



DIRECTIONS IN DEVELOPMENT
Energy and Mining

Public Procurement of Energy Efficiency Services

Lessons from International Experiences

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Why the public sector?

- Public sector energy use ~2-5% of total energy use in many countries (higher with district heating)
- Represents a large, homogenous, common-owner market
- Can “lead by example” and influence markets
 - Public sector typically represents 10-20% of GDP
 - Public procurement alone in EU is €200B or 3% of GDP
 - U.S. federal sales (2-3%) helped achieve high penetration rates for ENERGY STAR equipment (many at 90% or more)
- Reducing energy costs creates fiscal space for socioeconomic investments
- Natural comparative advantage for WB – we can guide procurement process, bundle and finance
- Suitable target for fiscal stimulus and “greening” infrastructure efforts

Why have results been so low?

Policy / Regulatory

- Low energy pricing and collections
- Rigid procurement and budgeting policies
- Limitations on public financing
- Ad hoc planning
- Limited and poor data

Public End Users

- Limited incentives to save energy/try new approaches
- No discretionary budgets for special projects/upgrades
- Unclear ownership of cost/energy savings
- Limited availability of financing
- Lack of awareness and technical expertise
- Behavioral biases

Equipment/ Service Providers

- Higher transaction costs for public sector projects
- Perceived risk of late/non-payment of public sector
- High project development costs
- Limited technical, business and risk management skills
- Limited access to equity and financing

Financiers

- High perceived public credit risks
- New technologies and contractual mechanisms
- Small sizes/high transaction costs
- Behavioral biases

What have other countries done?

- Policy measures
 - Energy pricing (time-of-use/feed-in tariffs, demand charges)
 - EE product procurement (public sector MEPS/labeling, life-cycle costing, bulk purchase)
 - Setting and monitoring of EE targets in public facilities
 - Allowance for use of energy savings performance contracts (ESPCs)
 - Building codes and certification
- Procedural changes
 - Changes in budgeting to allow retention of energy savings
 - Designation of energy managers, periodic energy audits to identify EE measures
 - O&M changes, such as automatic shut-off during evening/weekend hours
- Informational programs
 - Standard bidding documents and templates, analytical tools
 - Establishment of benchmarks, guidelines and good practices for buildings/systems
 - Public sector EE case studies and newsletters
 - Training of public sector staff, facility managers, procurement officers
- Incentive mechanisms
 - Funding for energy audits
 - Public financing for EE retrofits/upgrades
 - Awards for high performing public facility managers, agencies, cities
 - Publishing agency performance, ranking and rating of agencies

How ESPCs Can Help

Public Sector Barriers	ESPCs Can...
Lack of commercial incentives to reduce operating costs	Not deal with incentives, but can help reduce transaction costs/risks, by offering package of services & project performance risk.
No incentive to save energy (no retention of savings)	Not address the principal-agent issue, but better define the benefits/costs upfront, so agencies can negotiate and apportion them.
High perceived risks from new technologies and mechanisms	Involve performance guarantees to assign many project risks away from the public agency and financier.
Inflexible procurement procedures	Allow for high IRR projects to be done by evaluating the best value to the agency, bypassing procurement for each measure, equipment or service.
Constrained annual budgets for capital upgrades	Often facilitate project financing, with repayments derived from project savings.
Small projects with high project development/transaction costs	Allow smaller projects to be bundled, often with notional audit/baseline information, thus helping to address development/transaction costs.
Inadequate information and technical know-how	Invite technically competent private sector firms to compete based on their qualifications, experience and best project ideas.

Results from select countries

Country	National Law?	Market Size	Results	Projects
United States (FEMP)	x	US\$2.3 billion	- 18 trillion BTU/yr - US\$7.1 billion in energy cost savings	460 ESPC projects
Canada (FBI)		Can\$320 million	- 20% reduction in energy intensity - Can\$40 million in energy cost savings - 285 kt of CO ₂ reduction	85 EPC projects (7,500+ buildings)
Germany		~€200 million	- 20-30% reduction in energy costs - €30-45 million in energy cost savings/yr	2,000 properties
Japan		~10 billion yen	- 12% reduction in energy intensity - 265kt of CO ₂ reduction	50 ESPC projects in FY06

World Bank Public EE Portfolio

- From FY00-FY09, the WB has supported 22 projects with explicit public EE components, excluding supply-side (power, DH) investments
- 17 of these (77%) have been in the ECA Region
- 8 included focus on *public (office) buildings*, 5 on *municipal water supply*, 7 on *schools/hospitals*, 3 on *housing* and 2 on *street lighting*
- Only 2 projects had ESCOs mentioned as an instrument for project identification, packing and implementation
- 3 CF projects under advanced preparation (all in India, 2 *municipal water supply*, 1 *street lighting*)

Non-WB Public EE Portfolio

- Over same period, 27 other donor projects and programs identified involving public EE (including IFC)
- 18 of these (67%) have been in the ECA Region
- 10 of them (37%) involved the creation of a fund or financing facility
- EBRD, USAID and UNDP have been more active than others in this area, although GTZ, REEEP and Clinton Foundation have entered the sector
- 14 included focus on general public facilities, 7 on *public (office) buildings*, 4 on *municipal water supply*, 6 on *schools/hospitals*, 4 on *housing* and 5 on *street lighting*
- 15 of them (56%) had ESCOs mentioned as an instrument for project identification, packing and implementation

The Report

- Objective. Summarize international experiences in using EE performance contracting in the public sector
- Approach:
 - *Commissioned case studies from 5 developed countries – Canada, France, Germany, Japan, U.S. and 2 states (New York, Quebec)*
 - *Commissioned 5 country case studies from developing countries – Brazil, China, the Czech Republic, India, Poland*
 - *Collected several other developing country project examples from Bulgaria, the Philippines, Egypt, Hungary, South Africa*
 - *Review of international literature, collected and reviewed 10-15 RFPs, interviewed about 60 experts/practitioners*

