FINANCING ENERGY EFFICIENCY IN THE MUNICIPAL SECTOR

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Where is the potential for EE in cities?

- Retrofit existing public facilities
  - Energy system and building envelope retrofits in municipal buildings and public lighting
  - Loss reduction and energy efficiency measures in municipal utilities
  - Promote distributed generation and load reduction options
- Implement policies and programs in non-municipal facilities
  - Green building certification and campaigns
  - Promotion of efficient electrical equipment and appliances
  - Disseminate industrial process improvements
  - Encourage green transport modes
- Integrate energy considerations in land use planning and urban development
  - Spatial densification
  - Integrated urban planning and smart city design
  - Coordinated utility planning

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Illustrative economics of municipal EE

Sector	Short-Term Payback (under 5 years)	Medium-Term Payback (5-10 years)	Long-Term Payback (10+ years)
Public Buildings	▪ Equipment retrofits ▪ Labeling building energy use ▪ ESCO contracting ▪ Solar water heating	▪ Building envelop measures ▪ Green roofs ▪ Training in good building O&M practices	▪ Net zero, passive buildings ▪ Certification of building materials ▪ Building integrated PV ▪ Equipment standards
Public Lighting	▪ Lighting retrofits (HPSV) ▪ Control systems & sensors	▪ Retrofits using LEDs ▪ Lighting system redesign	▪ Street & traffic lighting standards
Water/ Wastewater	▪ Pumping retrofits, incl. VSDs ▪ Pressure management ▪ Load management ▪ ESCO contracting	▪ Wastewater methane recovery for power generation ▪ Water DSM (low-flow outlets)	▪ Leak reduction ▪ System redesign & optimization
Transport	▪ Improve traffic circulation planning ▪ Differential fuel taxation/pricing ▪ Congestion/Parking fees ▪ Promote non-motorized transport	▪ Alternative fuels for buses/ taxis ▪ BRT systems ▪ Fuel efficiency vehicle standards ▪ Promote fuel-efficient vehicles through fiscal incentives	▪ Modal shifts ▪ Vehicle I&M programs ▪ Changes in land-use patterns to promote urban densification

Commercial financing

Public financing

Regulation? Subsidies?

Barriers to EE in cities

Policy / Regulatory

- Low energy pricing and collections
- Public procurement and budgeting policies
- Limitations on public financing and borrowing capacity
- Ad hoc planning
- Unclear or under-developed EE institutional framework
- Lack of appliance standards and building EE codes, lack of testing, poor enforcement
- Limited and poor data

Equipment/ Service Provider

- High project development costs
- Perceived risk of late/ non-payment of public sector
- Limited demand for EE goods/services
- Diffuse/diverse markets
- New contractual mechanisms (e.g., ESCOs)
- Limited technical, business, risk mgmt. skills
- Limited access to financing/ equity

