

Financing Municipal Energy Conservation/ Efficiency Projects

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Overview of Municipal Energy Efficiency



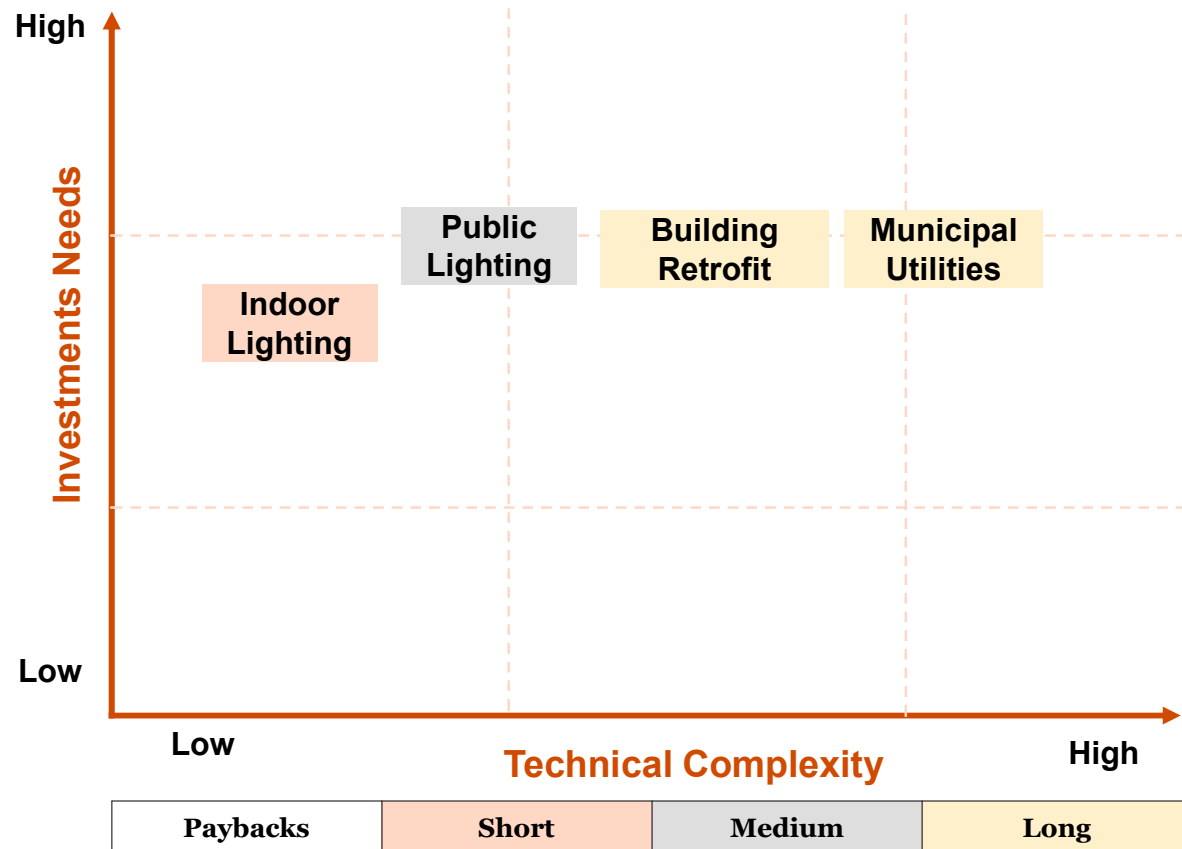
In 2017, global investments in Energy Efficiency grew by 3% to USD 236 billion

Indoor Lighting: replacement of inefficient lighting system and fixtures with energy-saving and efficient lamps such as LEDs, CFLs, etc.

