

THE BOTTOM LINE

Over the past decade, Super ESCOs have emerged as a viable alternative to private sector ESCOs. These government-established entities are well positioned to address market barriers and realize energy efficiency potential of the public sector even as they facilitate the development of private sector ESCOs. The concept, structure, and functions of Super ESCOs are still evolving, but experience to date has shown that Super ESCOs can unlock energy efficiency markets facing challenges with financing, delivery, and implementation.

Transforming Energy Efficiency Markets in Developing Countries: The Emerging Possibilities of Super ESCOs

What is at stake here?

Improving energy efficiency is one of the most cost-effective ways to mitigate global climate change

Significant energy efficiency contributions at a global level are necessary not only to limit the increase in global average temperatures to 2° C, but also to help countries enhance energy security, increase competitiveness, generate employment, reduce poverty, and protect the environment. Energy efficiency contributes to the World Bank's twin goals of poverty reduction and shared prosperity.¹

Energy efficiency investments may entail higher up-front costs (relative to standard equipment and appliances, for example), but they are generally financially viable and cost-effective on a life-cycle basis. Importantly, *energy cost savings can repay initial investment costs over time*. For example, the investment required to replace conventional incandescent or compact fluorescent lamps with efficient light-emitting diode (LED) bulbs pays off in 6–12 months, and investment in high-efficiency air conditioners may have a payback period of 6–8 years. Short payback periods are typical for industrial equipment, building materials and equipment, and common household appliances.

Yet shifting consumers to more-energy-efficient products remains a challenge. Evidence from several countries, both developed and developing, shows that realizing markets' energy efficiency potential, particularly on the end-user or demand side, is difficult, due to market failures and barriers at the macroeconomic and project transaction levels. Obstacles to scaling up energy efficiency are

particularly high in the public and residential sectors, where energy savings are dispersed, and where decisions are driven by multiple actors and complex ecosystems. In large industries, meanwhile, energy efficiency interventions can focus on specific, high-impact industrial processes (figure 1).

Global interventions that have successfully boosted demand-side energy efficiency have involved five main areas, as shown in figure 2 on page 3. All five areas aim toward the development of effective and scalable financing and delivery mechanisms, and encourage the switch to new technologies and consumer behaviors in support of investments for energy efficiency improvements. Interventions range from utility demand-side management programs (such as allowing consumers to finance efficiency improvements over time, on their bill²) to dedicated credit lines and venture capital investments.³

While some of these mechanisms may be best suited for certain sectors (e.g., credit lines for promoting the energy efficiency of large and medium industrial enterprises), others can be flexibly adapted to serve multiple sectors. Choosing the appropriate mechanism and its design involves several factors, including: (a) the current legislative, regulatory, and institutional frameworks relevant to energy efficiency within the country; (b) the maturity of financial and credit markets; (c) the current state of local energy efficiency service markets, including the availability of energy service companies (ESCOs) and energy auditors; and (d) stakeholders' technical and financial capabilities to develop and implement energy efficiency projects.

¹ Over the past few decades, the Bank's energy efficiency financing has increased to \$1–1.5 billion annually.

² Sometimes referred to as "On Bill-Financing" in demand side management (DSM) literature.

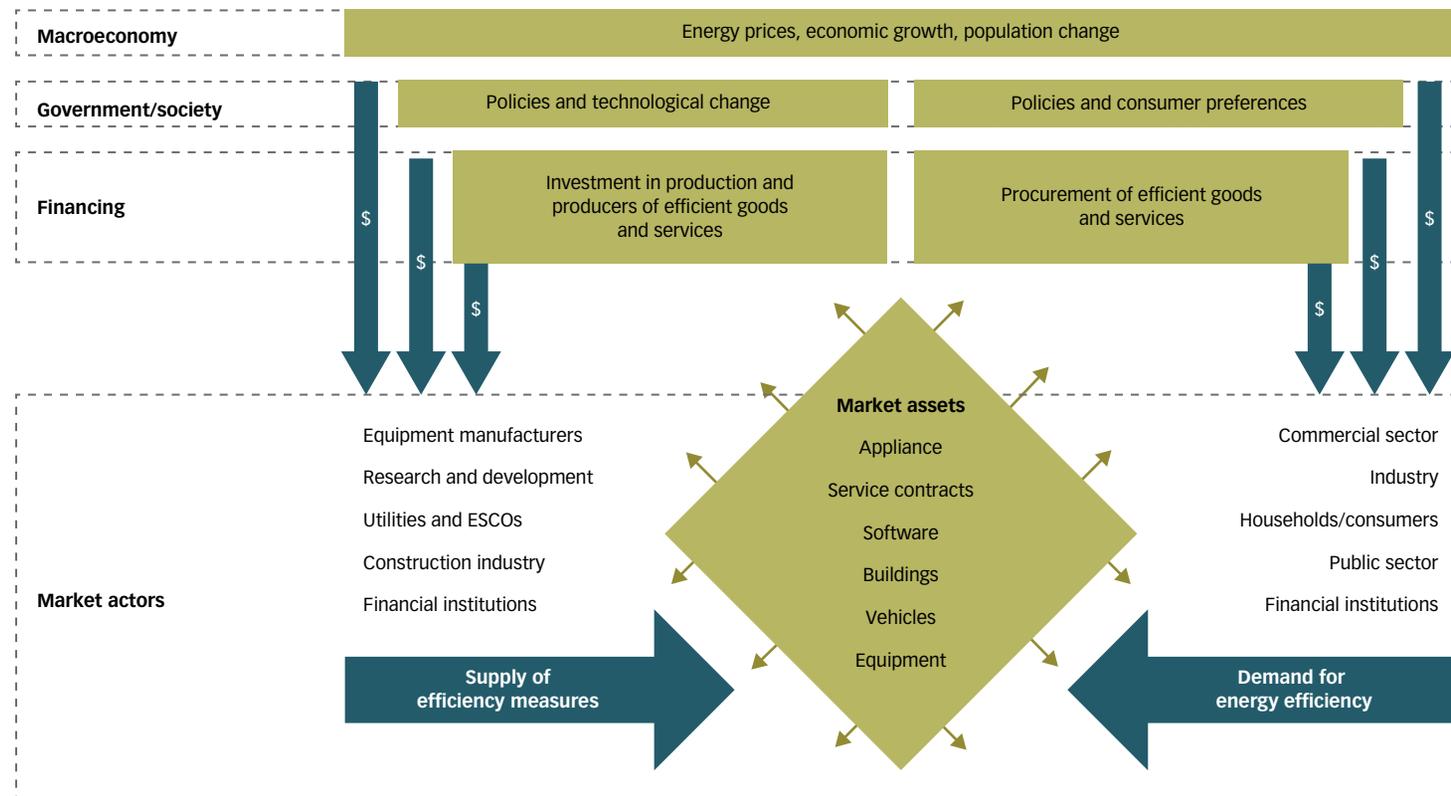
³ The range of possibilities may be conceptualized as a "ladder" of options for financing energy efficiency, as Aditya Lukas argues in Live Wire 2018/88. See the "Make Further Connections" section for the reference.



