ESMAP
Energy Sector Management Assistance Program
Briefing Note 09/10

World Bank Procurement for Energy Efficiency

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ENERGY EFFICIENT CITIES INITIATIVE

HELPING CITIES MEET THEIR ENERGY CHALLENGES OF THE NEW CENTURY

Why energy efficiency (EE)?

- Global energy demand will grow 45% by 2030, requiring ~US$26 trillion investment
- 87% of this growth will occur in developing countries
- Increased volatility in oil and gas prices and supply
- By 2030, greenhouse gas (GHG) emissions will also grow 45% to 41 Gt
- EE can:
  - Reduce new infrastructure investments while easing bottlenecks
  - Lessen country's dependence on imported/fossil fuels
  - Enhance industrial/commercial competitiveness
  - Ease public expenditures for energy creating fiscal space for other socioeconomic priorities
  - Reduce environmental footprint, both locally and globally

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 in EU was €1,500B or 16% of GDP in 2008
  - 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

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EE product procurement

- WB operations purchase ***large quantities of energy-using equipment*** (e.g., water/steam pumps, lighting, vehicles, office/hospital equipment, etc.)
- ESMAP report estimates that WB projects will result in procurement of ~***100 million CFLs*** [*global market in 2004 was 1.25B*]
- Despite optional provisions for life-cycle costing, etc. ***WB projects don't lead market*** for EE goods
- Most equipment manufacturers ***do not offer highest efficiency equipment*** for WB tenders, due to lowest bid evaluation
- This creates ***virtual cycle*** of perceived lack of demand and supply

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What are the issues?

- ***Transaction costs*** for developing technical specifications results in older ones being used again and again
- Lack of ***global testing and certification*** regimes make quality assurance more complex
- Limited ***technical capacities of local PIUs*** make more complex evaluations more time consuming and potentially subject to abuse
- Client concern over ***higher upfront costs***, given that many public sector agencies are subject to ***low energy pricing***
- Behavioral biases favor ***conventional practices***
- New approaches may require changes in budgeting, procurement, etc. and create ***new risks***

But the opportunities are many…

- WB can help to ***lead the market***, and thus ***foster increased innovations*** in EE
- ***International cooperation*** on testing and certification can help create new markets and level playing field with client-based manufacturing
- ***Many ways*** to do procurement:
  - improved technical spec preparation
  - life-cycle costing/NPV evaluation
  - country-level labeling and standards
  - output-based equipment procurement with performance-based payments
  - guaranteed procurement for new product development

- ESMAP will launch new study in FY12 on EE product procurement ***global experience and best practices***

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EE service procurement

- An energy savings performance contract (ESPC) is a contracting mechanism to implement EE projects similar to a ***turn-key contract*** – i.e., design, equipment procurement, construction/installation, and savings verification
- Optional services include financing, operations and maintenance (O&M), training, etc.
- Usually, ***compensation is tied to actual energy 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 (ESCOs), or ***energy service providers*** (ESPs)

How ESPCs can help

Public Sector Barriers	ESPCs Can…
High perceived risks	better define the benefits/costs upfront, assign some project risks away from the public agency and financier
Inflexible procurement procedures	allow high IRR projects by evaluating the best value to the agency, bypassing multiple procurements
Limited annual budgets for capital upgrades	facilitate project financing, usually with repayments derived from project savings
Small projects with high project development/ transaction costs	allow smaller projects to be bundled, streamline audits/M&V for similar types of facilities, reduces hassle factor for public agencies
Inadequate information and technical know-how	solicit technically competent private sector firms to compete based on their qualifications, experience and best project ideas

Results from select countries

Country	Market Size	Results	Projects
United States (FEMP)	US$3.8 billion	- 18 trillion BTU/yr (2006) - US$7.1 billion energy cost savings	460 ESPC projects
Canada (FBI)	Can$320 million	- 20% energy intensity reduction - Can$40 million energy cost savings - 285 kt CO_2 reduction	85 EPC projects (7,500+ buildings)
Germany	~€200 million	- 20-30% energy cost reduction - €30-45 million energy cost savings/yr	2,000 properties
Japan	~10 billion yen	- 12% reduction energy intensity - 265kt of CO_2 reduction	50 ESPC projects in FY06
South Korea	~220 billion Won	n/a	~1,400 public ESCO projects