Public Lighting: replacement of inefficient mercury vapour lamps with high quality LEDs and installation of lighting controllers

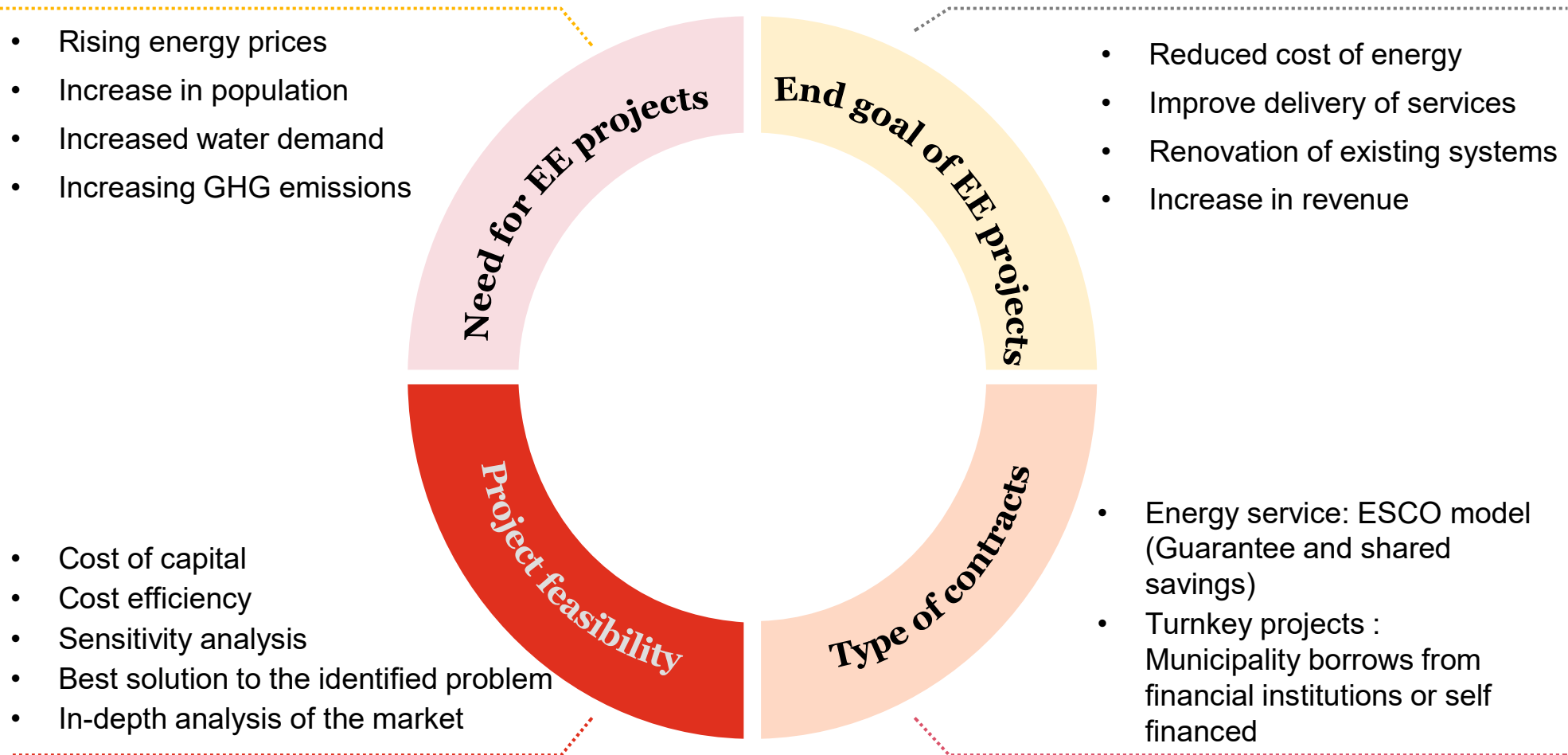
Building Retrofit: installation of efficient boilers and chillers, insulations, and development of energy management system

Municipal Utilities: reduce losses via adopting state-of-the-art technology to build a robust municipal infrastructure



- Due to low cost and shorter payback period, Indoor lighting projects are implemented by municipalities using budgets allocated by the state or central govt. or both.
- Utility infrastructure projects require heavy investments and hence rely on govt. budget, loans from banks and international development finance institution such as ADB, World Bank, IFC, etc.
- Weak credit and limited borrowing capacity of the municipal utilities limits the number of financing options to Budget Financing and Energy Efficiency Funds such as EEEF, NEFCO (Finland), VCFEE (India), etc.