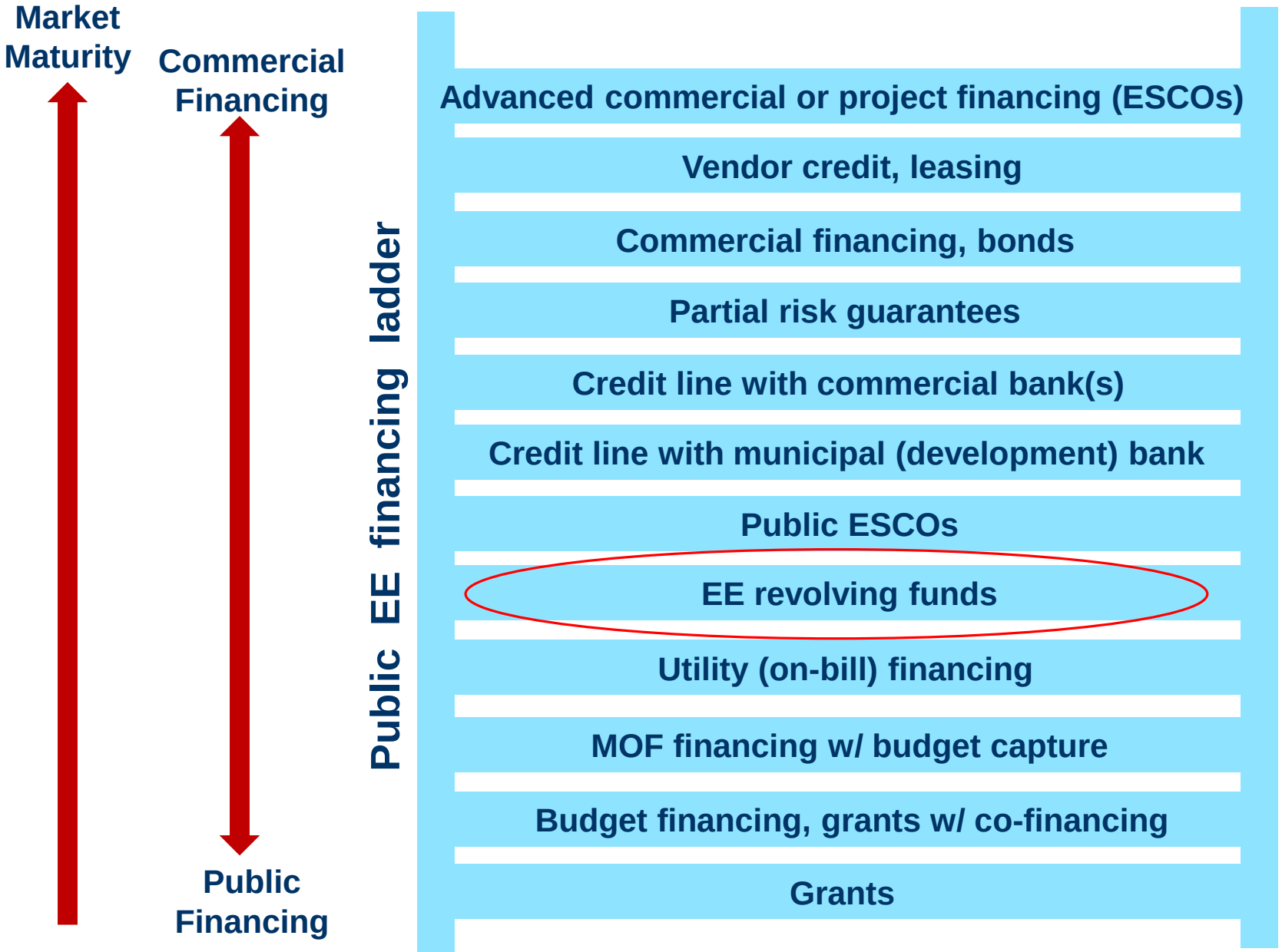
End User

- Lack of awareness
- High upfront and project development costs
- Ability/willingness to pay incremental cost
- Low EE benefits relative to other costs and priorities
- Perceived risks of new technologies/ systems
- Low levels of comfort
- Mixed/lack of incentives
- Behavioral biases
- Lack of credible data
- No discretionary budgets for special projects/ upgrades and limited ability to borrow
- Cannot collateralize public assets

Financiers

- New technologies and contractual mechanisms
- Small sizes/widely dispersed→ high transaction costs
- High perceived risks, incl. public credit risks
- Other higher return, lower risk projects
- Over-collateralization, restrictions on public assets as collaterals
- Behavioral biases