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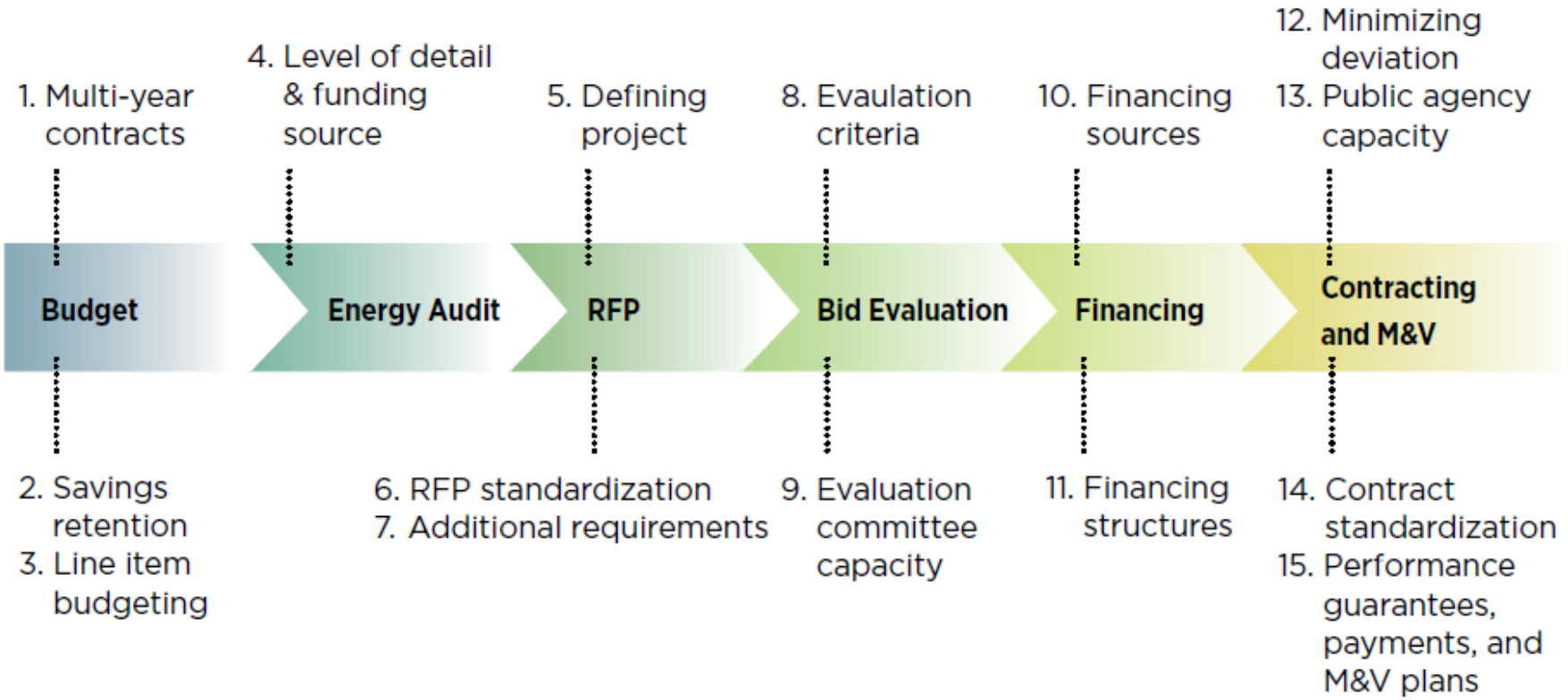
Steps and issues