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Figure 1. The complexities of nudging markets toward greater energy efficiency

Source: IEA, 2013.

Note: ESCOs = energy service companies.

In developing countries, energy efficiency projects have fallen short of their true potential owing to market failures. In some cases, private sector ESCOs have attempted to address some of these failures, but their success remains limited, especially in improving the energy efficiency of public sector facilities in developing countries.

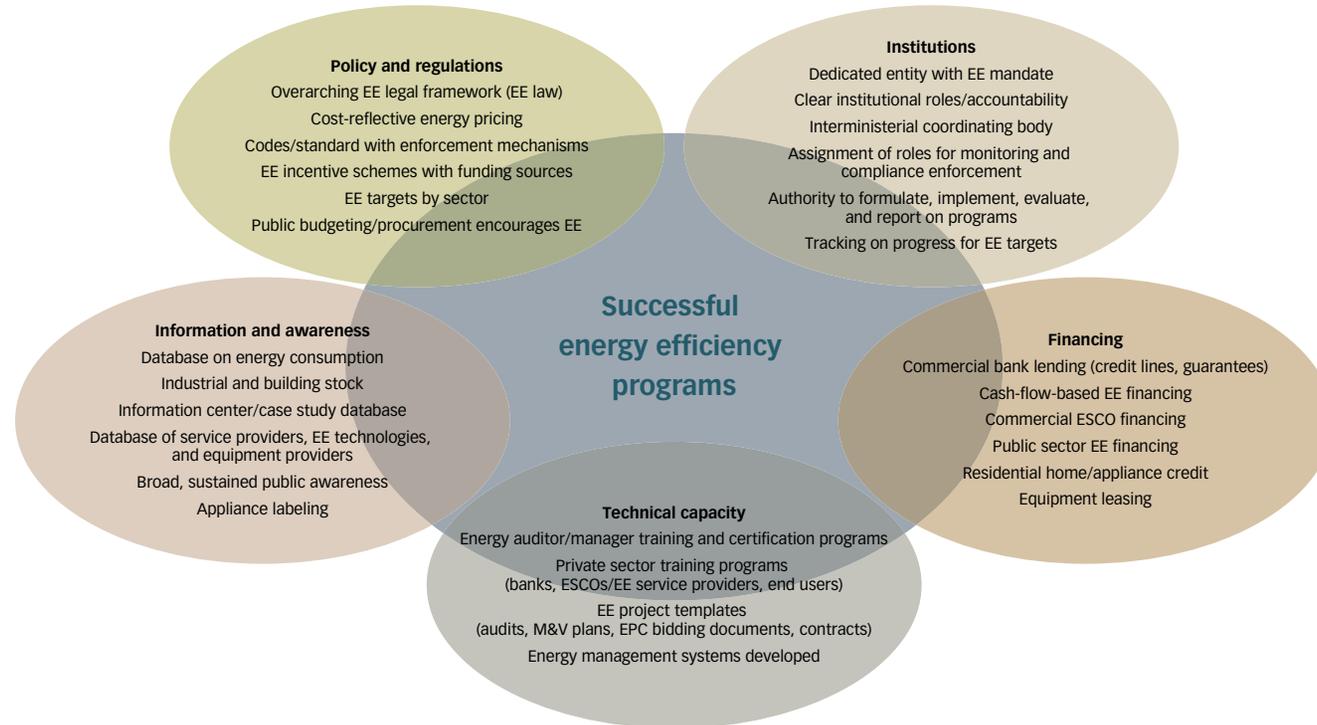
Where do ESCOs fit in?

ESCOs have long been recognized for their strong potential to scale up investments in energy efficiency

ESCOs are among the most feasible models for scale-up based on their early successes in the 1990s in North America, Australia, and Europe, and in the 2000s in countries such as Japan, the Republic of Korea, and China. An ESCO is an organization that provides a full range of services to energy users to design and implement energy efficiency options. The services may also include providing or arranging financing. Such services are provided by the ESCO using

a performance-based contract under which the payments from the energy user to the ESCO are contingent upon achieving certain pre-specified performance levels. Also, the ESCO generally allows energy users to pay for its services using the energy cost savings that result from the energy efficiency project. This approach allows energy users to transfer much of a project's technical, construction, and performance risks to the ESCO.

The concept of energy savings performance contracts (ESPCs) implemented by ESCOs has been recognized as a promising approach to overcome some of the most intractable market barriers. Under an ESPC, an ESCO develops, implements, and finances an

Figure 2. Key elements of successful energy efficiency programs

Source: Adapted from World Bank, 2014; 2016a.

Note: EE = energy efficiency; EPC = energy performance contract; ESCO = energy service company; M&V = measurement and verification.

energy efficiency project (at the customer level), and uses the stream of income from the cost savings to repay the costs of the project, including the costs of the investment (figure 3).⁴

However, despite the potential of ESPCs, the growth of the ESCO industry globally has been rather slow (Hofer, Singh, and Limaye 2016). There are many reasons for this, including the following.

- A lack of available commercial financing and a small capital base make it difficult for most independent ESCOs to access project funding from commercial finance institutions.

