Scaling up demand-side energy efficiency financing and implementation through ESCOs

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Energy & Extractives

IEA webinar on Evolving Energy Service Companies (ESCOs) in Emerging Economies

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Why is it Difficult to Scale Up the Cheapest "First Fuel"?

Energy Efficiency Market Ecosystems are Complex…

…Scaling up EE Implementation faces Multiple Barriers

Supply Side Options
(Conventional Supply & Large Scale RE)

- **Large Investments**
- Fewer Stakeholders
- **Standardized Solutions**
- Low Transaction Costs
- **Homogenous Market**
- **Asset- or Revenue based Financing**

Demand Side EE Measures

- **Small and Dispersed**
- Multiple Stakeholders
- **No "One-Size-Fits-All" Solutions**
- High Transaction Costs
- **Heterogenous Market**
- **Financing based on "Savings"**

But solutions have been developed and are being applied and replicated…

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Different EE Barriers Require Multi-Pronged Efforts

Implementation Pillars for Transforming Demand-Side EE Markets

Policy and Regulations

- Overarching EE legal framework (EE Law)
- Cost-reflective energy pricing
- Building Codes/ Appliance standards
- EE incentive schemes w/ funding sources
- EE targets by sector
- Public budgeting/procurement encourages EE

Institutions

- Dedicated entity with EE mandate
- Clear institutional roles/accountability
- Inter-ministerial coordinating body
- Assignment of roles for monitoring and compliance enforcement
- Authority to formulate, implement, evaluate and report on programs
- Tracking on progress for EE targets

Successfully Implemented Energy Efficiency Programs

Information and Awareness

- Database on energy consumption
- Industrial and building stock
- Information center/case study database
- Database of service providers, EE technologies, equipment providers
- Broad, sustained public awareness
- Appliance labeling

Technical Capacity

- Energy auditor/manager training and certification programs
- Private sector training programs (banks, ESCOs/EE service providers, end users)
- EE project templates (audits, M&V plans, EPC bidding documents, contracts)
- Energy management systems developed

Finance

- Commercial bank lending (credit lines, guarantees)
- Pay As You Save -based EE financing
- Utility Demand Side Management
- Commercial ESCO financing
- Public Super ESCO
- Public sector EE financing
- EE Residential home/appliance credit
- EE Equipment leasing incentives
- Green/EE building incentives

Source: World Bank (2016)