Assessment of Energy Efficiency Projects



Expenditure and Source of Income for Municipalities

Revenue streams

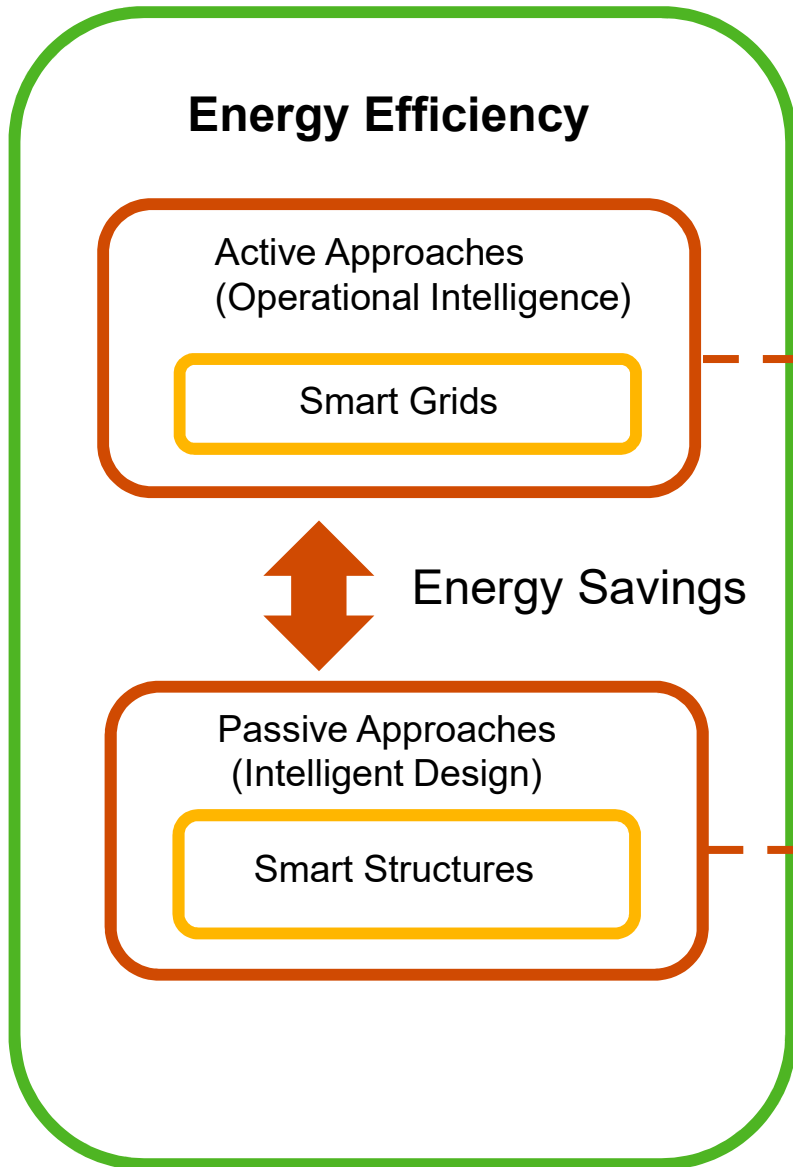
- **Assigned Revenue:** Profession tax, surcharge on stamp duty, entertainment tax, motor vehicles tax
- **Own Non-tax Revenue:** municipal fees, sale and hire charges, user charges, lease amounts
- **Own Tax Revenue:** property tax, vacant land tax, tax on animals, taxes on carriages and carts, advertisement tax
- **Borrowings:** Loans undertaken by the municipalities largely from state and central govt. banks, municipal bonds, pension funds and insurance firms.
- **Grants:** are available from govt. under various projects, programmes and schemes. Further, non-plan grants are made to compensate for loss incurred
- **Other Income:** sale of scrap, city buildings, revenue other than taxes from sanitation works.