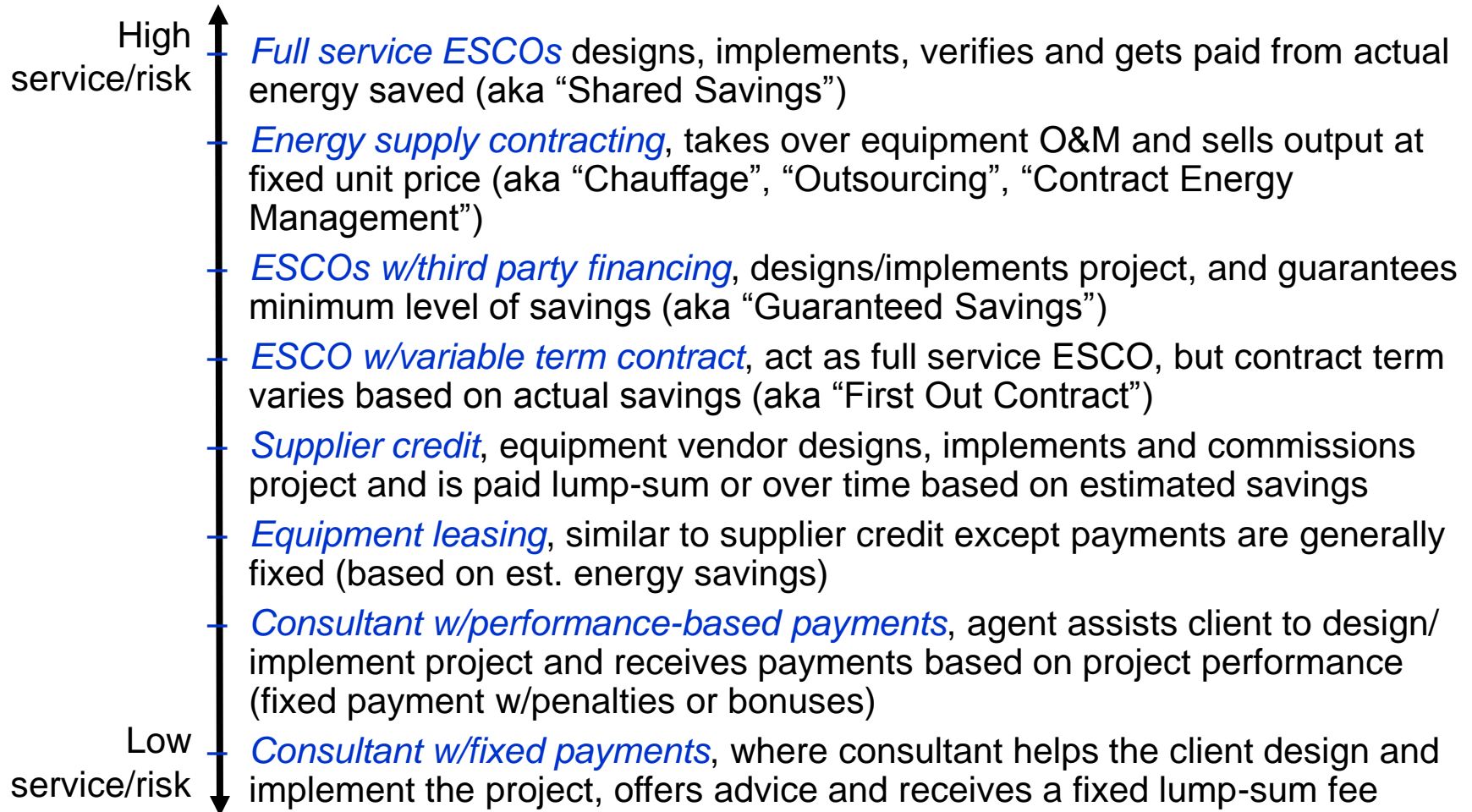
Definitions

- **Public Sector** refers to publicly-owned institutions subject to public procurement rules and regulations, including federal/municipal buildings, universities/schools, hospitals/clinics, public lighting, water utilities, public transportation stations, community centers, fire stations, libraries, orphanages, etc.
- **ESP** refers to an Energy Service Provider (broader than typical ESCO definition)
- **ESPC** refers to Energy Saving Performance Contracts – for the report, an ESPC must:
 - tie at least part of ESP payment to project performance
 - must be involved in project implementation (not just audit, equipment sale or O&M)

What is an ESPC?