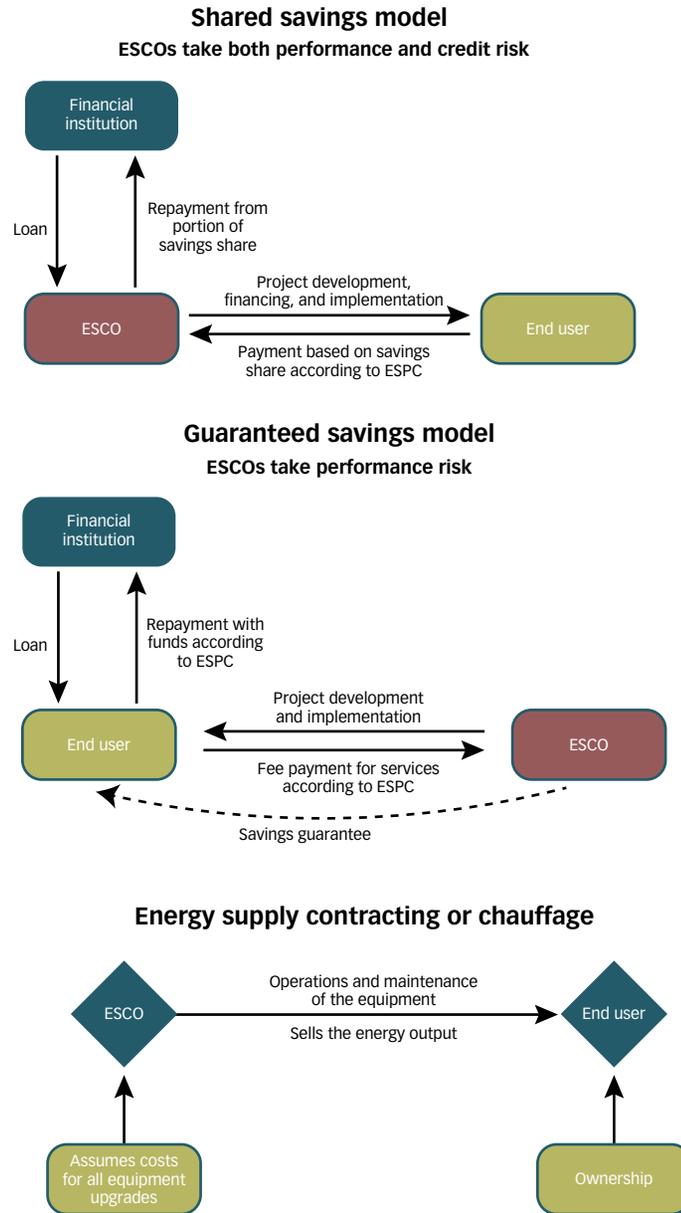
- An immature energy efficiency market implies high project development costs.
- The ESCO model lacks credibility among energy users due to its relative novelty and undeveloped measurement and verification (M&V) protocols.
- Domestic financial institutions perceive energy efficiency projects as inherently more risky than other investments, and set high equity requirements for project financing.

⁴ The terms EPC (Energy Performance Contracts) and ESPC (Energy Service Performance Contracts) are used interchangeably in the literature.

The concept of energy savings performance contracts (ESPCs) implemented by ESCOs has been recognized as a promising approach to overcome some of the most intractable market barriers. Yet despite the potential of ESPCs, the growth of the ESCO industry globally has been rather slow.

Not until the last decade have Super ESCOs emerged as a practical means of addressing the barriers to large-scale implementation of energy efficiency projects in the public sector.

Figure 3. ESCO implementation models



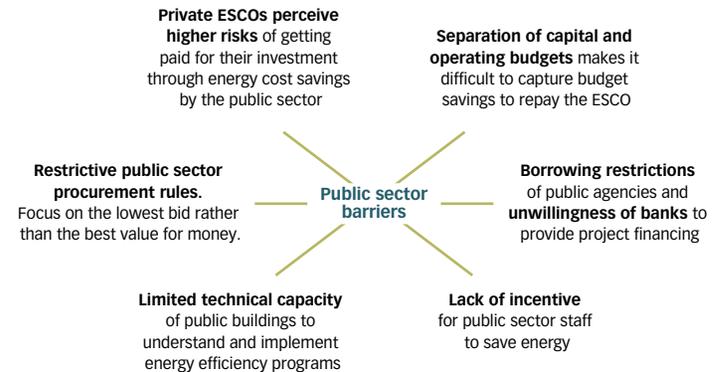
Source: Adapted from Sarkar 2018.

Note: ESCO = energy service company; ESPC = energy savings performance contract.

Public sector energy use varies widely across countries, but generally represents a major cost for government at all levels (central, state, city, etc.) even as it competes with other uses of the government’s limited resources. Since public sector buildings (administrative offices, schools, hospitals, etc.) often constitute the largest single largest energy user within many countries, the bundling of many small and dispersed investments to improve these facilities’ energy efficiency may be a highly attractive business opportunity, enticing commercial suppliers to enter the energy efficiency market. Investing in the energy efficiency of public facilities can also help lower future operating costs, create local jobs, and offer a high-visibility model for other sectors to follow.

To date, however, ESCOs have played a very limited role in the implementation of energy efficiency projects in both public facilities and the residential sector in developing countries. Barriers to their use in the public sector are outlined in figure 4.

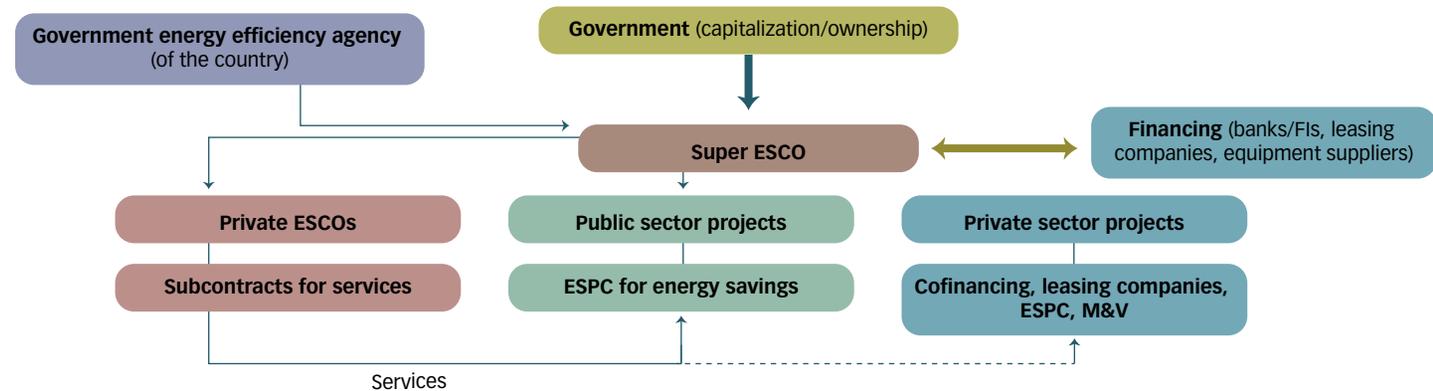
Figure 4. Barriers to using ESCOs to implement energy efficiency projects in the public sector



Source: Adapted from Limaye, Singh and Hofer, 2014.