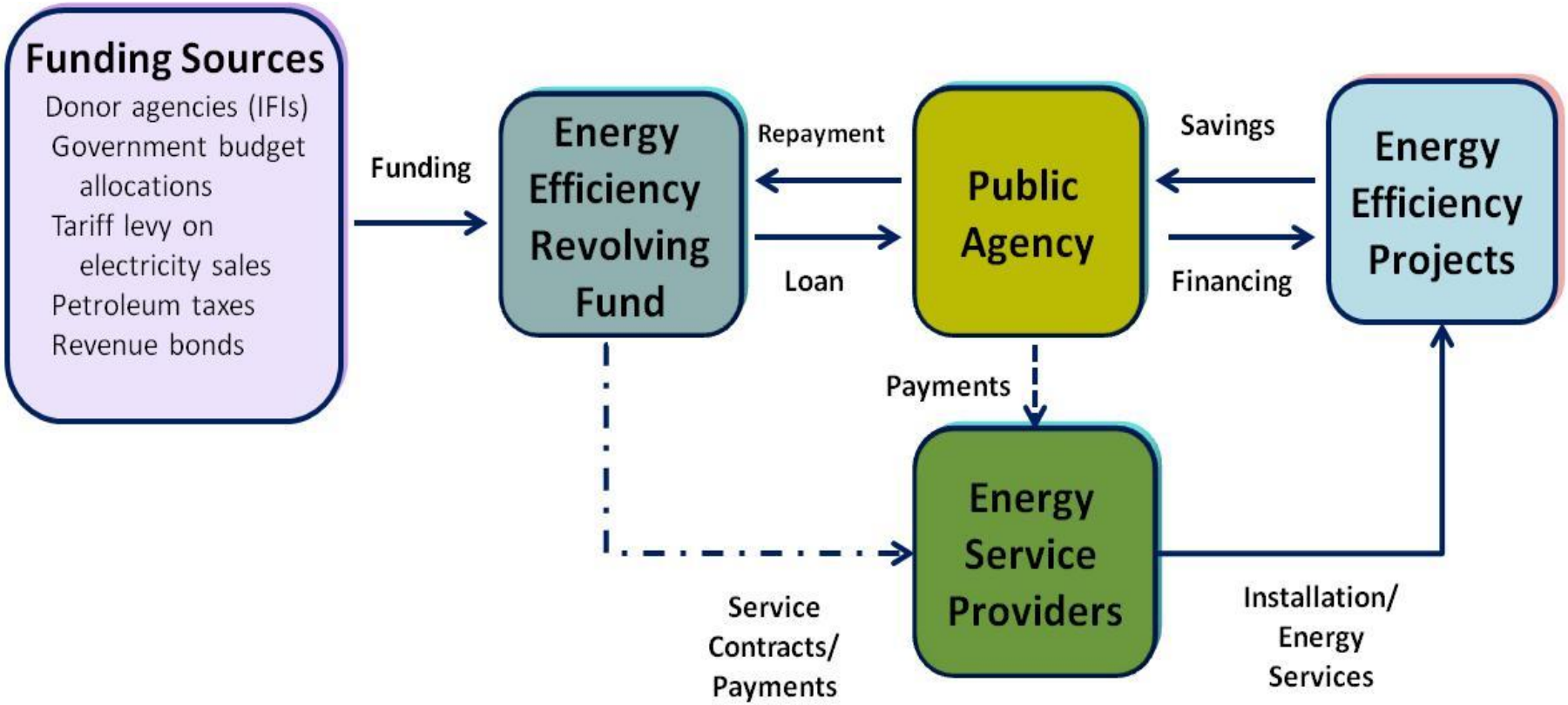
Public Sector EE Financing Ladder



Why an Energy Efficiency Revolving Fund?

- Allows for financing for public sector (central government, municipal) where banks are unable or unwilling to provide financing
- Can offer financing at more preferential terms, options to combine with grants where available
- Ability to pool government, donor, commercial financing more easily and bundle smaller projects, allowing for economies of scale and lower transaction costs
- Offers ability to centralize implementation (procurement, technical reviews, safeguards) to serve many cities and to grow capacity
- Revolving structures with associated fees allows it to operate sustainably
- But…
  - EE Funds should not crowd out private financing, when available
  - Recovery of operating costs and developing pipelines take time
  - Heavy reliance on good fund manger, proper governance structures
  - Cannot succeed when full grants are offered through budget and parallel donor programs

Typical Structure of EE Revolving Fund



EERFs in operation: Armenia, Bulgaria, Croatia, India, Romania, United Kingdom, Uruguay