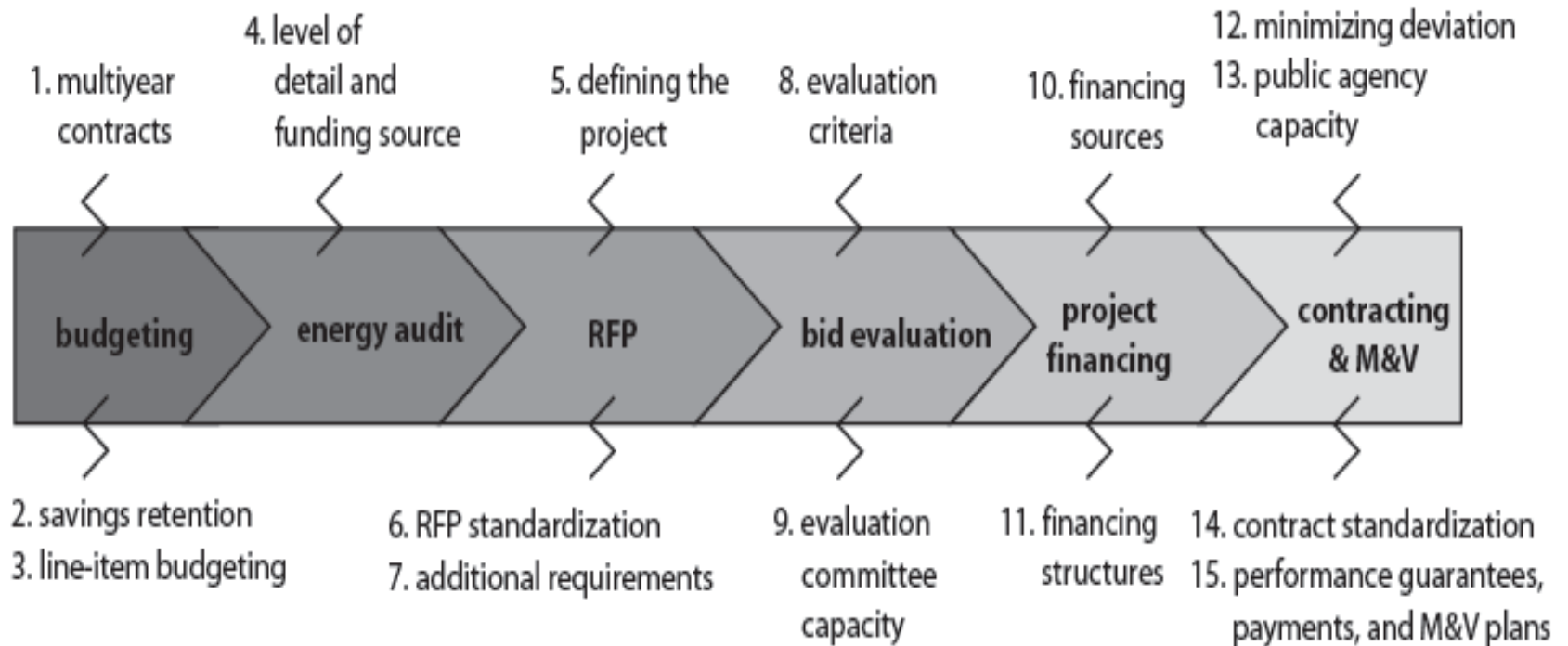
- A contracting mechanism for implementing EE projects on a **turn-key basis** – i.e., design, equipment procurement, installation, and savings verification
- Optional services include financing, operations and maintenance (O&M), training, etc.
- Compensation is generally based on actual demonstrated energy cost savings from the client or ‘host facility’
- Allows host facilities with limited capital to **pay for EE upgrades from future energy savings**, while mobilizing private capital and sharing of project performance risks
- ESPCs are generally carried out by energy service companies, or ESCOs

ESCO Models



Source: World Bank 2005

Steps and Issues



Emerging Public ESPC Models

Model	Examples
Indefinite Quantity Contract (IQC)	U.S. (FEMP), Hungary (MOE)
Public ESP	Ukraine (Rivne City)
Super ESP	U.S. (NYPA), Belgium (Fedesco), Philippines (EC ²)
Utility ESP	U.S. (FEMP – UESC), Croatia (HEP ESCO)
Utility DSM ESP	Brazil
Internal ESP (PICO)	Germany (Stuttgart)
Energy Supply Contracting	Germany, Austria, France
Procurement Agent	Germany (BEA, DENA), Austria, U.S., Czech Republic, Slovakia
Project Bundling	Austria, Germany, India, S. Africa, U.S.
Nodal Agencies	U.S. (USDOE), S. Korea (KEMCO), India (BEE), Japan (ECCJ)
Ad Hoc	Brazil, China, Egypt, Mexico, Poland, S. Africa