Note: ESCO = energy service company.

Figure 5. An illustrative model of a Super ESCO



Source: Authors' compilation.

Note: ESCOs = energy service companies; ESPC = energy savings performance contract; FIs = financial institutions; M&V = measurement and verification.

The functions of the full-service Super ESCO can potentially cover all the building blocks of an energy efficiency ecosystem.

Can “Super ESCOs” help ESCOs fulfill their potential?

Super ESCOs have succeeded where previous ESCO development did not

The concept of a so-called Super ESCO—designed for markets where traditional ESCOs have failed to expand their reach—has been discussed for years in policy circles. But not until the last decade, has the entity emerged as a practical means of addressing the barriers to large-scale implementation of energy efficiency projects in the public sector (Singh and others 2009).

The terms “Super ESCO” and “public ESCO” are often used interchangeably, but there is a fine line between the two. A public ESCO is owned by the government and deals almost exclusively with the public sector. A Super ESCO is established by the government and supports not only the public sector (hospitals, schools, municipalities, government buildings, and other public facilities) but also private sector ESCOs through capacity building, project development, and facilitation. For example, it may implement public sector projects with the support of private ESCOs, and, in some cases, even provide them with financing.⁵

⁵ In this context, a public ESCO may be considered a subset of a Super ESCO.

The functions of the full-service Super ESCO (figure 5) are multifaceted and can potentially cover all the building blocks of an energy efficiency ecosystem, from energy audits to project design to performance contracting, procurement of energy efficiency measures or services (including through private ESCOs), installation, and M&V of energy savings to operations and maintenance. Thus, the Super ESCO not only moderates stakeholders’ risks but also helps build trust, including between private ESCOs and public sector end users. In some cases, the Super ESCO provides credit or risk guarantees for ESCO projects, leases energy efficiency equipment, and facilitates interactions among policy makers, private sector ESCOs, financial institutions, and end customers.

Even in the face of financing, delivery, and implementation challenges, the Super ESCO has succeeded where private sector ESCO development has had limited results.⁶

⁶ Amid a rapid decline in costs and wider availability of solar photovoltaic (PV) and information and communication technology (ICT)-based technologies, the solutions offered by both ESCOs and Super ESCOs include renewable-energy-based technologies (like rooftop solar PV, solar [absorption] cooling, and solar LED street lighting) and energy conservation gadgets (like thermostats, motion sensors), packaged together with traditional energy efficiency measures like efficient LED lights, and efficient air conditioners and heating equipment and systems.

The ideal, full-service Super ESCO helps meet the energy efficiency needs of public agencies and the development needs of the private sector ESCO industry.

How do they work?

Typically, the government capitalizes a Super ESCO with sufficient funds to undertake public sector ESPC projects and to leverage private sector/commercial financing. The Super ESCO then has a dual role of supporting the capacity development and project development activities of existing private sector ESCOs, and helping to create new ESCOs.

In sum, the ideal, full-service Super ESCO helps meet the energy efficiency needs of public agencies and the development needs of the private sector ESCO industry in parallel. It works directly with the public sector to:

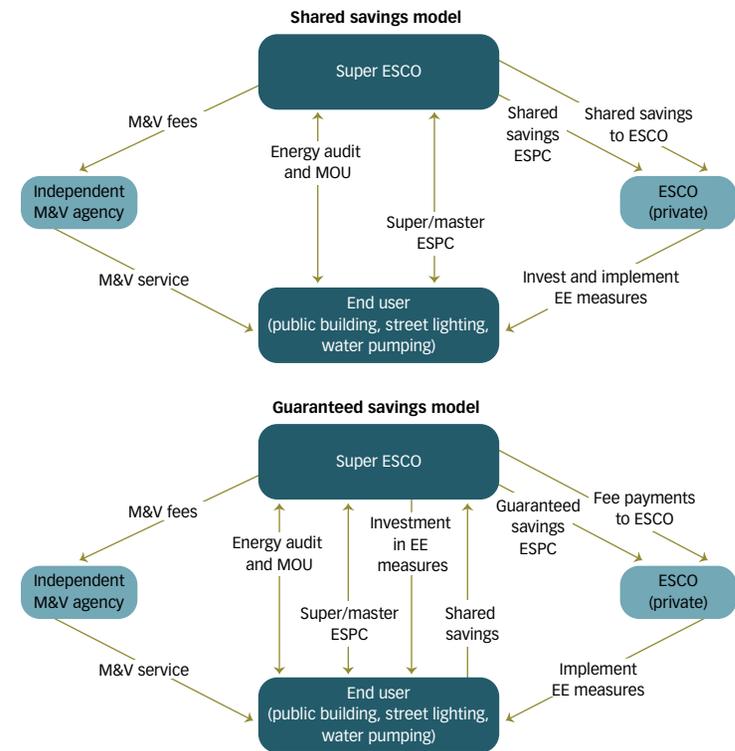
- Identify energy-savings opportunities in public facilities;
- Design technical solutions (that is, energy efficiency measures ranging from simple equipment replacement to complex systems-based approaches) and specifications;
- Aggregate the demand for energy efficiency measures, entering into ESPCs (shared or guaranteed savings contracts through pay-as-you-save [PAYS] schemes) with end users (municipalities, public building authorities, etc.);
- Conduct joint (with end users) or independent M&V of energy savings (as per the protocol agreed to in the ESPC⁷);
- Recover its investments from end users' monetized energy savings, as realized through PAYS schemes;
- Operate and maintain the equipment and systems for a few years, the entire period of the ESPC, or the entire lifetime of the equipment (as agreed with the end user).