Expenditure

- **General Administration:** municipal administration, finance, election, etc.
- **Planning & Regulation:** city planning, developing regulations, trade license, encroachment removal
- **Health:** public health, hospital services, ambulance, prevention control, primary health care
- **Public Works:** construction of roads and pavements, bridges, flyovers, street lights, drainage system
- **Civic Amenities:** Water supply, sewerage, fire services.
- **Urban Forestry:** parks, gardens, development of lakes and ponds, environment conservation
- **Social Welfare:** welfare of women, slum improvement, construction of houses, urban poverty alleviation programs.
- **Other Services:** educations, transportation services (road & water), facility for pilgrims

Smart Cities- Redefining Urban Energy

Energy Efficiency in Smart Cities



Active vs Passive Approaches

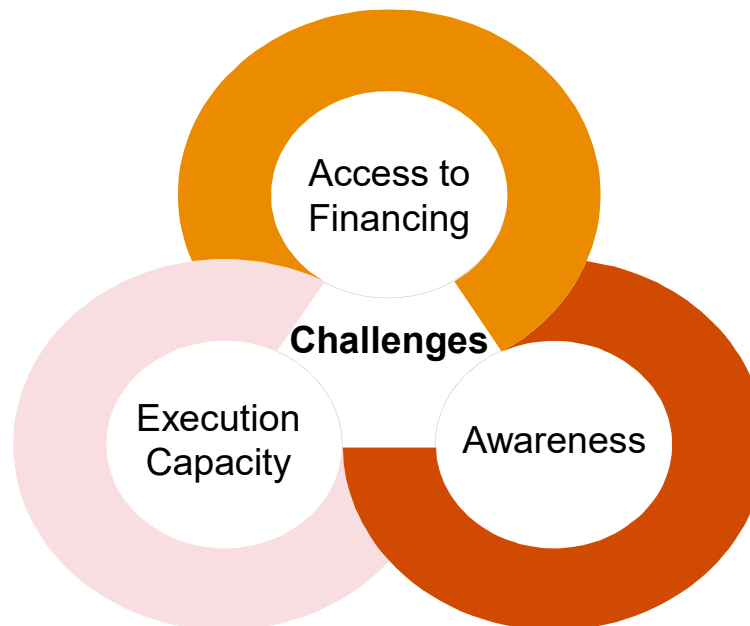
- Active approaches are depended on advancement in solid state technologies and the related fields
- For instance communication, control systems, power electronics, information science, sensor clouds
- The intelligence in active approaches strongly depends on technological advances.

- Passive Approaches are based on design improvements of static structures or elements forming cities, and they exhibits static responses for the requirements of cities.
- For instance, natural lighting and ventilation, habitability of indoor and outdoor spaces etc.
- The intelligence in passive approaches comes from the design and planning techniques.