Public ESPC Procurement Issues

- **Budget provisions for ESPCs**
 1. Multi-year contracts
 2. Retention of energy savings
 3. Line item budgeting
- **Initial energy audits**
 4. Level of detail and source of funds for initial audit
- **Development of the RFP**
 5. Defining the project
 6. Standardization of the RFP
 7. Additional steps in the bidding process
- **Evaluation of bids**
 8. Evaluation criteria for multiple technical and financial parameters
 9. Technical capacity of agency evaluating committees
- **Financing**
 10. Sources of financing
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- **Contracting and M&V**
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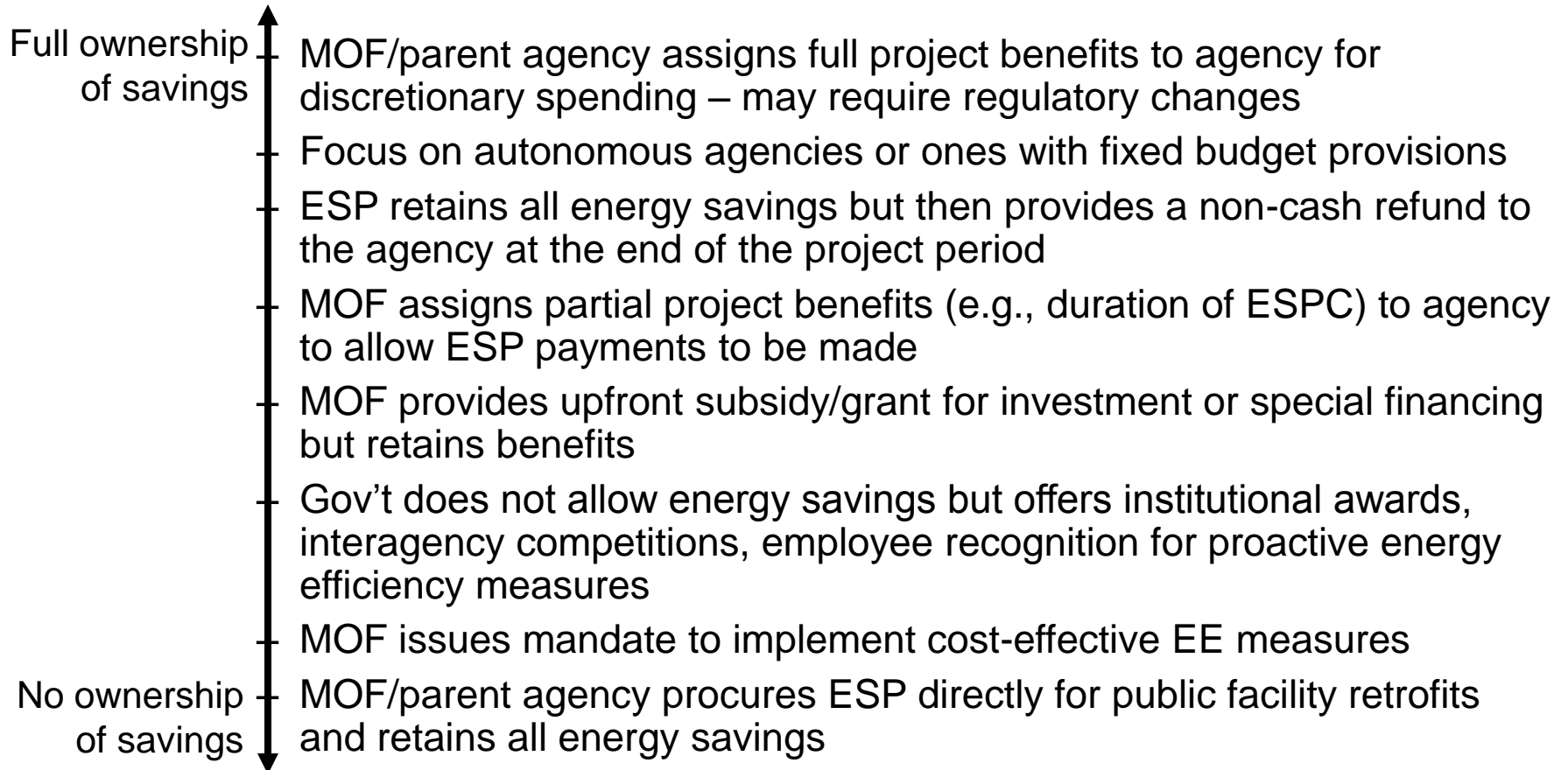
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Budget: Issue 1 (Multi-Year Contracts)

- **Medium Term Expenditure Framework (MTEF)** is approach promoted by WB to help reconcile multi-year obligations with annual budget envelopes
- MTEF helps ensure that public commitments are consistent with its medium-term fiscal outlook
- Many WB clients have adopted MTEF, so do not face this issue
- Many other countries have precedents for multi-year contracting, which should be explored
- But, if this is a key issue, consider **one-year ESPCs** (e.g., *Mexico*)

Budget: Issue 2 (Retention of Savings)



Budget: Issue 3 (Line Item Budgeting)

- With separation of capital & operating budgets, many public agencies have difficulties using savings from one category to pay for another – spirit of ESPCs
- The *U.S.* (24 years) and *Germany* (17 years) have addressed ESPC budgeting issues through series of legislative and regulatory amendments, yet both still face substantial state differences and recurring reviews
- *India* has dealt with it on a project-by-project basis with the issuance of Government Orders, until sufficient experience has been gained