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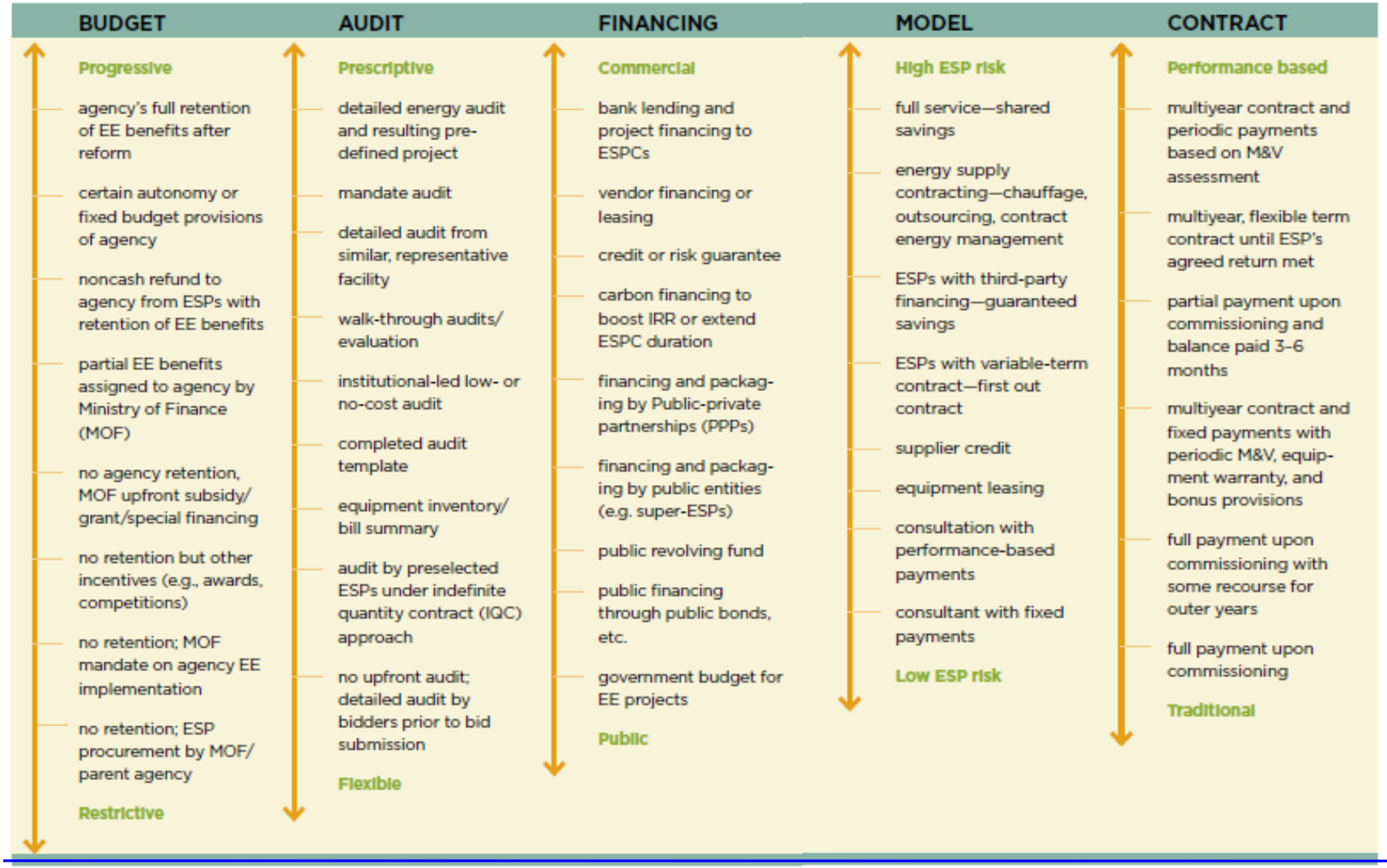
Emerging ESP contracting models

