



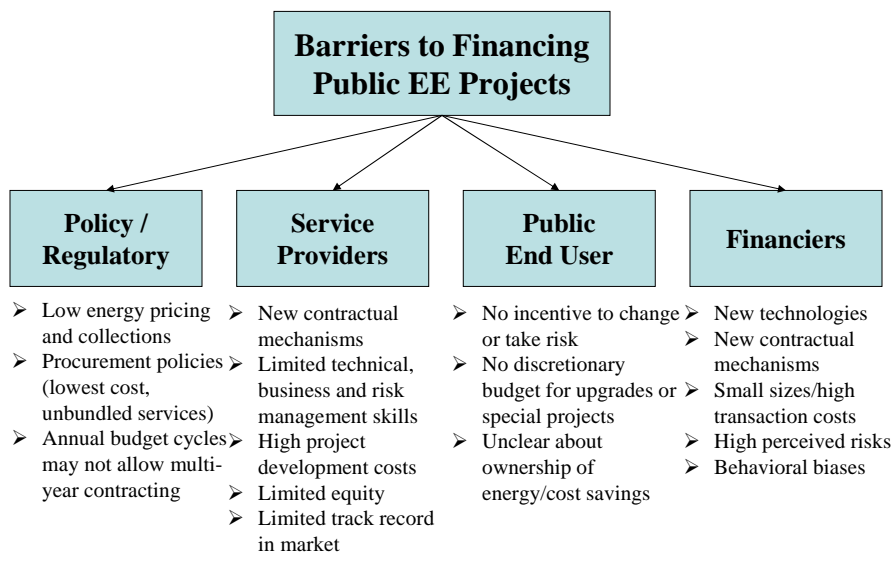
Financing Public Sector Energy Efficiency Projects: U.S. Experiences and Lessons Learned

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Barriers





Public Sector Financing Options

- Three basic ways to fund energy-saving project:
 - Pay for it – i.e., use internal appropriations
 - Borrow – i.e., take out a conventional loan or issue a bond (to be paid back from tax revenue)
 - Finance it from savings – i.e., borrow it (or have an ESCO borrow it) and pay it back from energy savings
- Energy projects financing axiom:
 - As risk moves away from host, price goes up



P.S. Financing Options – Variants

- Internal appropriations
 - Standard: request \$, get allocation, conduct project
 - Revolving loan fund: designate funds and assign them to pool
- Debt financing
 - Standard: take out loan or issue bond, get proceeds, conduct project
 - Lease: get equipment, pay as you go from operating (not capital) budget
- Finance from savings
 - Standard: Public sector entity makes one contract with ESCO, another with 3rd-party lender for loan
 - loan's interest rate dependent on credit record of borrower and not on savings stream
 - 3rd-party-financed “performance contract”: Public sector entity makes contract with ESCO and ESCO makes contract with 3rd-party lender such that payments are contingent on savings occurring
 - this “performance risk” may raise interest rate

What is an ESCO?

- An energy service company that offers technical services to help end users implement EE projects
- ESCOs can offer one or more of the following services: energy auditing, project identification/design, arranging project financing, equipment procurement, project construction/installation, commissioning, verification of savings, operations and maintenance
- In developed markets, ESCOs often provide turn-key services and allow payments from verified energy savings under a performance contract

Pros and Cons of ESCOs

Benefits

- ESCOs have technical expertise to identify and package EE projects
- Comprehensive approach allows different systems to be optimized
- ESCOs can assume technical and performance risk and arrange/offer financing when customers capital is limited
- ESCOs can offer a “one-stop shop”, which can reduce transaction costs from procuring services and equipment separately, and allow ESCOs to negotiate reduced equipment prices through bundling projects

Drawbacks

- Procuring ESCO services can be complex and take more time, since it may require pre-qualifications and allow for different projects with different investment costs, IRRs, equipment to be proposed
- ESCOs can be more expensive, since they are providing multiple services and assuming more risks
- Negotiating costs and contracts with ESCOs is generally more difficult, since projects can be based on proprietary designs and products, and contractual provisions may call for performance-based payments and monitoring and verification protocols



Example: McGuire Air Force Base (NJ)

- **Performance contract – savings guarantee**
 - Expected size/term: ~ US\$20M/ 15-20 yrs. (in process)
 - ESCO: Ameresco
 - Selected based on qualifications from 5 winners of DOE's "IDIQ" ESPC contract in Mid-Atlantic U.S.
 - Financing: 3rd-party loan to Ameresco
 - Must be competed among at least three financiers
 - Authorization: Energy Policy Act of 1992
 - Allowed exception to "anti-deficiency" mandates: site must have funds on hand only for first year of contract
 - BUT: Savings must exceed payments every year
- **Prospective energy conservation measures:**
 - T-12 → T8; incandescents → CFLs; HID → T5
 - Hi-eff. motors, variable frequency drives
 - Ground source heat pumps for housing units
 - Hi-eff. electric chillers and condensing boilers



EX: Suffolk County (NY)