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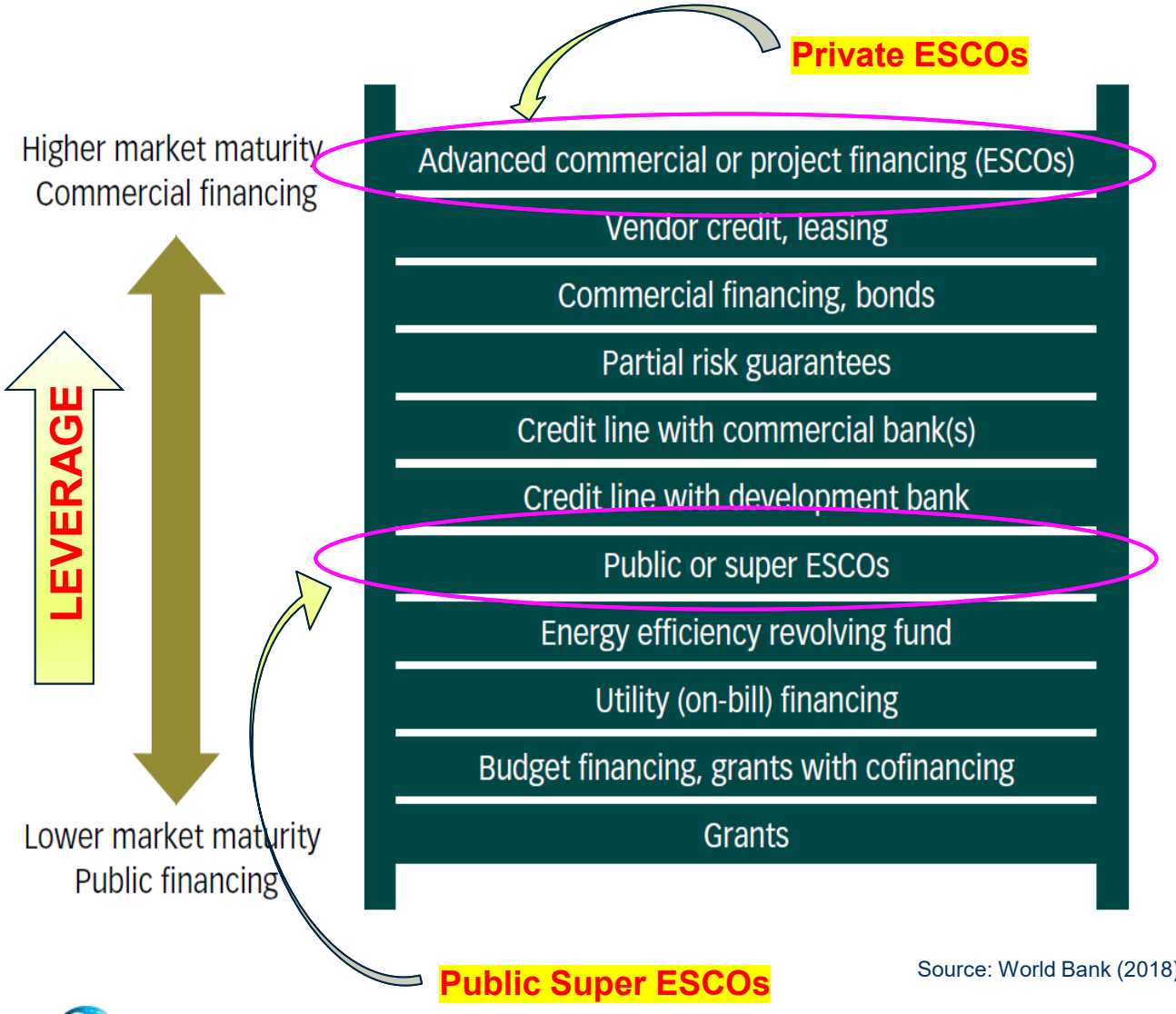
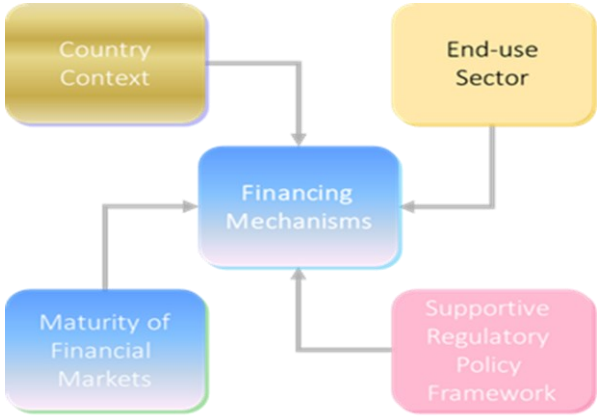
Energy Efficiency Financing Mechanisms "Ladder":

Unlocking Private Capital for Large-Scale EE Market Transformation



- Financing mechanisms should be selected based on stage of market development and financing gaps
- Public financing should be used judiciously to develop markets and crowd-in commercial financing
- Over time, programs should seek to climb the ladder to more sustainable and commercial models



Source: World Bank (2018)