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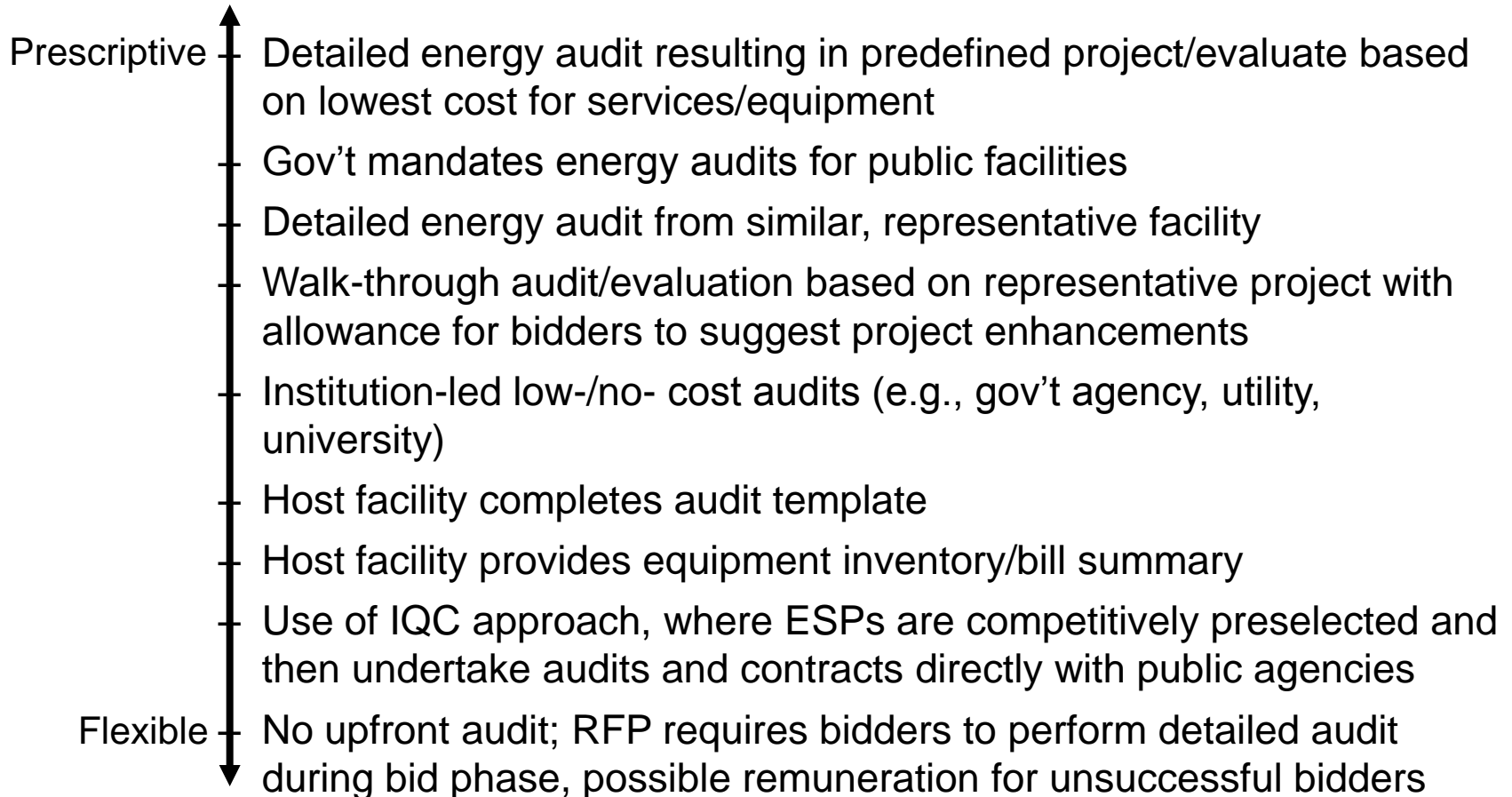
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Audit: Issue 4 (Level of Detail/Cost)



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Minimum information (buildings) required:

- Age of building
- Inventory of equipment
- Square footage by function (e.g., office space, cafeteria, training centers, etc.)
- Operating conditions (operating times, functions)
- 1+ year of energy billing data, including tariff information
- Past EE measures implemented to date
- If bundle of projects, only need data on representative sample

Conclusion: Technical information can be prepared at a very low cost!

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RFP: Issue 5 (Project Definition)

- 3 aspects to consider:
 - Type of procurement
 - Project parameters
 - Services to be provided

Country/Institution	Type of Procurement
India (Tamil Nadu)	Goods and Services
India (Gujarat)	Works and Services
Germany	Works or Services
USA (NYPA)	Services
USA (FEMP)	New Law/Procedures
France	New PPP Law/Procedures
World Bank	Management Contract (Goods & Services)

RFP: Issue 5 (Project Definition)

- Project parameters can include: pre-specified type and quantity of equipment to be replaced (*Egypt*), target end-uses or systems (e.g., lighting, HVAC), required & optional target systems (*Germany*), minimum level of energy savings (*India*), minimum share of energy savings
- Package of services can include detailed energy audit, engineering & project design, equipment procurement, financing, installation & construction, commissioning, performance guarantee, M&V, O&M

RFP: Issue 6 (Standard RFPs)

- There are substantial differences in standard RFPs for ESPCs among those available and reviewed
- Developed markets have many (federal, state, association, program)
- Need to consider opportunities for early innovation and testing of different approaches, customization for specific agency needs, high typical procurement transaction costs, avoid “reinventing the wheel”

RFP: Issue 7 (Additional Steps)

- Various countries have added additional steps to the typical bidding process including:
 - Pre-qualification or short-listing of ESPCs
 - Conducting of an investment grade audit (IGA) (*France*)
 - Draft RFP and pre-bidding meetings
 - Site visits
 - Oral presentations (*Japan*)
- Additional steps should be driven by client needs, level of project complexity, need for consultations, experience of bidders and agencies, etc.

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Evaluation: Issue 8 (Many Parameters)

- Most countries use two-stage evaluation process (technical and financial)
- Technical evaluation similar to typical services: firm experience, technical approach, personnel, etc.
- Financial evaluation more complex due to multiple cost-related parameters (e.g., energy savings, IRR, total project cost)
 - Some countries use weighted average of financial criteria (*Japan, Czech Republic, Canada, U.S. – NYSERDA, India*)
 - Others use single calculation or value to determine best value (i.e., NPV) (*Austria, Germany*)
 - Still others rely on direct negotiations (*U.S. – FEMP/NYPA, France*)
- Evaluation procedures must fit local regulations and agency needs, yet also be clear, transparent and simple

Evaluation: Issue 9 (Agency Capacity)

- Many country programs have some public agency or commercial agents that can assist in procurement, including evaluation of proposals
- Umbrella IQCs, pre-qualification of ESP bidders, standardized RFPs, pre-bidding conferences, training of ESPs and agency staff, etc. all can help