The Super ESCO can help create an enabling environment for private sector ESCOs by:

- Directly engaging ESCOs as contractors in the implementation of large projects in public facilities (such as for installation, commissioning, and performance monitoring), thereby helping to build their capacity through either shared or guaranteed savings (as shown in figure 6);
- Arranging access to or guaranteeing/de-risking financing for small, private ESCOs to help them implement projects and build their capacity and credentials;

⁷ Depending upon the sector, end user, and energy saving measures being used, the M&V protocol could range from simple (similar to Option A of the International Performance Measurement and Verification Protocol [IPMVP]) to complex (similar to Option D of the IPMVP).

Figure 6. How a Super ESCO can work with private ESCOs to implement projects



Source: Authors' compilation and adapted from World Bank, 2018b.

Note: EE = energy efficiency; ESCO = energy service company; ESPC = energy savings performance contract; US\$ - US dollar; M&V = measurement and verification; MOU = memorandum of understanding.

- Demonstrating ESPCs' viability to public sector decision makers and investors, and helping these actors become more familiar with shared and guaranteed savings models and PAYS schemes;
- Standardizing technical specifications and transaction templates and tools (e.g., ESPC and M&V protocols, risk-sharing platforms) and making these available to private ESCOs (e.g., to be used for public energy efficiency projects) and end users, thereby reducing the perceived risk of working with ESCOs;
- Raising consumers' awareness of energy efficiency concerns, resulting in increased demand for energy efficiency investments to be met by the private sector ESCO industry.

The U.S. Federal Energy Management Program is one of the earliest examples of a public institutional model close to the Super ESCO concept.

What has been the global experience with Super ESCOs?

Countries have created Super ESCOs to help tap their public sectors' energy efficiency potential and facilitate the development of domestic energy services and private sector ESCOs

The examples reviewed here span a quarter-century, from the early 1990s (U.S. Federal Energy Management Program) to the early 2000s (Belgium's FEDESCO, Croatia's HEP ESCO, and Fakai in China's Hebei Province), to more recently established Super ESCOs in India, Armenia, Saudi Arabia, and the United Arab Emirates. Others not profiled here are still on the drawing board. For example, the World Bank is currently discussing possible Super ESCO models in the Philippines and Turkey.

The U.S. Federal Energy Management Program. Even though the U.S. Federal Energy Management Program, (FEMP, <https://www.energy.gov/>) which came into existence in the 1990s, predates the term "Super ESCO," it is one of the earliest examples of a public institutional model close to the Super ESCO concept. The FEMP leverages government performance contracting to help federal agencies work with private ESCOs to implement energy-saving projects that build optimization, resilience, and security. The FEMP provides federal agencies with a broad range of information and tools to foster building optimization, affordable and replicable solutions, and project development guidance. To date, the FEMP has helped government agencies reduce the energy intensity of their facilities by approximately 49 percent.

The HEP ESCO in Croatia. The World Bank supported the creation of the HEP energy service company (ESCO) within Hrvatska Elektroprivreda d.d. (HEP—the national power utility) with the objective of developing, financing, and implementing energy efficiency projects on a commercial, for-profit basis, using local businesses as key delivery agents (World Bank 2010). The HEP ESCO found a niche market, financing energy efficiency projects for the public buildings of local authorities (administration buildings, schools, etc.), hospitals, or universities, and street lighting. It implemented 31 energy efficiency projects on a commercial, for-profit basis, for a total cumulative value of \$29.5 million in energy efficiency investments.

With the objective of increasing its profitability and positioning itself as a market leader, the HEP ESCO entered new market segments, including greenfield renewable energy projects—a notable example was the Hrast biomass cogeneration project.

Being a utility-based ESCO had both positive and negative consequences. On the positive side, the HEP ESCO benefited from HEP's positive corporate image and gained access to HEP's customer database for data mining and customer-sector identification. Additionally, loans to the HEP ESCO were made through HEP, which is a creditworthy client. But one of the major drawbacks of being a subsidiary was the need to apply HEP's human resources and compensation policies, which were not adapted for a fast-growing company that needed experienced staff.

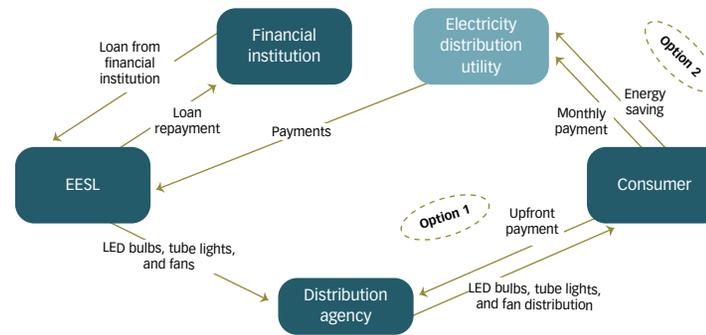
India's Energy Efficiency Services Limited (EESL). Energy Efficiency Services Limited (EESL) was established in 2009 as a state-owned ESCO, a joint venture of four public sector enterprises under the Ministry of Power.⁸ EESL has emerged as an important entity in India, financing and delivering energy efficiency solutions, especially in the residential⁹ and public sectors. India's energy efficiency market is estimated to be \$12 billion per year. Unlike most Super ESCOs, EESL's early success started with the residential sector under its UJALA program (figure 7). EESL's approach involves aggregating demand for energy-efficient appliances and equipment, providing up-front financing using a combination of financing sources (including equity capital from promoters, along with loans from development partners and commercial lenders), and using competitive bulk procurement to improve affordability while ensuring the quality of high-efficiency appliances. EESL has been able to mitigate up-front financing risks for its customers by making the entire up-front capital investment, through PAYS under an on-bill financing approach (Option 2 in figure 7) or a direct up-front payment by the consumer

⁸ The four public sector enterprises are the National Thermal Power Corporation (NTPC), Rural Electrification Corporation (REC), Power Finance Corporation (PFC), and Power Grid Corporation of India (PGCIL).