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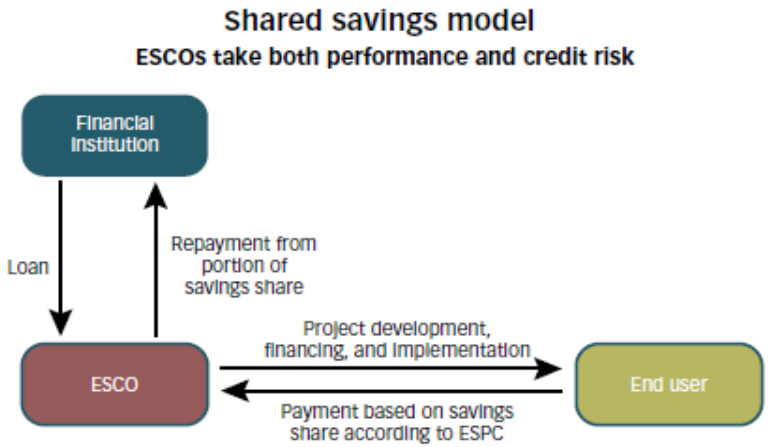
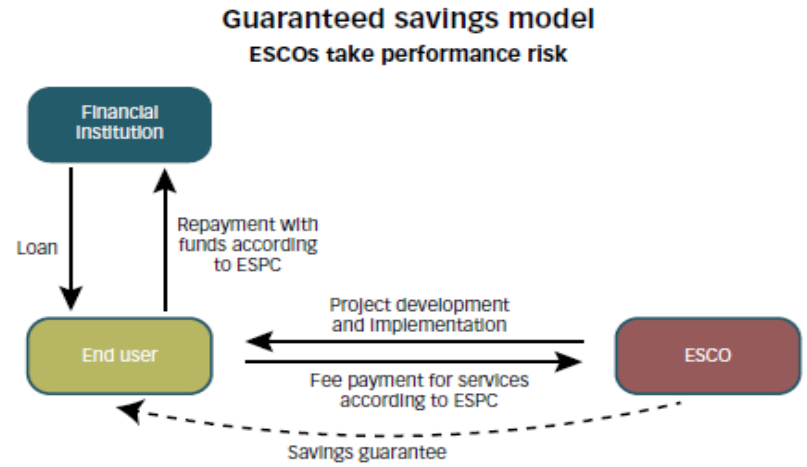
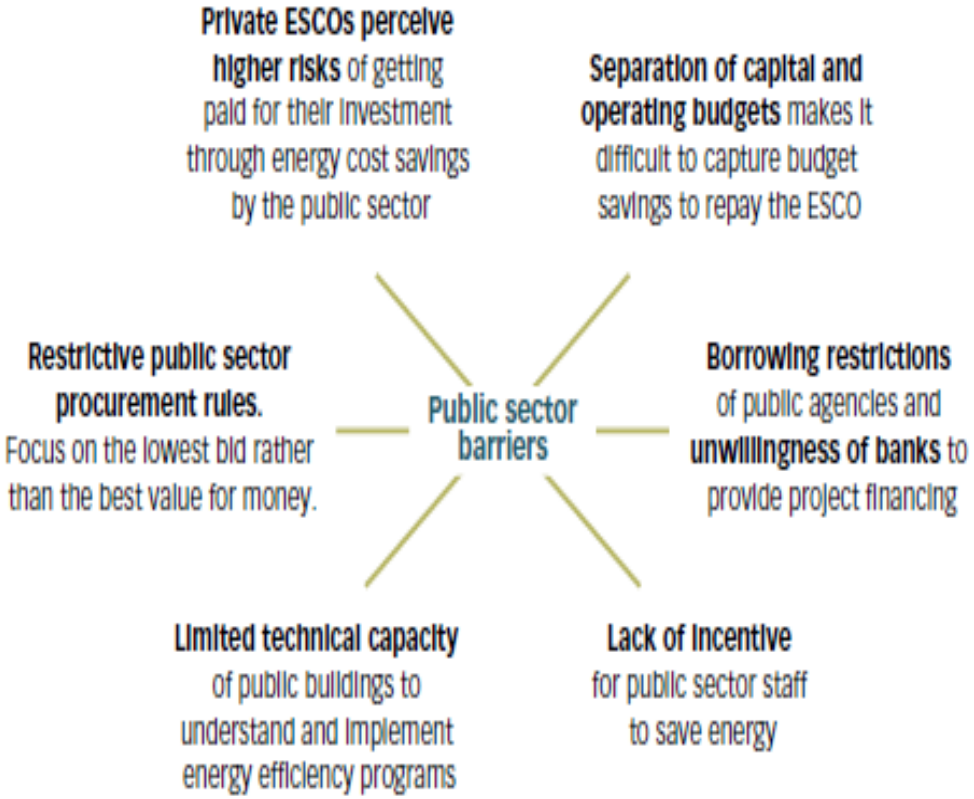
Opportunities and Challenges of Transforming EE Markets through ESCOs