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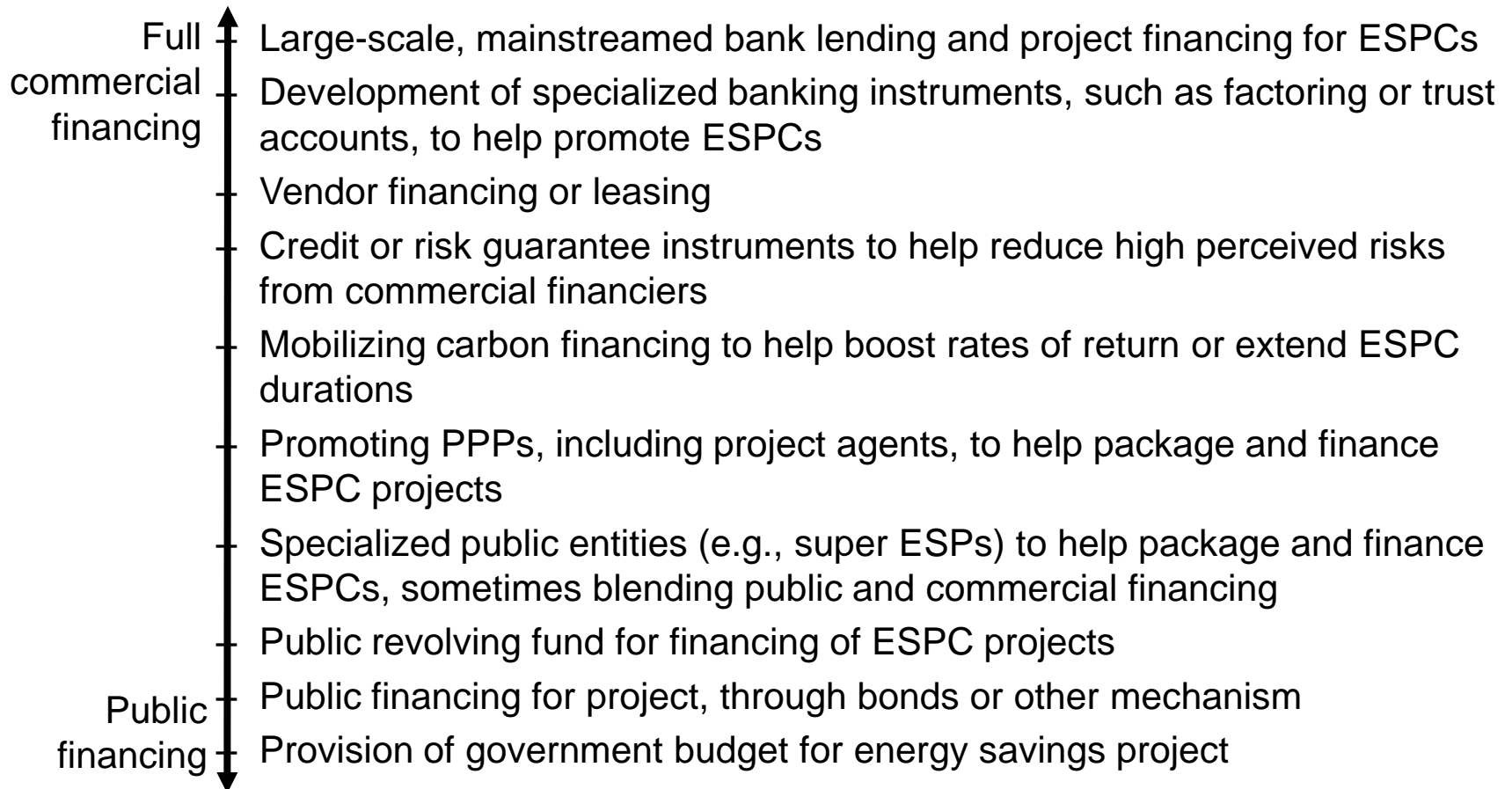
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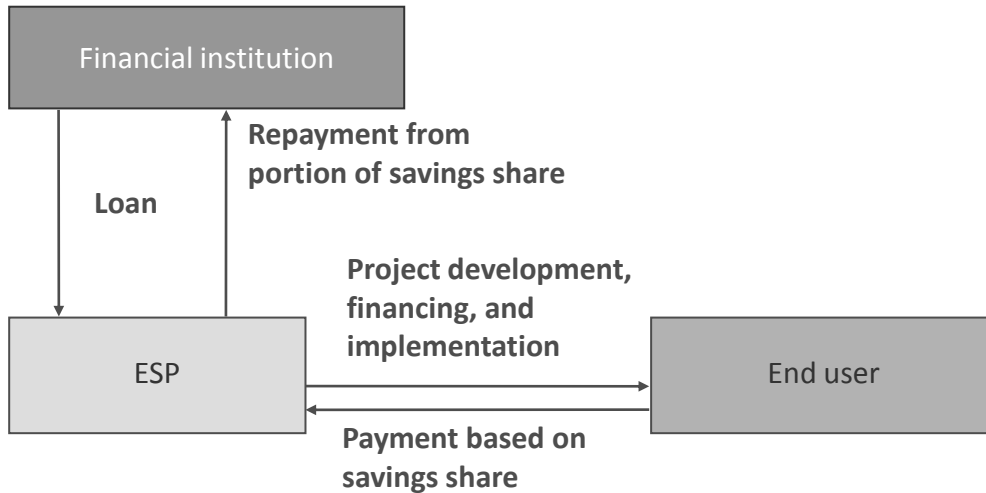
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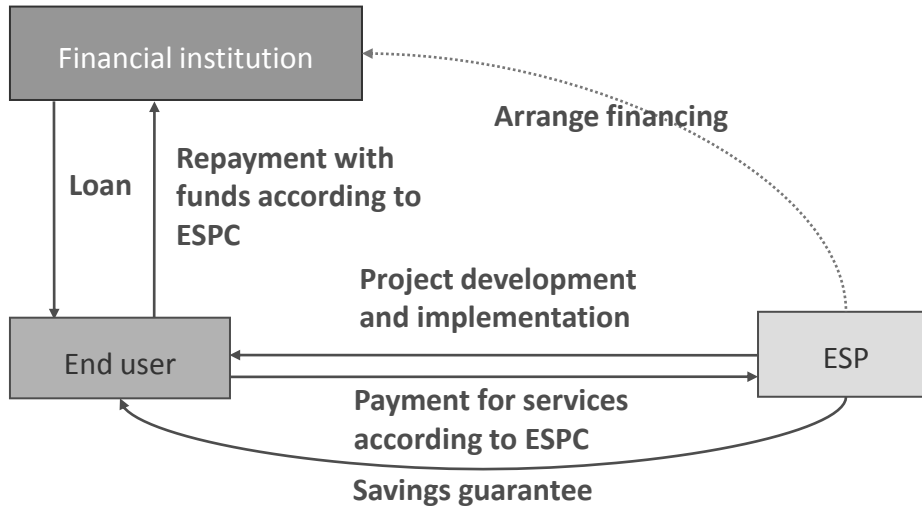
Financing: Issues 10 (Sources)