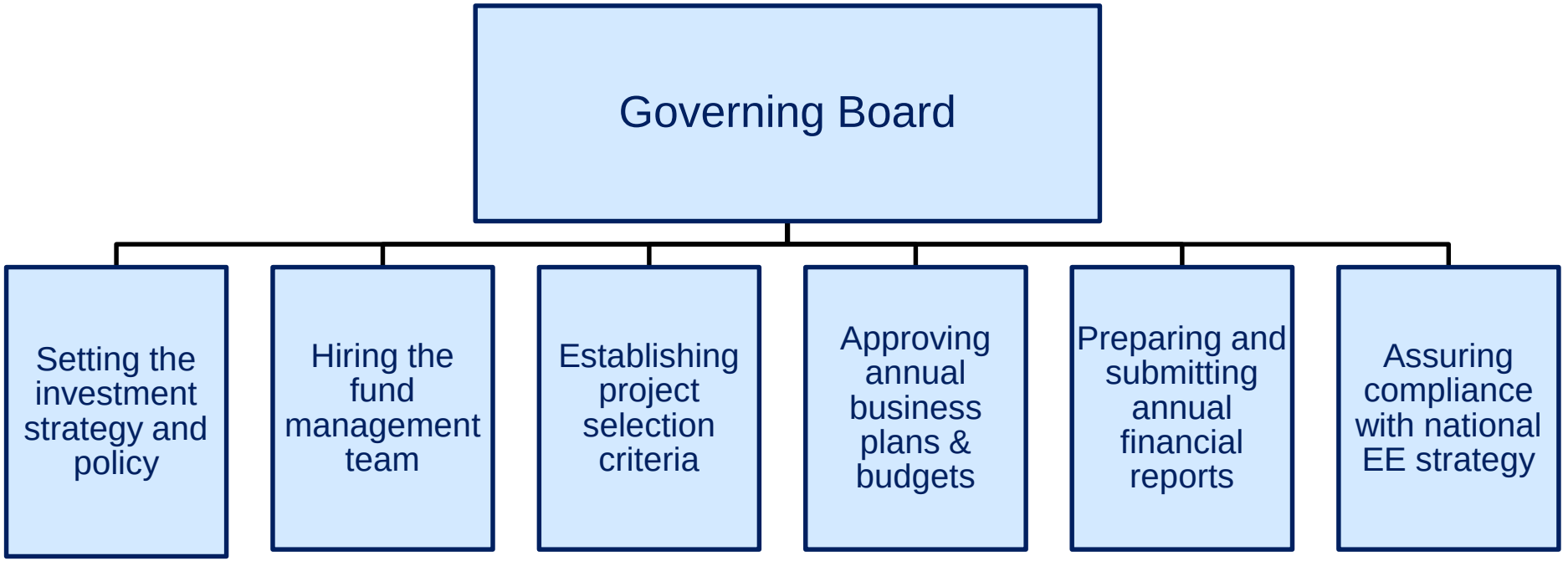
EERFs planned/proposed: Belarus, Bosnia & Herzegovina, Kazakhstan, Kosovo, FYR Macedonia, Mexico, Turkey, Ukraine

Establishing the Legal Framework

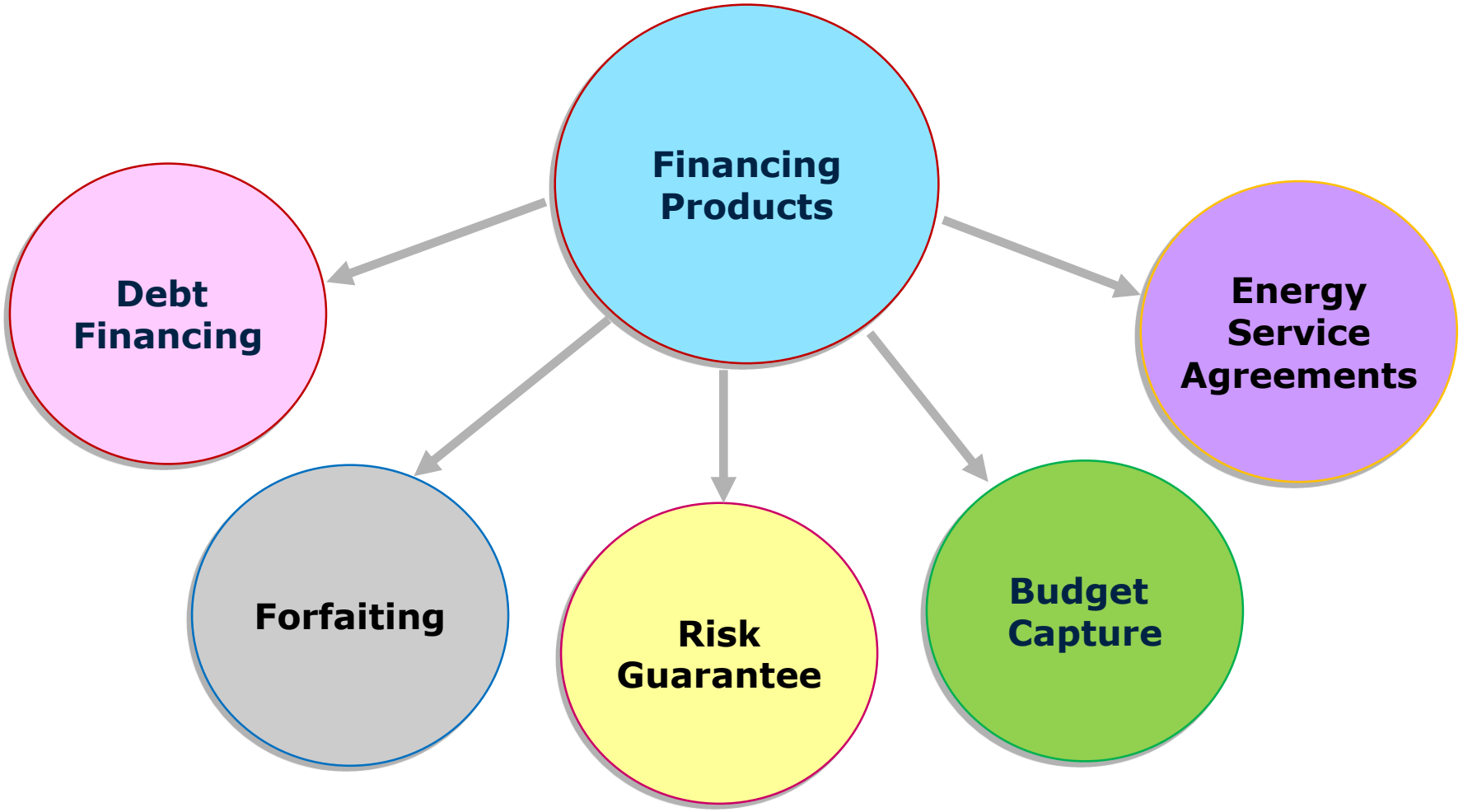
- Establishing an EE Fund typically requires some legislative actions:
  - Provision in Energy Law or Energy Efficiency Law
  - Funding may be authorized by a budget line item, new or existing tax, donor funds
  - Some legal frameworks do not allow for special funds to be created
- Legal provision typically does not specify the institutional set-up or establishment of a new entity, so some secondary legislation may be required
  - Secondary legislation is often needed to create a new institution, specifying organizational type and structure, governance arrangements, ownership
  - Amendments to existing regulations are needed to assign EE Revolving Fund management to an existing institution
- Institutional options may include:
  - Management by an existing entity (e.g., energy agency, municipal/ development bank, municipal/infrastructure/environmental fund, utility, buildings directorate, etc.)
  - Creation of a new legal entity (e.g., state-owned corporation, statutory agency)
  - Establishment of a public-private partnership (PPP)