- **Performance contract – savings guarantee**
 - Expected size/term: ~ US\$2.26M/ 12 yrs.
 - ESCO: Constellation Energy
 - Selected based on competitive solicitation; few ESCOs chosen from proposals, then interviewed to pick winner
 - Financing: 3rd-party loan to county
 - Constellation helps by identifying prospective financiers
 - Guarantee: part of separate service contract for M&V
 - Constellation does quarterly two-day inspection for fee; must report O&M problems that jeopardize savings, plus modify or "make whole" on any under-performance (e.g., design flaws or pre-mature eqpt. failure)
 - Service contract can be cancelled by county at any time, but savings guarantee ends then too
- **Energy conservation measures:**
 - Interior lighting: T-12 → T8; incandescents → CFLs
 - Parking lot lighting: lowered poles by 6 m., switched to HP sodium
 - Conversion to variable volume system w/ VFDs on air handler fans
 - Replacement of compressors in several DX units
 - Hi-eff. oil-fired boilers to replace old ones



Experiences from other countries

- Thailand - Established an Energy Conservation Fund from taxes on petroleum products to support EE projects and ESCOs, initial efforts to grant finance public EE projects proved problematic, created public revolving fund that has lent ~\$40m
- China – Desire to privatize public provincial energy conservation centers as ESCOs (EMCs) but faced lack of business/finance skills; created loan guarantee fund for public/private EMC projects (\$250m ESCO projects financed to date)
- Brazil – Regulator requires utilities to spend 0.5% of revenues on EE; several utilities created subsidiary ESCOs or contract ESCOs to implement EE programs; public procurement and financing have been major obstacles
- Eastern Europe – Substantial public investment made to upgrade district heating and power systems from Soviet era; small financing programs have been effective, particularly for municipal projects (heating, street lighting)



Case study - Mexico

Problem

- Annual budgets and election cycles not conducive for multi-year contracts or financing
- Procurement procedures require defining project (i.e., goods/services) upfront
- Public institution access to financing is limited; ability to keep financial benefits from energy savings is unclear
- Procurement staff are risk averse, may not understand technical issues, and lack incentives to try new approaches, such as performance contracting

Proposed Intervention

- USAID designed a bidding scheme for equipment and services based on sample audit to provide best IRR
- Bidders must design project and submit technical specifications, energy savings, cost, after commissioning service
- USAID experts work with host facilities (UAM, Xochimilco and Mexico City) to review proposals and advise on technical issues; host selects proposal offering best value
- Upon commissioning, firm verifies performance/savings in order to receive full payment
- Firm provides warrantee or bond to allow recourse if project fails after commissioning



Case study - Egypt

Problem

- Energy prices have been historically low, which means projects are smaller and paybacks longer
- Procurement procedures require defining projects upfront
- Many public agencies have existing relationships with product suppliers and some have spare part inventories
- Public institution access to financing is limited
- Procurement staff are risk averse and often have no incentives to try new approaches, such as performance contracting

Proposed Intervention

- Public host facility conducts upfront audit and designs project, including specification of equipment and services; RFP is issued requesting product/service/finance package to provide best IRR with product performance warranties
- Bidders must submit technical specifications, energy savings, cost, financing plan, warranty provisions
- USAID experts work with host facility (MWRI Headquarters) to review proposals and advise on technical issues; host selects proposal offering best value
- Upon commissioning, firm verifies product performance/savings in order to receive first payment
- Subsequent payments are made based on proper performance of equipment as specified in contract



Case study – Watery, South Africa

Problem

- Limited access to water
- High leakage and water wastage levels
- Public utility does not have access to financing is limited
- Public utility has limited technical expertise to manage system pressure

Proposed Intervention

- USAID supports conceptualization, planning, procurement, contracting and legal arrangements, negotiations, contract management and the statistical determination of future water supply projections (the baseline) to reduce pressure in the system
- Performance contracting is used
- BOOT (Build-Own-Operate-Transfer) arrangement is applied
- Bidders are required to provide funding for the project
- Remuneration to contractor (20%) and utility (80%) paid from shared water savings
- The contractor provides financing of capital, design, implementation, commissioning, operation and maintenance over the contract period as well as training of municipal staff in operations prior to handover
- This project reduced water losses by over 30%, (savings of \$3.5 million/year)



Case study – MUNEE, Armenia

Problem

- Very high electricity consumption in residential sector
- Rapidly growing residential sector gas consumption
- High losses of heat in buildings
- Collapsed district heating system
- Inefficient street lighting and water supply systems
- Public utilities have no or limited access to financing building improvements

Proposed Intervention

- Involvement of nation-wide and/or local public groups dealing with building conservation and condominium capacity building issues (local NGOs)
- Own advance contribution to the investment costs by beneficiaries (>10% investment cost)
- Commitment from municipality to cover the share of low-income households in capital investment costs (up to 20%)
- Small size of projects (\$500-600) with 6-12 month repayment



Case study – MUNEE, Armenia

Result

- Increased building energy efficiency, improved comfort and maintenance of buildings,
- Extended building lifespan
- Improved payment discipline of the residents
- Increased capacity of condominiums in building maintenance and management
- Long-term availability of the Revolving Funds
- Increased attractiveness of the city for future larger-scale investments
- Building credit history of borrowers



Thank you!