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

Designing the right process



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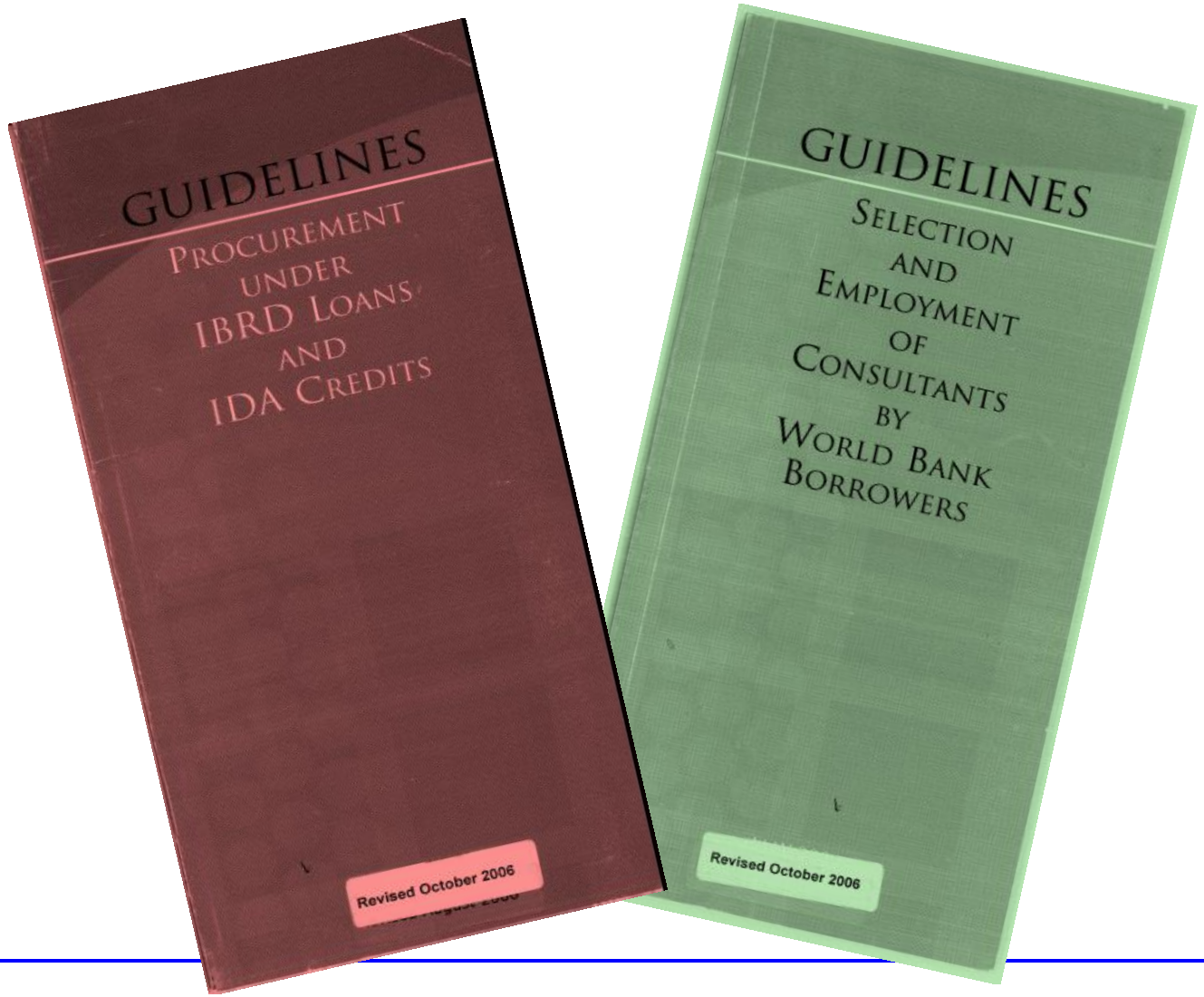
ESPCs and WB procurement



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Why is ESPC procurement different?

- ESPCs use ***output-based rather than input-based models***
- ESPCs involve a ***blend of goods, works, services, and financing***
- ***Payments are based on performance*** rather than time-based or delivery-based contracts
- ***Relatively small contract sizes*** for ESPCs make complex Bank procurement options cumbersome
- ESPCs require ***credible, upfront technical information***
- ESPCs are often ***finalized after contract signing***

WB procurement precedents

- **Output-based or performance-based contracts** allow for payments to be based on measurable output indicators rather than inputs
- **Cost plus contracts** allow for procurement when the exact type and quantity of goods is not known
- **Two-stage bidding** allows for bidding when the technical approach is uncertain by requesting unpriced technical bids first to see what solutions bidders may propose
- **Management services contracts** allow for turn-key, performance-based, output-based contracts

Split design & construction contracts

Pros

- Conventional approach
- Relatively easy to do
- Low risk to complete

Cons

- No accountability for results
- Auditors/designers always lack “hands-on” experience
- Requires two procurements
- Discourages innovation
- Public agency assumes project performance risks