Financing: Issue 11 (Structures)



Shared Savings Model



Guaranteed Savings Model

Source: Taylor et al., 2008

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Contract: Issue 12 (Deviation)

- Direct contracting, requiring detailed energy audits or pre-specifying the project do not face this issue
- For the rest, need measures to ensure IGA project does not vary significantly from ESP proposal
- Options include:
 - Some contracts allow small (<20%) deviation of IGA from proposal or IGA is not reimbursed and contract is cancelled (*U.S., Brazil*)
 - Others use “open book” model, where ESP gets fixed service fees and agreed mark-up for equipment (*Canada, Croatia*)
 - Others agree on fixed unit price for various measures (*Hungary*)

Contract: Issue 13 (Agency Capacity)

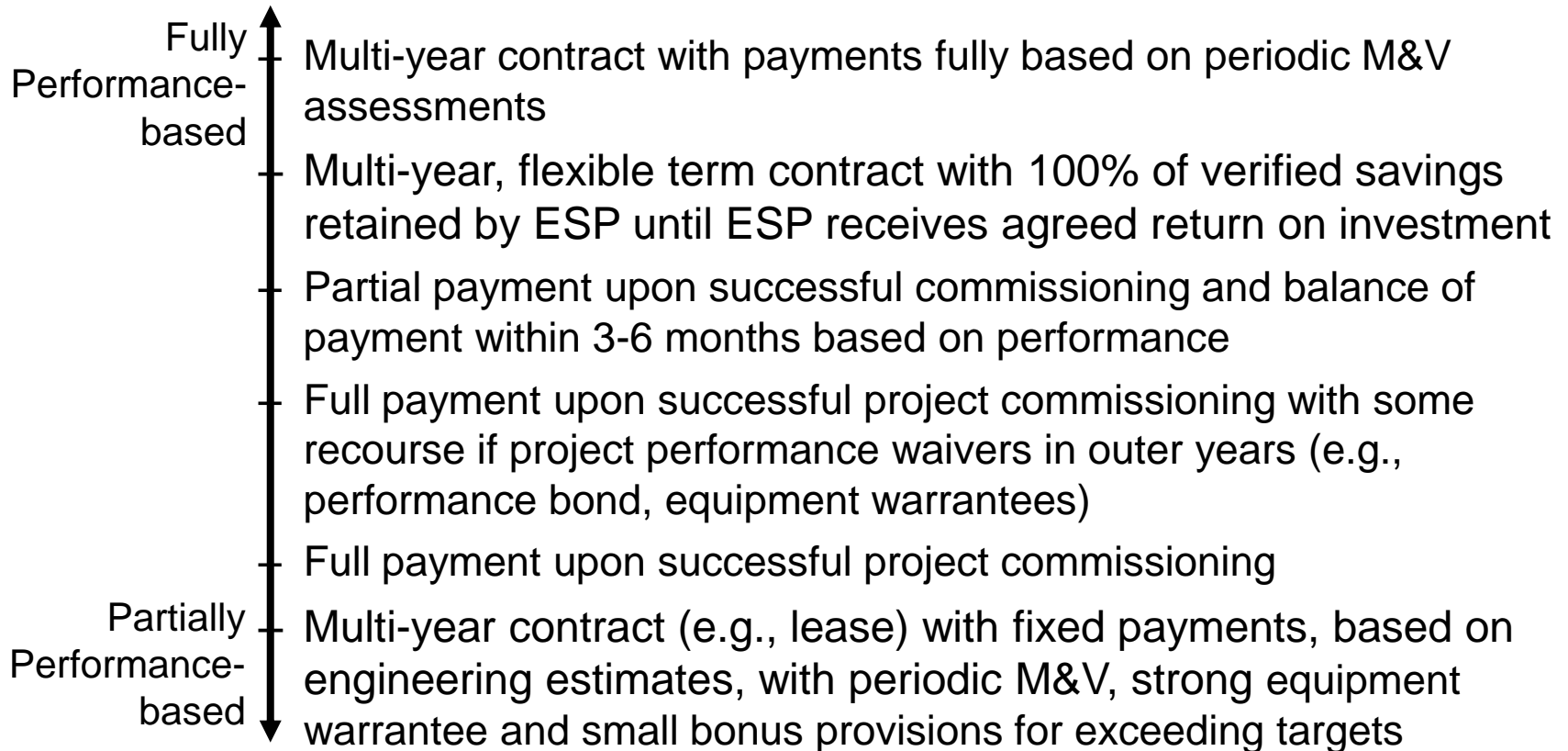
- Many countries have some public agency or commercial agents to assist in procurement, including contract negotiations and supervision
- IQC master contracts, public/super ESPs, procurement agents, standardized ESPCs, training of ESPs and agency staff, bundling of public projects, etc. all can help

Contract: Issue 14 (Standard Docs)