Key Challenges – Implementation of Energy Efficiency Projects

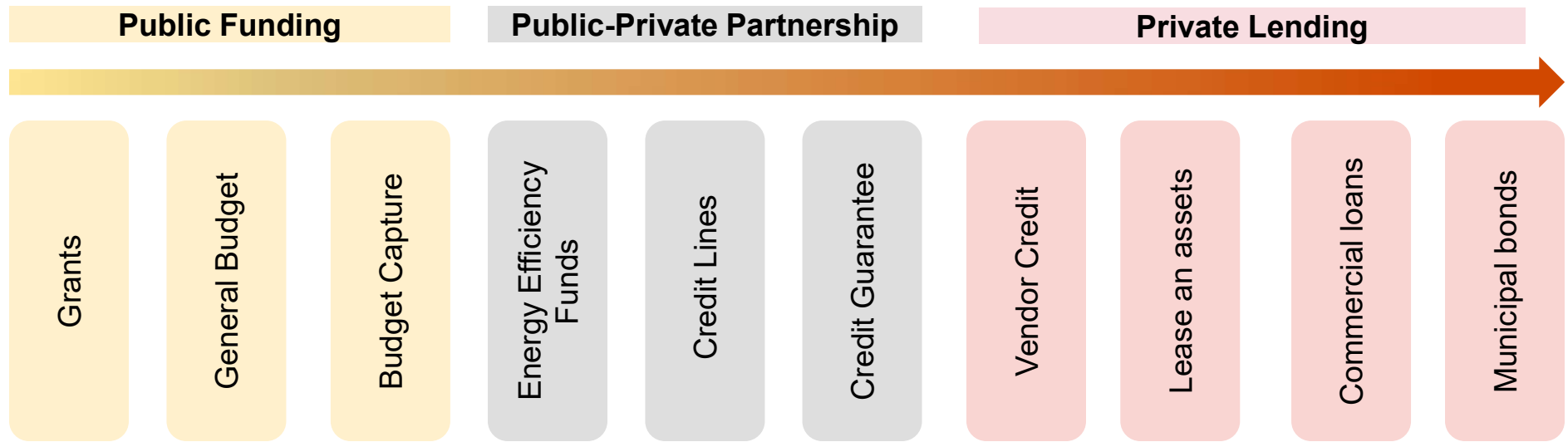
Challenges associated with Energy Efficiency projects

- Low realisation of revenue
 - Poor credit rating
 - Unable to attract private investments
 - Lack of collateral and recourse
 - Insufficient flow of hard cash
 - Limited revenue raising powers
 - Restrictions on deployment of available funds
- Constraints on the ability to identify, design and implement Energy Efficiency projects
 - Limited technical capacity to execute large scale projects
 - Limited knowledge on Energy Efficiency technology
 - Limited coordination between municipalities
 - Lengthy procurement process
 - Lack of skilled manpower
- Limited awareness on potential of Energy Efficiency
 - Inadequate information on baseline conditions
 - Lack of incentive from the govt. to execute Energy Efficiency projects
 - Uncertainty in regulatory framework
 - Low priority attached to energy related issues
 - Energy prices rarely reflect the true costs of environmental impacts



Financing Mechanism in Municipal Energy Efficiency Projects





Public Funding

Type of Funding	Definition	Advantage	Limitation
Grants	These are non-repayment funds provided by govt. or donors to municipalities	<ul style="list-style-type: none"> • Can be applied all municipalities • No financing costs 	<ul style="list-style-type: none"> • Limited grant funding available • Neither scalable nor sustainable
General Budget	EE project costs funded through revenue's of municipal corporations	<ul style="list-style-type: none"> • No additional financing cost is required • Less restrictions on use of money 	<ul style="list-style-type: none"> • Budget resource is limited • Sustainability not assured
Budget Capture	Financing provided by MoF, with repayments done via savings from EE projects	<ul style="list-style-type: none"> • Makes viability clearer • Provides security to financiers 	<ul style="list-style-type: none"> • Sustainability not assured • Can be difficult to ring-fence

Public-Private Partnership

Type of Funding	Definition	Advantage	Limitation
EE funds	It's an independent, public owned Co that finances EE projects	<ul style="list-style-type: none"> Municipalities with poor credit ratings can borrow money Leverage funds by bundling EE projects and develop ESCO models 	<ul style="list-style-type: none"> Recovery of Operation cost is difficult initially Reliance on good fund manager
Credit Lines	Soft public loan to banks for lending to municipalities for EE projects	<ul style="list-style-type: none"> Funds can revolve Municipalities can execute large scale projects 	<ul style="list-style-type: none"> Funding to municipalities with good credit ratings
Credit Guarantee	Guarantee provided by PIDG or govt.	<ul style="list-style-type: none"> Allows leverage from public funds Mitigates risks perception of lenders 	<ul style="list-style-type: none"> Can be applicable to handful of municipalities and limited EE projects