Split design & construction contracts

No.	Model	Description
1	Standard design & CW contract	- Hiring of consultant for energy audit & project design - Procurement of supply & install contract - Fixed payments based on inputs
2	Standard design w/output-based CW contract (fixed payments)	- Hiring of consultant for energy audit & project design - Procurement of supply & install contract based on energy savings - Evaluation based on lowest cost to achieve savings - Fixed payments based on inputs
3	Standard design w/output-based CW contract (performance-based payments)	- Hiring of consultant for energy audit & project design - Procurement of supply & install contract based on energy savings - Evaluation based on lowest cost to achieve savings - Partial payments based on energy savings

Comb. design & construction contracts

Pros

- Promotes innovation and accountability (less risk for agency)
- Single procurement

Cons

- More complex bidding and evaluation (higher bid preparation costs and more time for procurement)
- Greater opportunities for ‘gaming’ the system

Challenges

- Defining project parameters
- Bidders have to develop binding cost proposals
- Transparent evaluation of dissimilar bids
- Defining and measuring outputs

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Comb. design & construction contracts

No.	Model	Description
4	Combined design & output-based CW contract (fixed payments)	- Bidding docs issued for design & build based on min. energy savings - Evaluation based on lowest cost to achieve min. energy savings - Fixed payments based on completion of project per design
5	Combined design & output-based CW contract (performance-based payments)	- Bidding docs issued for design & build based on min. energy savings - Evaluation is based on technical feasibility and highest NPV - Payments partially based on energy savings
6	Two-stage bidding w/output-based CW contract (performance-based payments)	- Bidding docs issued for design & build based on min. energy savings - Submission of unpriced technical proposals first - Bid docs can then be revised based on solutions proposed - Final evaluation based on technical feasibility, highest NPV - Payments based partially on energy savings

Comb. design & construction contracts

No.	Model	Description
7	Cost plus CW contract	- Bidding docs issued for design & build based on min. energy savings - Evaluation based on technical feasibility and lowest cost structure - Payments would be based on actual input costs w/mark-ups, with some bonus for meeting energy savings targets
8	Management services contract	- Bidding docs issued for design & build based on min. energy savings - Evaluation is based on technical feasibility, highest NPV - Payments based on energy savings

Financing models

No.	Model	Examples
1	Credit lines	India RE II (1998) China EE Financing I & II (2006, 2010) Turkey Private Sector RE & EE (2009) Tunisia EE (2009)
2	Credit guarantees	China Energy Conservation II (2002) Philippines Electric Cooperative System Loss Reduction (2004) Tunisia EE Program/Industrial Sector (2004) HCEEF, CEEF, CHUEE (1997, 2002, 2006 - IFC)
3	Public ESPs	China Energy Conservation (1998) Croatia EE (2003) Poland EE (2004) China Shandong EE (2011) – proposed Ukraine ESCO Financing (1998 - EBRD) Philippines EE (2009 - ADB)
4	Funds	Bulgaria EE (2005) India Tamil Nadu Urban Development II (1999) Romania EE (2002) Uruguay EE (2004) Armenia Electricity Supply Reliability & EE (2011) – proposed
5	Public financing	Ukraine Kiev Public Buildings EE (1999)
6	Project financing	Hungary OTP Subsovereign Schools EE (2006 – IFC)

Getting started

- ✓ Conduct an upfront market survey
- ✓ Hold stakeholder consultations
- ✓ Define solutions to key barriers
- ✓ Develop and test small procurements
- ✓ Expand and replicate
- ✓ Institutionalize systems