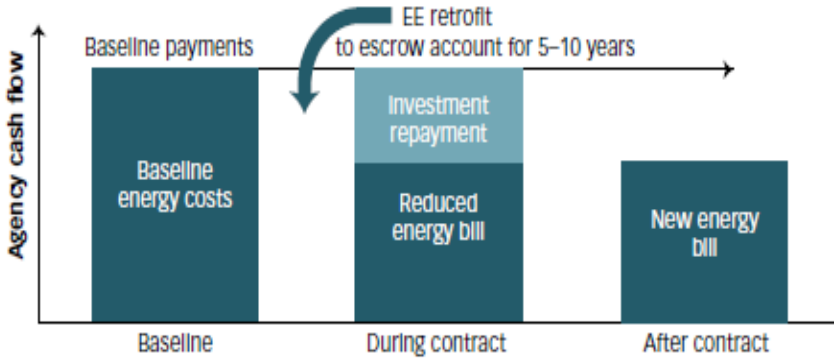
Challenges ESCOs Face in Public Sector EE



Source: World Bank Live Wire on Super ESCOs, 2018

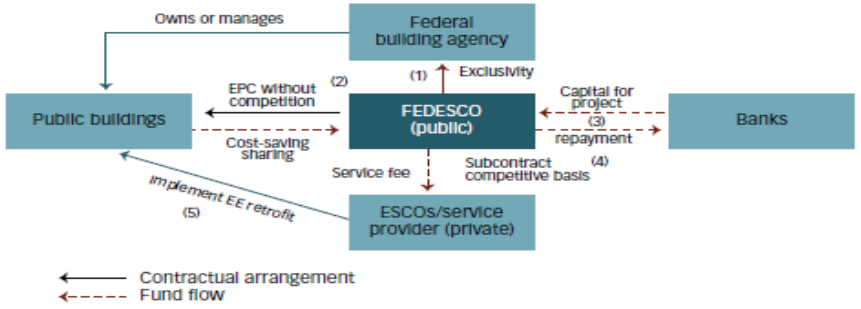
Global Super ESCO Experiences: Selected Examples

Armenia R2E2 Fund



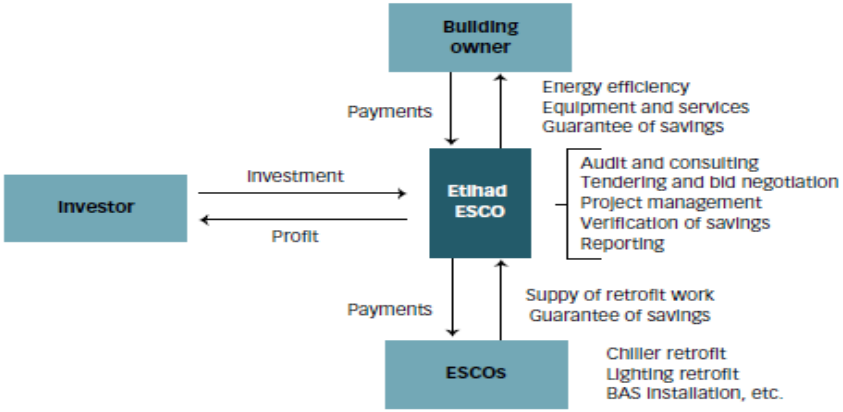
Source: World Bank, 2016b.

FEDESCO (in Belgium)



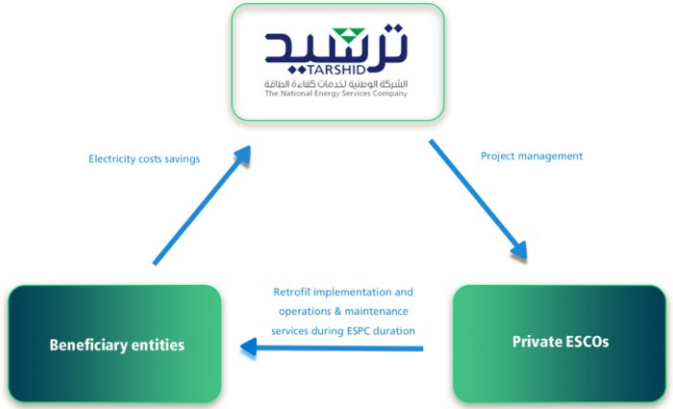
Source: World Bank, 2018a.
Note: EPC = engineering, procurement, and construction; ESCOs = energy service companies.