⁹ Like public sector facilities, the residential sector has relatively homogeneous end-use consumption patterns, but, here, energy efficiency measures entail higher transaction costs because of the dispersed nature of residential consumption—and the relative low impact of measures at the individual household level. Thus, the residential sector offers great potential for replicability and bundling. Efforts to realize this have been stymied by similar challenges as those seen in the public sector. ESCOs) driven by inaccessibility of credible market data, absence of standardization of technology-specific solutions, and tight contractual frameworks and legal enforcements.

Saudi Arabia created the National Energy Services Company to diversify the economy and drive environmental sustainability.

Figure 7. Operating model of EESL's UJALA Program (tube lights, LED bulbs, efficient ceiling fans)



Source: Adapted from Bhatt, 2017.

Note: EE = energy efficiency; EESL = Energy Efficiency Services Limited; LED = light-emitting diode.

(Option 1 in figure 7). In case of public sector projects (like LED public street lighting), EESL has demonstrated the viability of the deemed savings M&V approach as the basis for ESPC-based contracts, paving the way for use of similar contractual models by private ESCOs. In addition, by procuring large volumes from a variety of suppliers that meet strong technical standards, EESL is credited with helping spur development of manufacturing capacity in India and lowering the price of energy efficiency measures to make them affordable and financially more viable. In its Street Lighting National Program (SLNP), the entire up-front investment for street lights is made by EESL and recovered from the energy savings of municipalities over the project duration, using the deemed savings M&V approach. Over 6 million street lights have been deployed so far.

EESL's initiatives have helped avoid over 8.5 gigawatts (GW) of new electricity generation capacity. Under its LED initiative, called UJALA, EESL has successfully deployed over 300 million (7 and 9 watt) LED bulbs over four years to households and institutional consumers (as of May 2018) through bulk procurement, distribution, quality control, M&V of savings, and after-sales and warranty servicing, and has driven the procurement price of LEDs from \$4.60 per bulb in 2014 to \$0.56 in 2017, triggering the retail market price to also go down from \$8.20 to \$2.20 during the same period.

EESL's role as a facilitator of projects implemented by private ESCOs has been limited to date. Recently, the World Bank approved a loan that aims to help EESL develop sustainable business models using private ESCOs (World Bank 2018b).

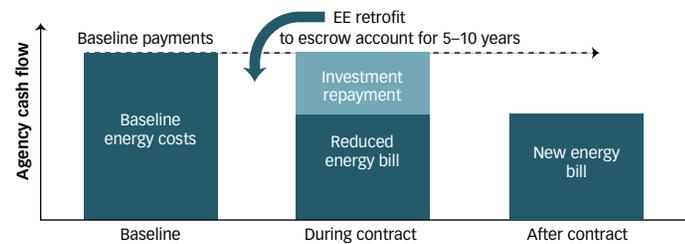
Saudi Arabia's Tarshid. Saudi Arabia's Public Investment Fund (PIF 2017) created the National Energy Services Company (NESCO), also known as Tarshid, <http://www.tarshid.com.sa/> in October 2017 with an initial capitalization of over \$500 million, to increase the energy efficiency of government and public buildings, public street lighting, etc., and stimulate growth of the country's energy efficiency industry, in line with the objectives of the Government's Vision 2030 to diversify the economy and drive environmental sustainability (Al Arabiya English 2017). All government bodies are mandated to contract with Tarshid on an exclusive basis as per a royal decree. This Super ESCO will cover 70 percent of all projects in the country's energy efficiency sector, estimated to be an over \$11 billion market.

Tarshid has set up a framework for competitively procuring the services of private sector ESCOs through ESPCs to deliver energy efficiency equipment and solutions in public buildings across the country. In this process, Tarshid is also helping build the capacity of local ESCOs, and preparing transaction tools and ESPC templates as well as developing guidance for the measurement and verification of energy savings as per international benchmarks. Since early 2018, Tarshid has started the process of developing and implementing energy retrofit projects in dozens of public office buildings, schools, and mosques, and has also started developing a LED street lighting program. The initial deployment of LED street lights in Riyadh is under way.

Armenia's Renewable Resources and Energy Efficiency Fund (R2E2 Fund). The Armenian government established the R2E2 Fund, in 2005 with the mandate to promote the development of Armenia's renewable energy and energy efficiency markets and to facilitate investments in these sectors. Under the World Bank–Global Environment Facility's Energy Efficiency Project, the R2E2 Fund provides turnkey services (energy audit, procurement, detailed design, financing, construction, and monitoring) for energy efficiency upgrades in public buildings using output- and performance-based contracts. The project was designed to develop, test, and disseminate replicable and sustainable models for the provision of energy

Overall, a Super ESCO lends credibility to energy efficiency investment, addresses barriers such as high transaction costs, enables the public sector to improve efficiency in buildings and infrastructure, builds local ESCOs' capacity, and ensures the accountability of equipment suppliers and contractors through the introduction of performance-based payments.

Figure 8. End user's cash flows under the ESA in Armenia



Source: World Bank, 2016b.

efficiency services through the use of energy service agreements (ESAs) as explained in figure 8.¹⁰

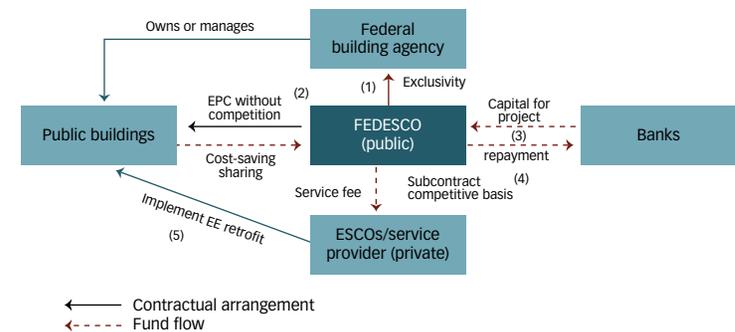
At the end of the project in 2016, 62 ESAs totaling \$9.89 million were signed by the fund.¹¹ The fund more than doubled the project's key indicator targets, with energy savings of 520 million kilowatt-hours (kWh) and greenhouse gas (GHG) savings of 137,569 tons of carbon dioxide (CO₂) (versus the project targets of 215 million kWh and 50,549 tons CO₂). Energy savings averaged almost 51 percent, and payback periods ranged from 2.6 to 8.8 years. The repaid amount is \$2.6 million, and there are no defaults—in fact, several have made early repayments. In addition to energy savings, the procurement scheme encouraged the development of a local ESCO industry and introduced new technologies, such as LED bulbs, condensing boilers, solar photovoltaic (PV), and heat pumps. Many beneficiaries have reported substantial improvements in their building conditions and in operations and maintenance savings, which they have used to invest in extending service and completing internal repairs and renovations (World Bank 2016b).