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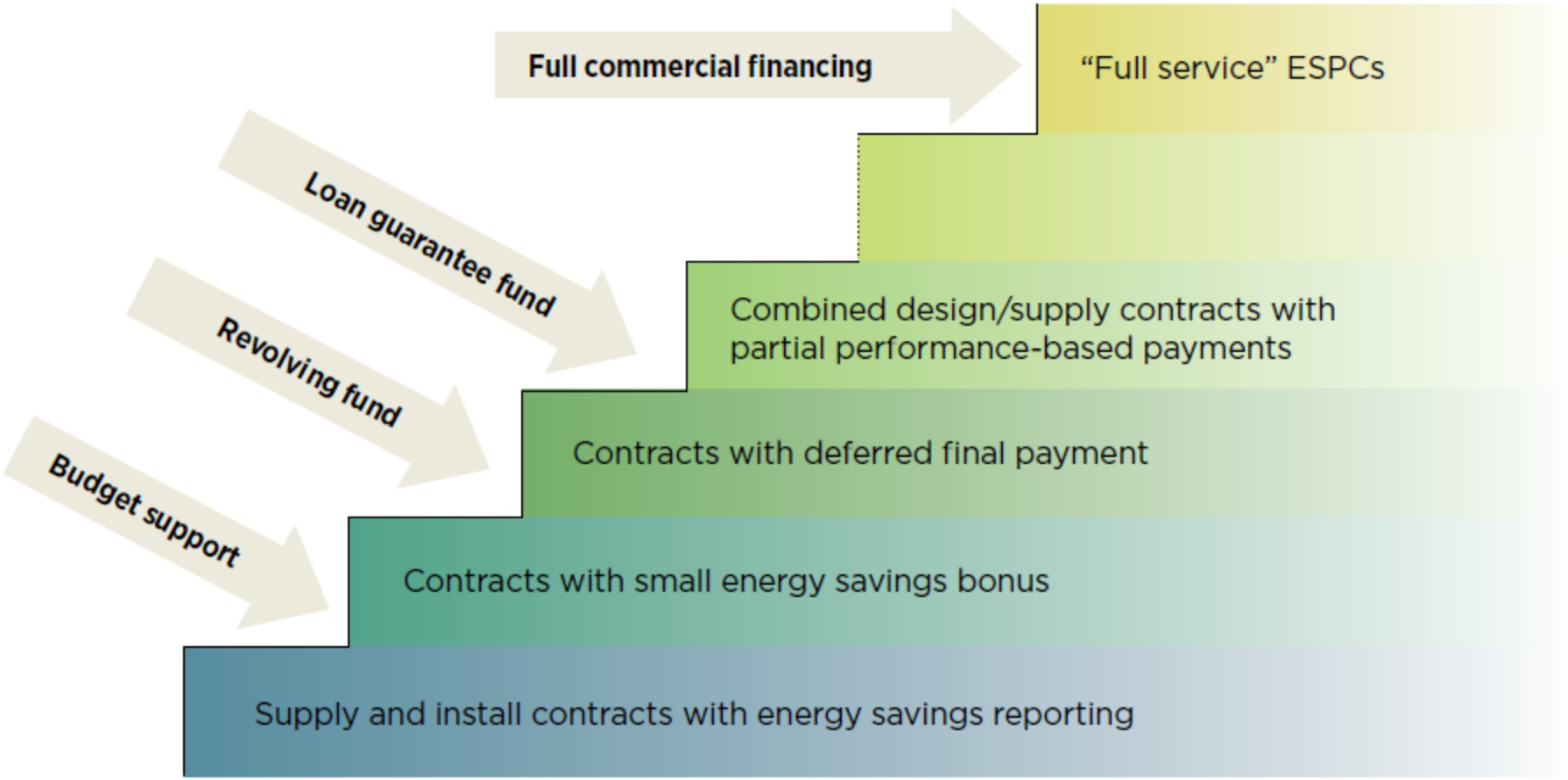
Building the Market



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Remaining challenges for discussion

- Need to develop and test alternate bidding documents and collect results
- Need mechanisms to inform local procurement staff
- Develop and test small procurements
- Expand and replicate


Thank you!
For more information,
please visit: www.esmap.org
The case of Armenia…

Case study: Armenia social buildings

Conditions

- Social public buildings (schools, orphanages, clinics) face budget constraints and rising energy costs, which is not sustainable
- All gas (for heating) is imported from Russia
- Most cannot take loans, and grants are not sustainable