Etihad ESCO (in UAE)



Source: Michaud, 2016.
Note: BAS = building automation system; ESCOs = energy service companies.

Tarshid (in Saudi Arabia)



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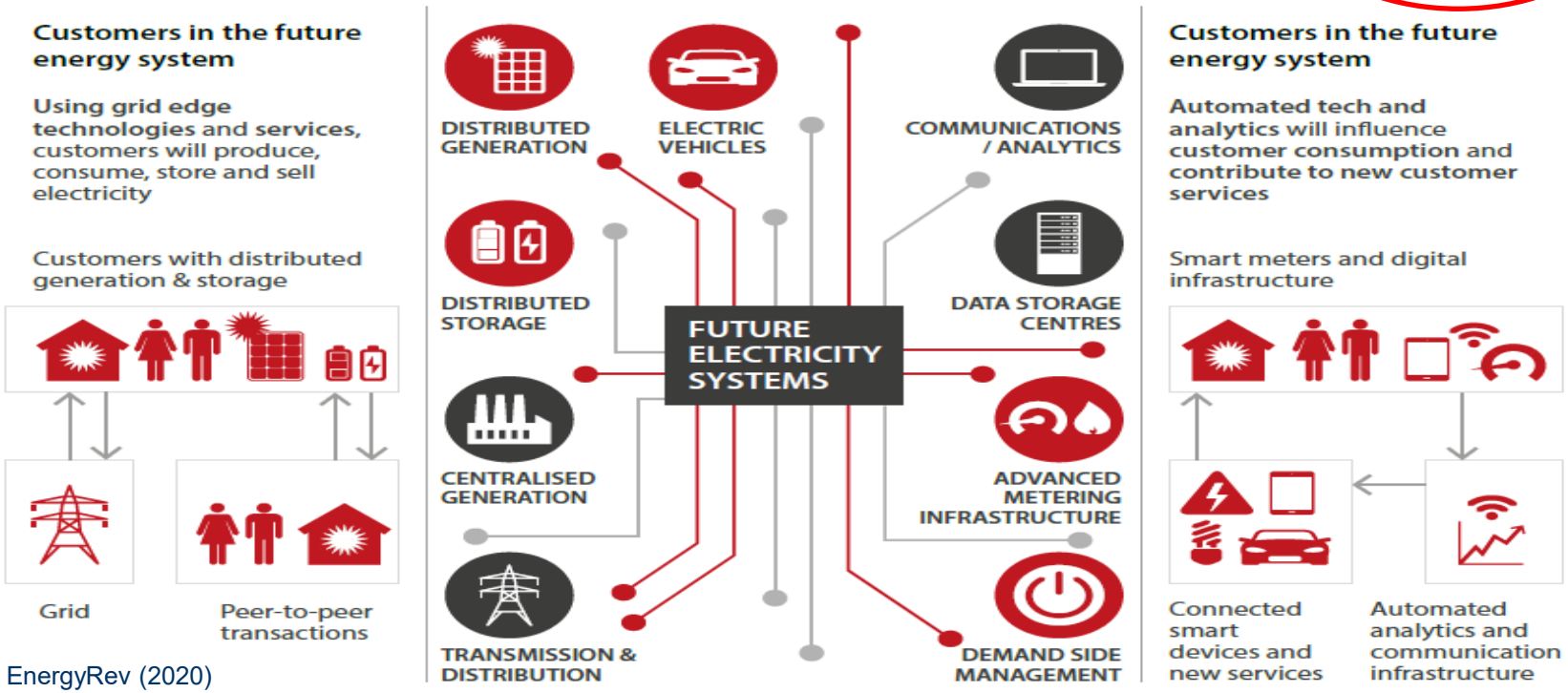
Source: World Bank Live Wire on Super ESCOs, 2018; Public Sources

Evolving Energy Systems of the Future will Unlock New Opportunities for Innovative ESCO Business Models

- Decentralized energy assets and resources, incl. generation, storage, and electric vehicles – connected to the network.
- Digitalization of this network will allow data, communications and analytics to be used to improve the energy efficiency and resilience of the system.
- Customers are likely to have a more active role than they do today; individually-owned assets can provide flexibility to the system, and new markets could allow trading between households or communities.