Belgium's FEDESCO. As a 100 percent subsidiary of the Federal Participation and Investment Corporation, FEDESCO facilitates and finances energy efficiency projects in federal government buildings throughout Belgium. It was founded in September 2005 as a public limited company with a capital investment of €6.5 million and an additional €10 million in state guarantees. To implement projects,

¹⁰ Under an ESA, the financier (in this case, the R2E2 Fund) offers a full package of services to identify, finance, procure, implement, and monitor energy efficiency projects for clients. The client is asked to pay only what it is currently paying for energy, that is, its baseline energy costs. The financier then uses this to make the new (lower) energy payments and recover its investment costs and associated fees until the contract period ends.

¹¹ As of today, 64 ESAs (representing 164 facilities) have been completed and commissioned.

Figure 9. Implementation arrangements of FEDESCO in Belgium



Source: World Bank, 2018a.

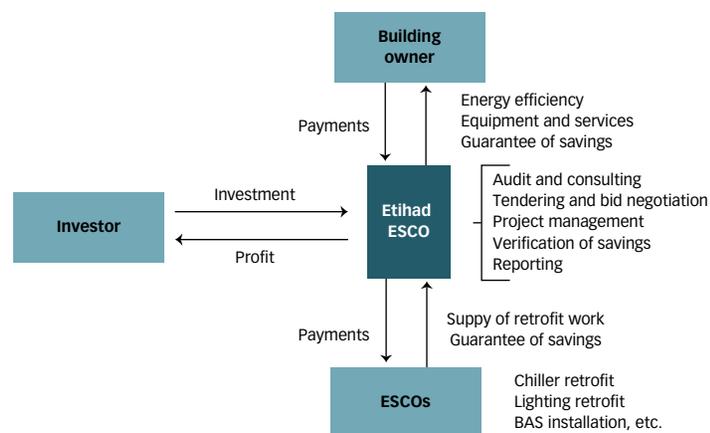
Note: EPC = engineering, procurement, and construction; ESCOs = energy service companies.

FEDESCO cooperates exclusively with the Federal Building Agency and enters into engineering, procurement, and construction (EPC) contracts with public facilities without competition, using either internal funds or financing from commercial banks (with a state guarantee) (figure 9). It then subcontracts energy efficiency retrofit work to private ESCOs or service providers on a competitive basis. In these implementation arrangements, FEDESCO bears a direct contractual obligation to repay loans from the banks and assumes performance risks for thermal retrofits.

In 2012, FEDESCO reported total energy savings of 19,883 megawatt-hours (MWh), which it valued at €1,937,159. The forecast was for annual savings of €1,109,681.61 and the average payback for the measures was estimated to be 2.25 years. Total greenhouse gas (GHG) savings totaled 9,400 tons of CO₂. FEDESCO offers lessons in the importance of taking a long-term perspective and working with other stakeholders to spread knowledge and experience. In a short time, it has evolved from a third-party financier offering all services to a company that provides a range of services and acts as a facilitator to bring in the private sector as much as possible (World Bank 2018a).

The Etihad ESCO in the United Arab Emirates. In the United Arab Emirates, the Etihad ESCO¹² was established in 2013 by the Dubai Electricity and Water Authority (DEWA) as a Super ESCO to make Dubai's built environment a leading example of energy

¹² <http://www.etihadesco.ae>.

Figure 10. Etihad ESCO model in the UAE

Source: Michaud, 2016.

Note: BAS = building automation system; ESCOs = energy service companies.

efficiency for the region and the world. Etihad ESCO aims to develop energy efficiency projects targeting more than 30,000 buildings in Dubai with a goal of 1.7 terawatt-hours (TWh) in energy savings by 2030. Etihad ESCO is fostering a viable ESPC market for ESCOs by executing building retrofits, increasing the penetration of district cooling, building the capacity of local ESCOs, and facilitating access to project finance. As explained in figure 10, Etihad ESCO prequalifies buildings from the owners' portfolios, organizes the tendering on behalf of owners, arranges financing if it is outside an owner's budget, follows up on project execution, and follows up during the guarantee phase.

In September 2017, Etihad ESCO announced that it had initiated a project to retrofit 243 buildings in different parts of Dubai. The company is also retrofitting 8 power stations for DEWA, 1 fuel station for ENOC, 3 buildings for Dubai Healthcare City, and 35 buildings for Dubai Golf. Etihad ESCO intends to complete 6 ongoing retrofit projects before June 2019, including Terminals 1, 2, and 3 of the Dubai International Airport and the Airport Hotel. All 6 projects are expected to result in combined annual energy savings of \$16.44 million or 131.45 gigawatt-hours (GWh) (Cerna 2018).

It is important for a Super ESCO to have an exit strategy after triggering transformation in energy efficiency markets.

What have we learned?

In developing countries, energy efficiency projects have fallen short of their true potential owing to market failures. Super ESCOs can help

Overall, a Super ESCO lends credibility to energy efficiency investment, addresses barriers such as high transaction costs, enables the public sector to improve efficiency in buildings and infrastructure, builds local ESCOs' capacity, and ensures the accountability of equipment suppliers and contractors through the introduction of performance-based payments. To achieve these successes, the Super ESCO must be overseen by a strong, dedicated institution with a clear mandate, well-trained and motivated staff with adequate compensation, dedicated management, and a strong marketing plan to raise awareness and promote understanding of energy efficiency.

Since the success of Super ESCOs in scaling up energy efficiency investments requires a continuous influx of financing, it is critical that follow-on financing be secured before development financing (e.g., from the World Bank) ends, to ensure that there is no disruption in operations. Also, the model must be adapted to the country context, and may not be the right fit for all institutional setups.