Countries	Approach	Status
U.S., Japan, India, Canada - FBI	Nodal agencies developed standard contracts for use by government agencies	Standard contracts available and have been used in many cases
Australia	Standard contract developed by ESP Association	Standard contract available and being use
Czech Republic, Canada-Quebec, Germany	Assistance and guidance from NGOs/ associations/agents in contracting process	Standardization likely to occur with additional experience
S. Africa, China, Mexico, Egypt	Little or no effort devoted to standard contracts	No standard contracts currently available
France	Unique contracting process (PPP) - individually negotiated	No standard contracts currently available

- Need for standardized ESPCs is more important than RFPs
- Need to consider alternate provisions, customization for specific agency needs, high typical contracting transaction costs, creating legal precedents, avoid “reinventing the wheel”

Contract: Issue 15 (Perf. Guarantees)



Designing the Right Process

Budget	Audit	Financing	Model	Contract
<p>Progressive</p> <ul style="list-style-type: none"> agency's full retention of EE benefits after reform certain autonomy or fixed budget provisions of agency noncash refund to agency from ESPs with retention of EE benefits partial EE benefits assigned to agency by Ministry of Finance (MOF) no agency retention, MOF upfront subsidy/grant/special financing no retention but other incentives (e.g., awards, competitions) no retention; MOF mandate on agency EE implementation no retention; ESP procurement by MOF/parent agency <p>Restrictive</p>	<p>Prescriptive</p> <ul style="list-style-type: none"> detailed energy audit and resulting predefined project mandate audit detailed audit from similar, representative facility walk-through audits/evaluation institution-led low- or no-cost audit completed audit template equipment inventory/bill summary audit by preselected ESPs under Indefinite quantity contract (IQC) approach no upfront audit; detailed audit by bidders prior to bid submission <p>Flexible</p>	<p>Commercial</p> <ul style="list-style-type: none"> bank lending and project financing to ESPCs vendor financing or leasing credit or risk guarantee carbon financing to boost IRR or extend ESPC duration financing and packaging by Public-private partnership (PPPs) financing and packaging by public entities (e.g., super-ESPs) public revolving fund public financing through public bonds, etc. government budget for EE projects <p>Public</p>	<p>High ESP risk</p> <ul style="list-style-type: none"> full service—shared savings energy supply contracting—chauffage, outsourcing, contract energy management ESPs with third-party financing—guaranteed savings ESPs with variable-term contract—first out contract supplier credit equipment leasing consultant with performance-based payments consultant with fixed payments <p>Low ESP risk</p>	<p>Performance based</p> <ul style="list-style-type: none"> multiyear contract and periodic payments based on M&V assessment multiyear, flexible term contract until ESP's agreed return met partial payment upon commissioning and balance paid 3–6 months multiyear contract and fixed payments with periodic M&V, equipment warranty, and bonus provisions full payment upon commissioning with some recourse for outer years full payment upon commissioning <p>Traditional</p>

Conclusions and Recommendations

For countries interested in developing a process:

- Conduct an upfront market survey of potential ESPs
- Hold stakeholder consultations to analyze barriers and identify potential solutions
- Define multiple solutions for each barrier and options for each issue
- Develop and test small procurements
- Expand and replicate
- Institutionalize systems

Project Examples

1. India Akola Street Lighting Replacement
 - *State of Maharashtra plagued by power shortages, high electricity costs (~5% of Akola municipal budget)*
 - *Akola issued tender for financing/replacement of 11.5k lamps using an ESPC*
 - *AEL won tender in April 2007, invested ~\$120k replacing all lamps with T-5 FTLs, and took 95% of verified energy savings (metering 10% of lamps), 6 year term w/ maintenance/replacement obligation*
 - *Project savings were 2.13 million kWh (\$133k cost savings, or 11 month payback)*

Project Examples

2. Water Pressure Management in South Africa

- *Mesti-a-Lekoa utility (Emfuleni municipality near Jo'berg) experienced 80% water losses in 2004*
- *Issued tender for energy/water savings performance contract; firms could offer various approaches to reduce losses and finance the project*
- *Engineering consortia led by WRP Engineering Consulting won with proposal to finance/install pressure management system under BOOT scheme*
- *In 2005, WRP invested \$800k and saved 14 million kWh, 8 million kl, and \$3.8 million per year (3 month payback!)*
- *WRP gave Mesti-a-Lekoa 80% of savings for 5 years*

Projects Can also be Bundled

- State of Tamil Nadu (**India**) urban development fund (PPP) to bundle SL and water pumping in 7 municipalities under single tender (30% energy savings requirement, ESPC signed in 2008)
- State of Gujarat (**India**) recently issued tender for up to 159 local urban bodies (2 phases)
- MOE in **Hungary** issued tender in 2006 for ESOC to renovate all schools in country; OTP Bank and local ESCO (Caminus) signed 20-yr agreement with \$250m IFC guarantee; about \$22m implemented as of Aug '08
- City of Johannesburg (**South Africa**) bundled 50 municipal buildings for retrofits in 2008
- **Austria, Belgium, Czech Republic, Germany, South Korea, United States** – all have successful bundling of EE projects using ESPCs

ESPCs in WB Procurement

- Innovative mechanisms exist to deal with many aspects of ESPCs (e.g., output-based, BOT, cost-plus, management services, two-stage bidding, etc.)
- Key challenges for WB procurement:
 - How should project be defined (if design has not taken place)?
 - How can bidders develop binding cost proposals?
 - How can different proposals be evaluated fairly?
 - On what basis should payments be made?
- Great interest by WB and ESMAP to test locally-appropriate procurements in order to scale-up EE in public clients' facilities and save money

Thank you!

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