Mega-TrenDs
Disruption
Decarbonization
Decentralization
Democratization
Digitalization



Source: EnergyRev (2020)

Key Lessons Learned from ESCO/ Super ESCO Development Efforts

1. Existence of a clear Policy and Ecosystem Support by the Government provides a strong signal for the consumers and incentivizes to make EE investments
2. Potential for scaling-up of ESCO model can be strengthened using standardization of ESPC/EPC contractual arrangements, financing models and simpler M&V protocols. Super ESCO can facilitate and demonstrate this approach.
3. Shared savings (ESCO is the Borrower) is more popular, which also allows to build track record for ESCO in accessing commercial financing in future EE projects.
4. Technical assistance efforts to improve capacity of ESCOs, FIs and End Users are important to unlock market potential.
5. Public sector institutions and financing (along with development and climate financing) can help leverage and unlock private ESCO and capital mobilization

Thank You

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How EE can help address development challenges: EE Contributes to Different Goals

Development challenge	Energy efficiency can …	Costs and opportunities—examples
Infrastructure bottlenecks and shortfalls	… mitigate impacts of supply constraints by better managing system peak loads and easing demand during shortages, minimizing productivity losses.	In Turkey, a seven-hour blackout in March 2015 resulted in an estimated US$700 million loss in production. The United States has saved 150 GW in peak demand over the past 30 years through refrigerator efficiency standards alone.
Fiscal constraints	… ease fiscal limits through reduced energy and fuel subsidies, fiscal transfers to distressed public utilities, and energy costs for publicly owned assets (e.g., buildings and street lighting).	Energy accounts for 8 percent of Serbia's fiscal deficit due to energy subsidies, direct transfers to state-owned energy utilities, and guarantees for utility borrowing. An initial evaluation of the European Union's advanced buildings directive expects €30–40 billion in direct benefits to the public budget. The addition of tax revenues and reduction of unemployment benefits increases the estimate to €67–128 billion.
Energy security	… enhance energy security by easing the need for energy imports, making local energy resources last longer, and reducing volatility in energy supply and prices.	Vietnam's energy consumption has tripled over the past decade, making it one of the most energy-intensive economies in East Asia. It has, as a result, become increasingly reliant on imported coal after having been virtually energy independent (1997–2007). Japan has replaced half of its missing nuclear power capacity since the March 2011 earthquake, tsunami, and subsequent nuclear disaster at Fukushima, solely with energy efficiency measures.
Economic growth, competitiveness, and jobs	… develop new industries from the reduction of energy waste (e.g., energy service companies), improving industrial productivity and creating employment opportunities.	Small and medium-sized enterprises, which constitute over 80 percent of industrial firms in India, face high and rising electricity costs coupled with supply shortages (about 10 percent overall; 17 percent at peak times), undermining their global competitiveness. A study on the impacts of energy efficiency programs in Canada shows a net increase of Can$234–580 billion in GDP, with 1 dollar of spending yielding 5 to 8 dollars in GDP and the creation of 30–52 jobs.
Poverty reduction	… lower overall energy bills and the percent of household income devoted to energy, thereby decreasing energy poverty.	The lack of cost-reflective tariffs cost countries in Europe and Central Asia 0.5–1 percent of GDP. Effective social assistance programs and energy efficiency could alleviate these losses. An electricity connection regularization program in the slums of Sao Paolo, Brazil, promoted energy efficiency measures and formal connections. Nonpayment was reduced by 67 percent and customer energy use by 40 percent.
Environmental stewardship	… reduce local and global pollution in a most cost-effective manner.	Russia is the third largest energy-consuming country, but it is more energy-intensive than the top 10 energy-consuming countries. Through energy efficiency, it could eliminate almost 800 million tons of CO_2 per year—equal to the total energy consumption of France. China has embarked on one of its most ambitious energy efficiency programs. From 1980–2010, energy intensity declined by 70 percent, resulting in CO_2 emission reductions of 24.4 billion tons.
Energy access	… support reductions in energy losses that increase energy access or lower upfront costs for off-grid energy services.	Under a national grid extension initiative, Rwanda is distributing more than 900,000 compact fluorescent lamps to new household connections, enabling it to reduce the load on the grid and connect to more homes.