EE Fund Governance

EE Fund oversight is delegated to a Board appointed by the government



Financing Products



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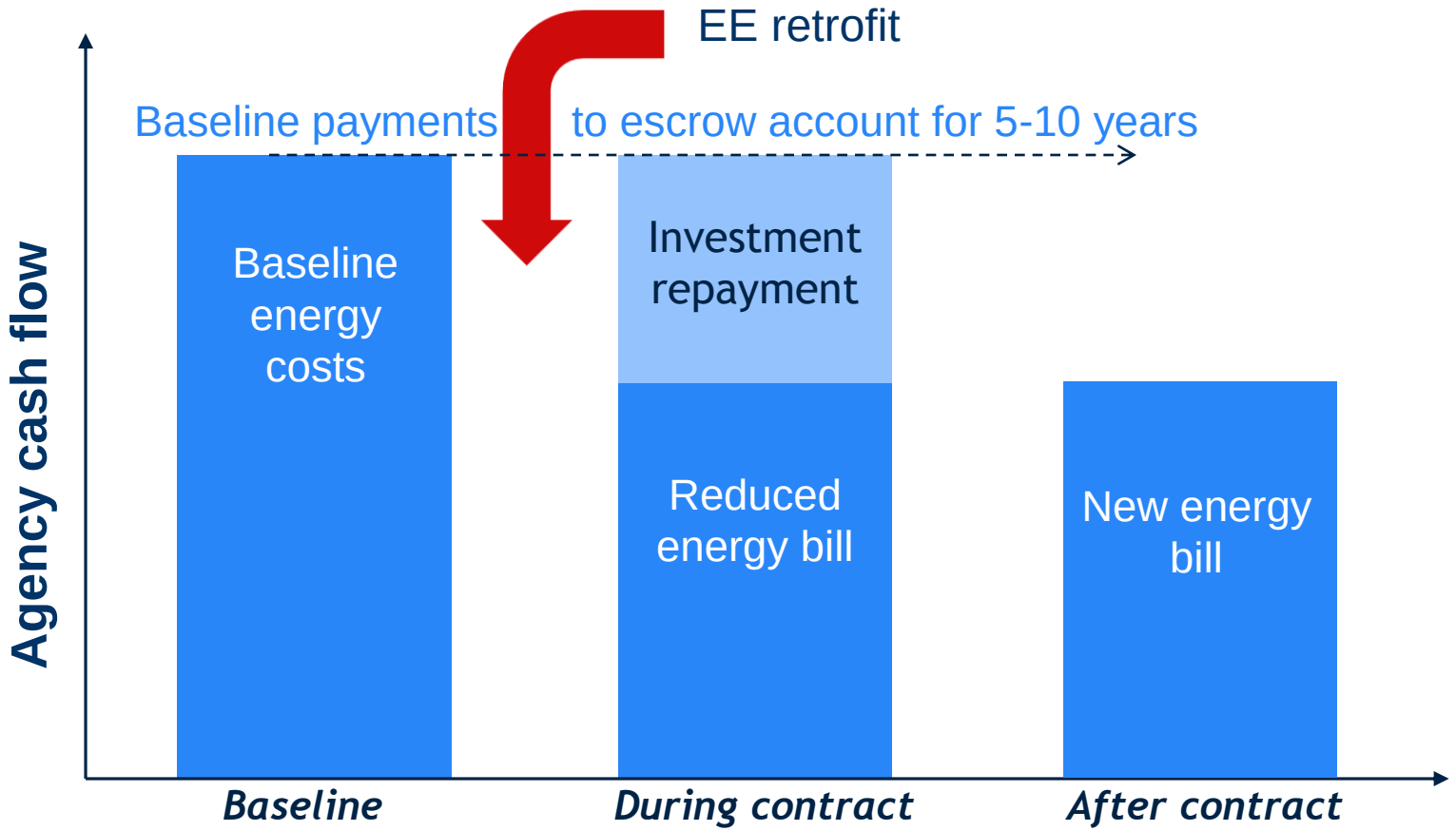
What is an energy service agreement?