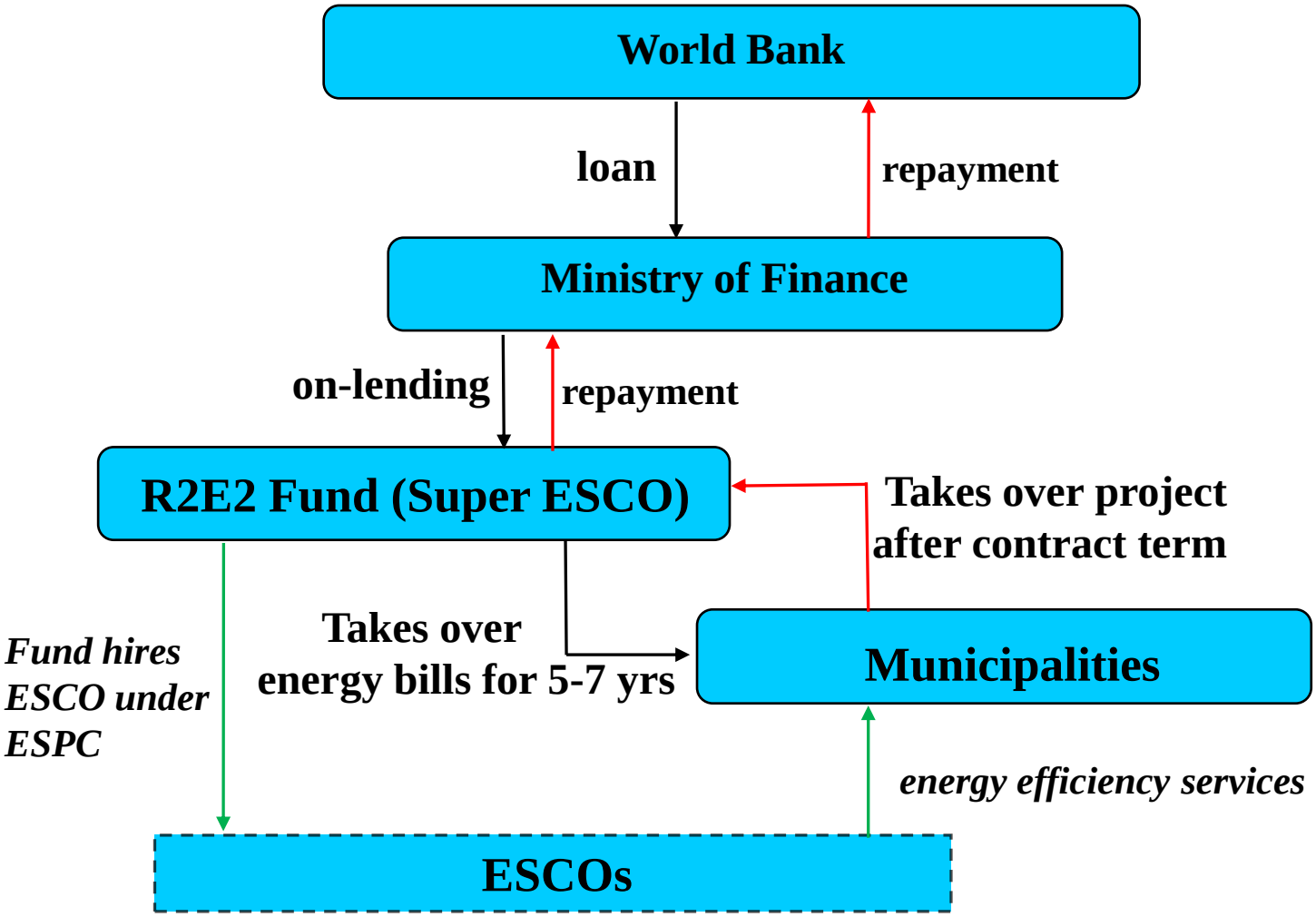
Proposed solution

- Existing independent fund will enter into energy service agreements with social facilities to take over energy bills and systems
- Schools will pay their “baseline” energy costs, adjusted for weather, energy tariffs, and usage patterns
- Fund will make investment and use baseline energy costs to pay energy bills and recover investment

Proposed procurement scheme

- Use of NCB template for small Works (updated Nov 2010)
- Project is defined on output basis - minimum level of energy savings - based on preliminary energy audit
- Bidder must bid on design and construction
- Evaluation is based on (i) technical feasibility to meet promised energy savings, and (ii) highest NPV
- Bidding documents to include process for commissioning and 1-year M&V
- Thus, proposed payment scheme is as follows:
  - 20% advanced payment at contract signing with bank guarantee
  - 60% payment upon successful delivery of project per approved design
  - 10% payment based on commissioning performance tests (within 10% of promised NPV)
  - 10% payment after 12 months O&M, savings verification, defects liability period

Financing Scheme – Super ESCO



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