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Source: World Bank, 2016. Why energy efficiency matters and how to scale it up. Live Wire 2016/53.

Global Experience of ESCOs: Not An Overwhelming Success

- USA, Germany, France, China, Japan and Korea, have seen significant growth of the ESCO industry
- Others, such as India and Thailand, have seen limited ESCO growth and development
- Barriers to ESCOs particularly in the public, residential sector; other barriers (financial credibility, M&V, access to finance
- Success of ESCOs was linked to Government Support and Financial Incentives
- Simplified M&V approaches – like Deemed Savings

Country	Initiation	Market size (2012/13)	Characteristics and success factors
China	1998	• 2,339 registered companies • 1,472 ESCOs with EPCs • Size: US$8.25 billion • Potential: US$14.5 billion	• World Bank support to demonstrate or pilot ESCO models • Focus on industry and single energy efficiency technologies • Primarily guaranteed savings • ESCO accreditation scheme and aggressive energy efficiency policy
India	1995	• 114 ESCOs accredited • Size: US$140 million • Potential: US$2.8 billion	• Strong ESCO accreditation scheme • Focus on public sector and industry • Creation of super ESCO • Market dominated by a few large ESCOs
Thailand	1999	• 45 ESCOs registered • 10 ESCOs with EPCs • Size: US$100–200 million • Potential: US$500 million	• Government funding support (dedicated ESCO fund) • Focus on industry, hospitals, and government buildings • Guaranteed and shared savings
South Africa	2004	• 500 ESCOs registered (only 50 active) • Potential: US$1 billion	• Growth driven by Eskom Standard Offer Program • Focus on industry and buildings • ESCO accreditation scheme (ESKOM)
Czech Republic	1994	• 20 ESCOs with EPC-type contracts • 150–200 EPC projects implemented (US$120 million since the 1990s) • Size: US$11–23 million • Potential: US$110– 560 million	• Active ESCO companies, facilitators, and procurement advisors • Availability of standard documents • Commercial banks started investing in ESCO projects • Focus on public sector • Common use of guaranteed savings

Source: World Bank (2016) Live Wire (Hofer, Limaye, Singh)

Move Towards Simplified ESCO Delivery Models
(to address common barriers in developing countries)

Model and description	How model addresses barriers	Examples
Standard product model with "deemed savings" Applies to standard products or equipment where the energy savings are well-known and agreed to in advance. Customer pays the ESCO predetermined amount after installation.	• Equipment supplier or the ESCO can provide and install standard products or equipment • Does not require energy audits or measurement and verification	South Africa
Equipment leasing with verified savings The ESCO or equipment supplier identifies and installs energy efficient equipment. The ESCO retains ownership of the equipment until all lease payments are made. Payments are contingent on energy cost savings, which are usually verified by measurements taken during commissioning.	• ESCO does not need strong balance sheet • Facilitates bank financing • Particularly well suited for small- and medium-sized enterprises	Turkey, China, Vietnam, and India
One-year contract with partial performance payment The ESCO receives 60–70 percent of the payment based on deliverables and measurements taken at commissioning; the remainder is paid 6–12 months later, ensuring continued performance and savings.	• Takes into account contracting limitations for public institutions and short-term loans • Introduces simplified or partial performance	Mexico, Armenia, and Turkey
Variable-term contract Similar to common ESCO models except contract term varies based on actual savings. If actual savings are less than expected, contract can be extended to allow the ESCO to recover its agreed payment. The "first out" model is a variation in which the ESCO receives all energy savings benefits until its costs have been recovered and it has made a profit.	• Reduces perceived risk for ESCO companies • Provides greater flexibility during transition to complete ESCO models • Offers possibility of success when project host lacks capacity to implement project • May be implemented by public (or "super") ESCO using private ESCO companies as subcontractors for implementation services	Canada
Energy service agreements The ESCO finances, designs, and implements the project, and the customer pays a fixed amount per year (e.g., baseline energy costs with agreed adjustment factors) until the ESCO recovers its investment.		Armenia and Mexico

Source: World Bank (2016) Live Wire (Hofer, Limaye, Singh)