² and an annual energy bill of over 100 million Euros. These buildings are owned and managed by the Federal Building Agency.[17] In subsequent phases, other public buildings (from regional governments, provinces, municipalities, public companies, etc.) and even private buildings will be included.

FEDESCO provides both professional energy services and innovative financial services (pre-financing, third party financing, and energy savings performance contracting) to private ESCO companies in Belgium. This Super ESCO also seeks to facilitate an annual investment program of up to 7.5 million Euros to encourage private sector investment in energy efficiency. FEDESCO was created in the framework of the 2nd Belgian Federal plan for sustainable development (2004-2008) and the National Climate Plan (2002-2010). FEDSCO has been successful in achieving a 10% reduction in both total energy consumption and greenhouse gas emissions in federal public buildings in Belgium.

Croatia - HEP ESCO

In 2003, the World Bank and the Global Environment Facility (GEF) helped create an ESCO subsidiary within the national power utility, Hravatska Electroprivreda (HEP).[18] This national HEP ESCO was capitalized by a World Bank loan, HEP equity, local banks, and other sources to offer energy efficiency services to public and private clients. GEF funds were also mobilized to provide additional credit enhancement for HEP ESCO projects and provide some technical assistance to the ESCO and local banks. Since the

Croatian market was small and few private ESCOs were operating in the market, the government did not foresee inherent risks related to crowding out the private sector. The HEP ESCO used the "open book" model to keep its pricing fair and transparent. Government entities can directly contract with government companies and their subsidiaries, so public agencies are not required to conduct any competitive procurement to contract with HEP ESCO.

The HEP ESCO received a $7 million GEF grant and a $5 million World Bank loan, and equity investment from the parent utility. The ESCO also negotiated financing arrangements with local commercial bank debt facilities. By the end of 2008, about 186 million Kuna (US$35.4 million) in energy savings contracts have been signed.[19]