Private Lending

Vendor Credit	Vendors supply equipment with longer payment durations	<ul style="list-style-type: none"> Little or no collaterals required Help mobilize commercial funds 	<ul style="list-style-type: none"> Limited choice of equipment as handful of vendor can provide such facilities.
Lease an Asset	Lease EE equipment with payments based on estimated energy savings	<ul style="list-style-type: none"> Paying the costs of EE equipment on leasing terms may not be counted against borrowing limits 	<ul style="list-style-type: none"> Requires banks & leasing companies to assume reasonable financing and credit risks
Commercial loans	Financial institutions lends money towards EE projects directly or through ESCO	<ul style="list-style-type: none"> Complete project is financed With ESPC, risks is transferred to ESCO 	<ul style="list-style-type: none"> ESCOs to bear majority of the risks High Due Diligence costs
Municipal bonds	Municipality issues bonds to raise funds from private investors to finance EE projects	<ul style="list-style-type: none"> Mobilize funds with less restrictions Scalable and sustainable model 	<ul style="list-style-type: none"> High transaction costs Limited to large municipalities with good credit rating

Successful implementation of EE projects via appropriate use of financing mechanism

Public Funding

Commercializing Sustainable Energy Finance Program (CSEF), Turkey

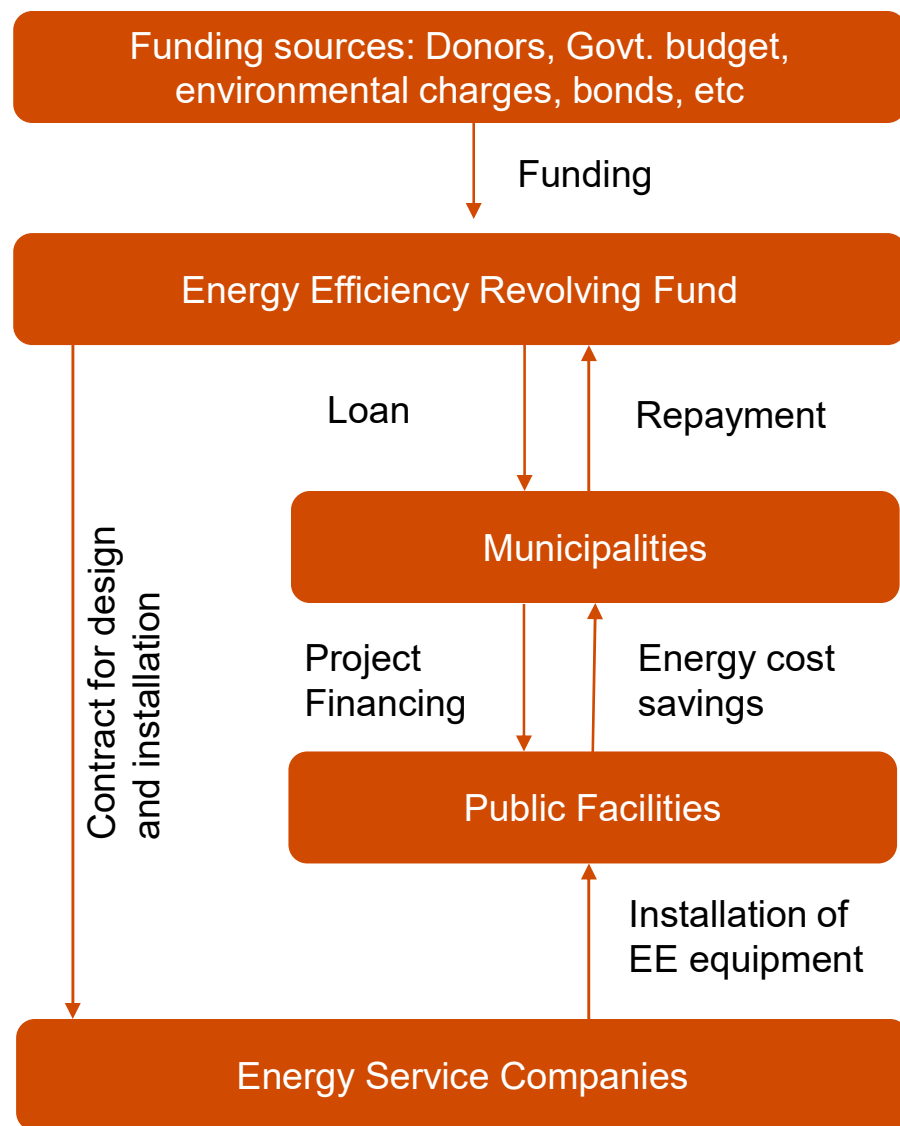
- As Turkey's GHG emissions grew from 188 to 422 mtCO₂, the Turkish Govt. made EE a key priority and has enacted new laws and policies.
- It launched CSEF that was setup by IFC in 2010, via funding from USD 21 million Clean Technology Fund (CTF) and USD 100 million by IFC itself.
- The aim of the program was to help local financial institution to develop the capacity to finance EE projects.
- In the first 4 years of the operations, leasing companies invested more than USD 100 million of CSEF funds in over 50 energy efficiency projects which helped mitigate 200,000 tonne of CO₂ per year.
- The program has helped to catalyze an increase in both supply and demand of EE equipment as well as to have increased awareness and expertise of Turkish commercial banks in the EE sector.