It is important for a Super ESCO to have an exit strategy after triggering transformation in energy efficiency markets. Partnering financial institutions should bring in, not crowd out, commercial financing, even as private ESCOs grow to meet the increasing market demand for energy efficiency improvements.

Over the past decade, Super ESCOs have emerged as a viable alternative to private sector ESCOs. These government-established entities are well positioned to address market barriers and realize energy efficiency potential of the public sector even as they facilitate the development of private sector ESCOs. The concept, structure, and functions of Super ESCOs are still evolving, but experience to date has shown that Super ESCOs can unlock energy efficiency markets facing challenges with financing, delivery, and implementation.

MAKE FURTHER CONNECTIONS

Live Wire 2014/11. "Designing Credit Lines for Energy Efficiency," by Ashok Sarkar, Jonathan Sinton, and Joeri de Wit.

Live Wire 2014/18. "Exploiting Market-Based Mechanisms to Meet Utilities' Energy Efficiency Obligations," by Jonathan Sinton and Joeri de Wit.

Live Wire 2014/25. "Doubling the Rate of Improvement of Energy Efficiency," by Jonathan Sinton, Ivan Jacques, Ashok Sarkar, and Irina Bushueva.

Live Wire 2016/53. "Why Energy Efficiency Matters and How to Scale It Up," by Jas Singh.

Live Wire 2016/54. "Fostering the Development of ESCO Markets for Energy Efficiency," by Kathrin Hofer, Dilip Limaye, and Jas Singh.

Live Wire 2016/55. "Designing Effective National Industrial Energy Efficiency Programs," by Feng Liu and Robert Tromp.

Live Wire 2017/82. "Exploiting Synergies between Rooftop Solar PV and Energy Efficiency Investments in the Built Environment," by Pedzi Makumbe.

Live Wire 2018/88. "Financing Energy Efficiency, Part 1: Revolving Funds," by Aditya Lukas.

Live Wire 2018/91. "Financing Energy Efficiency, Part 2: Lines of Credit," by Yun Wu and Jas Singh.

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References and other sources

- Al Arabiya English. 2017. "Saudi's PIF Sets up Energy Service Firm Super ESCO." <http://english.alarabiya.net/en/business/energy/2017/10/18/Saudi-s-PIF-sets-up-energy-service-firm-Super-ESCO.html>.
- Beyer, J. 2017. "Facilitating Finance: A Case for the Super ESCO." EU-GCC Workshop on Energy Efficiency and Cooling Technologies, May 3–4.
- Bhatt, N. 2017. "Success Story 'Scaling Energy Efficiency': An Indian Experience." Presentation at the Asia Clean Energy Forum, Manila, June 5–9.
- Cerna, F. 2018. "Etihad ESCO To Deliver Six Retrofit Projects in Dubai by Q2 2019." *ConstructionWeekOnline.com*, ITP Media Group, April 11, 2018.
- FEMP (Federal Energy Management Program). n.d. "Small Business Advocate Success Story." U.S. Department of Energy and Federal Energy Management Program. <https://www.energy.gov/>.
- Graves, L. 2017. "Saudi Arabia's PIF to Save Oil with New Energy Services Company." *The National*, October 18, 2017.
- Hofer, K., D. Limaye, and J. Singh. 2016. "Fostering the Development of ESCO Markets for Energy Efficiency," by Kathrin Hofer, Dilip Limaye, and Jas Singh." *Live Wire 2016/54*, World Bank, Washington, DC. <http://hdl.handle.net/10986/23949>.
- IEA (International Energy Agency). 2013. *Energy Efficiency Market Report*. Paris: IEA/OECD (Organisation for Economic Co-operation and Development).
- . 2014. *Capturing the Multiple Benefits of Energy Efficiency*. Paris: IEA/OECD.
- Kumar, S., N. Kumar, K. Cherail, S. Setty, N. Yadav, and A. Goenka. 2017. *Transforming the Energy Services Sector in India—Towards a Billion Dollar ESCO Market*. New Delhi: Alliance for an Energy Efficient Economy.
- Limaye, D., and E. Limaye. 2011. "Scaling up Energy Efficiency: The Case for a Super ESCO." *Energy Efficiency 4*: 133–44.
- Limaye, D., J. Singh, and K. Hofer. 2014. Establishing and Operationalizing an Energy Efficiency Revolving Fund: Scaling Up Energy Efficiency in Buildings in the Western Balkans. World Bank Group, Washington, DC. <http://hdl.handle.net/10986/20043>
- Michaud, N. 2016. "Etihad ESCO, the Implementation of a Super ESCO in Dubai." Presentation at the Asia Clean Energy Forum, Manila, June 5–9.
- PIF (Public Investment Fund). 2017. "The Public Investment Fund Establishes Super Energy Service Company—Super ESCO." PR Newswire, October 18, 2017, Riyadh, Saudi Arabia.
- Sarkar, A. 2018. "Overview of ESCO Delivery Models." Presentation at the Energy Transition in Asia: South-South Knowledge Exchange Workshop on Energy Efficiency, Singapore, January 24–28.
- Singh, J., D. Limaye, B. Henderson, and X. Shi. 2009. *Public Procurement of Energy Efficiency Services: Lessons from International Experience*. Washington, DC: World Bank.
- World Bank. 2010. *Croatia—Energy Efficiency Project*. Washington, DC: World Bank.
- . 2013. *Global Overview of ESCOs and Super ESCOs*. Washington, DC: World Bank.
- . 2014. *Scaling Up Energy Efficiency in Buildings in the Western Balkans*. Final Report. Washington, DC: World Bank.
- . 2016a. "Delivering Energy Efficiency in the Middle East and North Africa: Achieving Energy Efficiency Potential in the Industry, Services and Residential Sectors." Working paper, World Bank, Washington, DC.
- . 2016b. World Bank–GEF Armenia Energy Efficiency Project. Washington, DC: World Bank.
- . 2018a. Scaling up Thermal Retrofit of Residential and Public Buildings in Eastern Europe. Washington, DC: World Bank.
- . 2018b. "\$300 Million World Bank Operation to Help Scale Up India's Energy Efficiency Program." Press Release. Washington, DC: World Bank. <http://www.worldbank.org/en/news/press-release/2018/05/17/usd300-million-world-bank-operation-help-scale-up-india-energy-efficiency-program>.

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