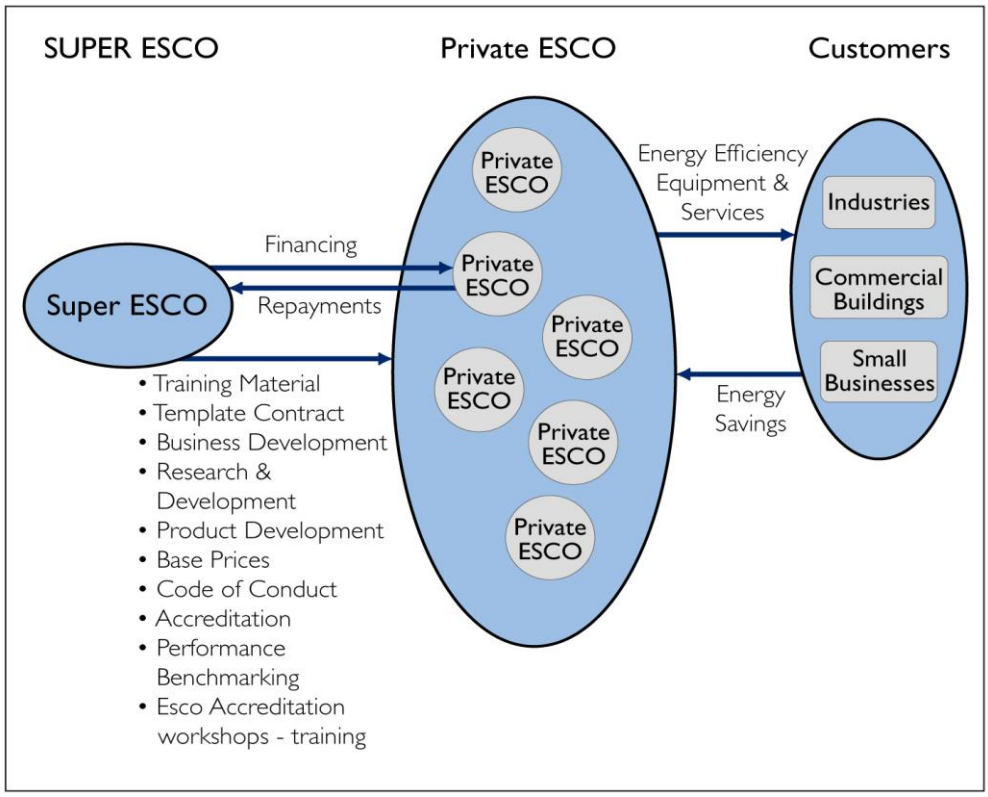
Philippines – EC2 Corporation

In response to challenges it faces in the energy sector, the Government of the Philippines organized the Philippine Energy Summit in February 2008 to discuss options for mitigating the impact of high-energy prices on the general public. One of the conclusions of the Summit was that there should be increased focus on promotion of energy efficiency because of its potential for rapid implementation. The summit participants agreed to pursue energy efficiency as the short-term strategy to combat the impact of high energy prices. The Government recognized that it alone could not identify and finance the various energy efficiency initiatives and requested the Asian Development Bank (ADB) to support it in reducing the impact of high-energy prices and the overall carbon footprint of the energy sector.

Under this initiative, and with ADB's support, the Government of the Philippines approved the concept of the creation of Super ESCO operation, to be called EC2 Corporation (E for energy efficiency, environment, and entrepreneurship, and C2 for climate change), that will both address the development and implementation of energy efficiency projects in public sector facilities, and help support the development of a private sector ESCO operation for private facilities in the Philippines.[20]

An illustration of the EC2 Corporation is shown in Figure 1.

Figure 1 - Illustration of the EC2 Corporation in the Philippines



Province of Hebei, China - The Fakai Scientific Services Corporation

China has established aggressive goals for energy efficiency. Many energy efficiency and DSM programs are being established by the National Development and Reform Commission (NDRC) as well as by provincial DRCs. The Province of Hebei aims to establish a 600 MW energy efficiency power plant (EPP) and reduce electricity consumption by 15 billion kWh during the period 2009 to 2013.[21]

To achieve this aggressive goal, the Province of Hebei created a special fund from the urban construction surcharge covered in the electricity price, with RMB 0.001 charged per KWh of electricity sales. This fund is mainly used to provide subsidies for the electricity DSM projects, the support of R&D, and popularization of high-efficiency energy-saving products, the publicizing and training with respect to power DSM, and the construction, operation and maintenance of power DSM system. Hebei also created the Hebei Province DSM and Instruction Center as the agency in charge of DSM work in Hebei Province, including DSM information, communication and training and promotion of new energy efficiency technologies.

Recognizing that implementation of energy efficiency projects needed to be substantially increased in Hebei, the DSM Center established the Fakai Scientific Electricity Services Limited Corporation as a wholly-owned subsidiary to encourage, promote and implement energy efficiency and DSM projects.[22] This company is expected to operate as a Super ESCO. It will develop and implement energy efficiency projects using the ESPC model,

as well as assist other ESCOs operations in Hebei to grow their businesses and undertake more ESPC projects.

Fakai is being capitalized by the Hebei Development and Reform Commission (DRC) and will strive to work with local, national and international financial institutions as well as donor agencies (such as the Asian Development bank) to mobilize resources in an effort to achieve the EPP goal of 600 MW.

India - Energy Efficiency Services Limited

The energy efficiency market in India is characterized by a very large untapped potential and a small number of fledgling ESCOs that are mostly undercapitalized. The Bureau of Energy Efficiency (BEE), created by the Energy Conservation Act, 2001,[23] has undertaken a number of initiatives to encourage and promote ESCOs and to create a market for ESCO services. A number of donor agencies have also provided funding to promote the ESCO business model, and there has been some recent activity at the State level to undertake ESPC projects for municipal pumping and street lighting.

Recognizing that much more needs to be done, the Government of India is now establishing a national organization called Energy Efficiency Services Limited (EESL).[24] EESL will be capitalized by four existing national public sector undertakings (PSUs) namely National Thermal Power Corporation, Power Grid Corporation, Power Finance Corporation, and Rural Electrification Corporation.

The company will function as the implementation arm of the National Mission for Enhanced Energy Efficiency (NMEEE). The purpose of setting up a separate corporate entity is to develop an energy efficiency market that is virtually nonexistent in the country. The EESL was conceptualized by the BEE, but it is expected that it will have no direct link to BEE, which will act as the monitoring agency and oversight body for energy efficiency programmes of the government. The initial capital of EESL is expected to be about US$50 million.