Baseline payments need to be adjusted for:

- Changes in energy prices
- Changes in operations and comfort levels
- Severe weather impacting energy use

Energy service agreements continued…

Other aspects

- Public entities/municipalities can maintain a positive cash flow throughout the energy service agreement
- ESAs under EE Revolving Fund may have increased procurement flexibility – allows for innovation
- Smaller projects can be bundled by EE Revolving Fund, lowering product and transaction costs
- Contract duration can be flexible until the investment is fully repaid
- Energy service agreements may not count against municipal debt limits
- Performance risks can be offloaded to contractors/ESCOs under simplified energy performance contracts

But clients need…

- Proper metering and energy bill payment discipline, with recourse for nonpayment
- Retention of energy savings in order to make baseline payments
- Sufficient baseline data, comfort levels
- Staff qualified to understand and negotiate energy service agreements

Case Study: Armenia R2E2 Fund

- Renewable Resources and Energy Efficiency (R2E2) Fund established in 2005, started revolving mechanism in 2012 for public EE projects using ESAs
- Project targeted US$9 million (about 100 municipal street lighting and building retrofit projects) over 3 years
- To date, the R2E2 Fund has signed 55 ESAs totaling US$8.7 million
  - Average project size is about US$150,000 (one US$1.2 million project with a university)
  - All ESAs are being repaid on time (or early)
  - All projects are subcontracted to local construction firms under simplified performance contracts; to date, all have met or exceeded ex-ante energy savings estimates
  - Many new technologies have been introduced, since procurement is based on highest NPV rather than lowest cost
- Some key lessons/remaining issues include:
  - High % of application rejection (55/307 applications accepted) creates higher admin costs than expected
  - Need to develop robust project pipeline to meet investment target
  - Increased bundling in procurement to lower transaction costs
  - Fund sustainability after project closure is unclear

Case Study: Bulgaria EE Fund

- Bulgaria Energy Efficiency Fund (BEEF) was established in 2006 (name changed in 2014 to the Bulgaria EE and Renewable Sources Fund)
- Capitalized with US$15 million in grant funds (GEF, Austria, Bulgaria) plus two private shareholders (Lukoil, Enemona)
  - Overseen by non-political Board of Directors which includes government, private sector and NGOs
  - Serves mostly municipal sector (60+%) although also finances some SME and residential apartment building projects
  - Provides loans to end users, portfolio loan to ESCOs, loan guarantees to commercial banks
  - Operates on a fully commercial basis, including covering administrative costs, defaults, etc.
- Results and lessons
  - Financed or guaranteed over 160 projects valued at over US$80 million
  - Small capitalization was useful initially but a second financing would have allowed the Fund to expand operations
  - Continued reliance on public financing, government creates perpetual risk of sustainability

Thank you

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