Some of the major functions of EESL are expected to include energy efficiency planning and implementation in buildings and industrial sites, implementing the "Bachat Lamp Yojana" (a scheme for promotion of CFL lamps), and demand-side management in the municipal and agricultural sectors. EESL will also assist the growth and development of the existing ESCOs.

HOW CAN A SUPER ESCO ADDRESS THE IMPLEMENTATION BARRIERS?

As indicated above, there are many barriers to the scaling up of energy efficiency project implementation in both the public and the private sectors. A Super ESCO can help address many of these barriers. Tables 1 and 2 below illustrate the major barriers in the public and private sectors respectively, and suggest how a Super ESCO can help overcome these barriers.

Table 1
How a Super ESCO Can Address Barriers to Implementation in the Public Sector

BARRIERS TO EE PROJECT IMPLEMENTATION IN THE PUBLIC SECTOR	HOW THE SUPER ESCO CAN ADDRESS THESE BARRIERS
Low awareness and interest on the part of public agencies in energy efficiency (EE) projects	Super ESCO can conduct "marketing campaign" to increase awareness and interest
Zero budgeting policy of many governments provides little incentive for saving energy costs	Super ESCO can develop incentive mechanisms for public agencies
Budgeting Issues for public agencies - Capital Expenditure vs. Operating Expenditure	Agency can avoid issue by having project financed by a Super ESCO
Lack of procurement regulations that would allow ESCOs and Performance Contracting	Contracting with a Super ESCO can overcome this problem
Limited capacity in public agencies for performance contracting using ESCOs	Super ESCO can develop standard contracts customized for public agencies
Lack of interest on the part of local financial institutions to fund public sector projects	Financing can be provided by Super ESCO
Local financial institutions generally unwilling to provide "project financing" for EE projects	Super ESCO can provide "project financing" for public agency EE projects
Private ESCOs unwilling to invest in public sector projects	Super ESCO can invest in public agency EE projects
Public agencies not used to contracting with private sector for energy services	Public agencies may find it easier to contract with a Super ESCO

Table 2
How a Super ESCO Can Address Barriers to Implementation in the Private Sector

BARRIERS TO EE PROJECT IMPLEMENTATION IN THE PRIVATE SECTOR	HOW THE SUPER ESCO CAN ADDRESS THESE BARRIERS
Small number of ESCOs operating in the domestic mret in many nations - makes competition difficult	Super ESCO can facilitate the creation of additional ESCOs
Low awareness of the ESCO concept on the part of commercial and industrial energy users	Super ESCO can conduct "marketing campaigsn" and provide case studies and demonstration projects
Most private ESCOs are undercapitalized and have limited resources for project development	Super ESCO can assist ESCOs in project development
Most ESCOs have limited resources for project financing of EE projects	Super ESCO can provide capital and/or leverage funds from commercial financial institutions
Few successful ESCO projects that can serve as "demonstration projects" for ESCO concept	Super ESCO can develop and disseminate case studies of successful ESCO projects
Project hosts unwilling to invest internal capital in energy efficiency projects	Super ESCO can provide capital and/or leverage funds for EE projects from commercial FIs
Local FIs' lack of familiarity with lending for EE projects	Super ESCO can provide TA to local FIs on EE projects and help develop new financial products
Local FIs' unwillingness to finance ESCOs due to their limited assets	Super ESCO can provide credit enhancement products for ESCOs
Local FIs' perception that EE projects are highly risky	Super ESCO can provide risk management products for FIs
Local FIs' lack of capacity to conduct technical due diligence of EE projects	Super ESCO can provide assistance in technical due diligence
High project development costs for ESCO projects due to limited experience in performance contracts	Super ESCO can develop standardized templates for ESCO contracts and agreements
Commercial and industrial users are not convinced of energy and cost savings benefits of EE projects	Super ESCO can develop standardized and formal measurement and verification protocols

CONCLUSIONS

Super ESCOs can provide a much needed stimulus to the implementation of energy efficiency projects by overcoming some of the major barriers to implementation in developing countries. The structure and functions of Super ESCOs are still evolving and it will be interesting to see how successful the Super ESCO concept and model will be in the early models being established in the Philippines, China and India. The key contributions that a Super ESCO can make to the scaling up of energy efficiency project implementation include:

- Implementing ESPC projects in the public sector, thereby overcoming the typical problems that private sector ESCOs face in public sector ESPC projects
- Using private sector ESCOs as implementing agents, thereby increasing their level of competence and experience
- Providing technical assistance, training and capacity building for private sector ESCOs
- Developing standard contracting models and related templates for agreements, procedures and guidelines for both public and private sector ESPC projects
- Developing financing facilities to assist private sector ESCOs in accessing project financing
- Leveraging funds from commercial financial institutions and donor agencies to create an energy efficiency fund
- Implementing and publicizing demonstration projects and case studies of best practices of ESPC
- Developing risk management products to increase the participation of commercial financial institutions in financing energy efficiency projects
- Improving knowledge and awareness on the part of energy users in order to increase acceptance of the ESPC approach.

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[3] Singh, Jas, Dilip Limaye, Brian Henderson and Xiaoyu Shi, *Public Procurement of Energy Efficiency Services: Lessons from International Experience*, The World Bank, November 2009

[4] It should be noted that the definition of Super ESCO in this paper is quite different from the so-called Super-ESCOs in the U.S., which are simply large ESCOs that have won the IDIQ contracts with the Federal government for implementing energy efficiency projects in government facilities.

[5] Electric Power Research Institute and Edison Electric Institute, *Demand-Side Management Guidebook, Volumes I- V*, Palo Alto, CA, 1984

[6] For additional information on the concept of ESPC, see SRC Global Inc., "A Strategic Framework For Implementation of Energy Efficiency Projects for Indian Water Utilities," prepared for The World Bank, Public-Private Infrastructure Advisory Facility, May 2005

[7] PROST, "Harnessing the Power of the Public Purse: Final report from the European PROST Study on Energy Efficiency in the Public Sector," The European Union, 2003

[8] Singh, Jas et al, op cit

[9] SRC Global Inc., "A Strategic Framework For Implementation of Energy Efficiency Projects for Indian Water Utilities," prepared for The World Bank, Public-Private Infrastructure Advisory Facility, May 2005

[10]Many reports describe the status of international ESCO activities. See for example, MOTIVA, "International Review of ESCO Activities", July 2005, and Bertoldi, P and Rezessy, S., "Energy Service Companies in Europe: Status report, European Commission," DG JRC 2005

[11]These concepts are described in many reports on ESCOs and energy efficiency financing. See, for example, Taylor, Robert P., Chandrasekar Govindarajalu, Jeremy Levin, Anke S. Meyer and William A. Ward, *Financing Energy Efficiency: Lessons from Brazil, China, India, and Beyond*, The World Bank, 2008

[12]The World Bank, 2005, "World Bank/GEF Energy Efficiency Portfolio Review and Practitioners' Handbook.," World Bank, 2005

[13]For a discussion of some of the barriers to the development of ESCOs, see Charles River Associates (Asia Pacific) Pty Ltd, "Energy efficiency Enhancement Project," prepared for the Asian Development Bank, 2005.

[14]Hasnie, Sohail, "ESCOs in the Philippines", presentation at the Workshop on ESCOs and Energy Efficiency Projects, Asian Development Bank, January 2009

[15]A Super ESCO may also be established as a public-private partnership; although to date there are no examples of this approach.

[16]Singh, Jas et al, op cit

[17]Paolo Bertoldi, Benigna Boza-Kiss, Silvia Rezessy, "Latest Development of Energy Service Companies Across Europe," European Commission, Joint Research Centre, 2007; also www.fedesco.com.

[18]The World Bank, "Croatia Energy Efficiency Project Appraisal Document," World Bank Report No. 25592-HR. September 11, 2003

[19] Rudy Vanderbeken and Christophe Madam, "Presentation on Fedesco," 2008

[20]Asian Development Bank, "The ESCO Approach for Public Facilities and Private Sector Development," 2009

[21]Hebei Development and Reform Commission, "The Medium and Long-Term Plan for DSM in Hebei Province (2009-2013)," 2009

[22]Hebei Development and Reform Commission, "The Introduction of Hebei DSM Work," Presentation at Asia Clean Energy Forum, June 2009.

[23]The Gazette of India, *Energy Conservation Act*, 2001

[24]Business Standard, "Four power PSUs to Establish Energy Efficiency Company", June 23, 2009