Private Lending

Ann Arbor, Michigan, USA

- The city issued energy bonds worth USD 1.4 million to Energy Efficiency measures at 30 city facilities. The bonds were fully repaid in 10 years via energy cost savings
- After the repayment of bond amounts, the city continued to redirect the energy saving costs for the next five years and accumulated USD 500,000 as Energy Efficiency Revolving Fund.
- The city used the funds in public lighting and building retrofitting.
- Further, these funds were also used to finance a scheme “ **a2energy loan fund for rental housing**” which aimed to implement EE measures in the rental housing in Washtenaw County of the city. The loan to landlords was capped at USD 8,000 at low interest rates and payable in 12-36 months
- It is estimated that the projects resulted in cost savings of USD 860,000 energy saving of 10.7 GWh and CO₂ emissions reduction of about 8,000 tonnes after from offering better comfort and modern city facilities.

Revolving Energy Efficiency Fund play a key role in providing long-term financing for municipal EE projects



Note: this model may change according to market required

Public-Private-Partnership

Case Study: Bulgarian Energy Efficiency Fund (BEEF)

- BEEF was established with the support of World Bank, Global Environment Facility, government of Austria and Bulgaria and private investors such as Eurobank EFG, Brunata Bulgaria, etc.
- BEEF aims to finance and provide guarantees to EE projects implemented by municipalities, corporates and individuals,

Case Study: Energy Efficiency Revolving Fund (EERF), India

- EERF aims to expand and sustain investments in the energy efficiency market in India, build market diversification, and scale up existing technologies.
- Energy Efficiency Service Limited and ADB signed an agreement for a global environment facility grand of USD 13 million to establish EERF.

Mapping of financing tools to mitigate challenges

Key Challenges	Financing mechanism to mitigate challenges	
	Large Municipalities	Small Municipalities
Inadequate revenues	<ul style="list-style-type: none"> • Special project vehicle (SPV) approach • Municipal funds (instead EE focused funds) 	<ul style="list-style-type: none"> • Public Private Partnerships • Dedicated EE funds • Budget financing
Limited revenue raising powers		
Restrictions on use of funds		
Less borrowing powers		
Requirement of collaterals	<ul style="list-style-type: none"> • Commercial loans • EPSC implemented by ESCOs • Issuance of municipal bonds 	<ul style="list-style-type: none"> • Energy Saving Performance Contract (EPSC) model can be implemented ESCOs (Energy Saving Companies or providers) • Aggregate small projects into one large project • Govt. can provide guarantee to lenders
Assessing creditworthiness		
Lack of cash flows		
High transaction costs		

- Selection of different financial mechanism depends on municipality's financial strength, capacity to execute large scale projects, nature of energy efficiency projects, policies and regulatory framework, ,etc.
- Small municipalities may have a greater need to rely on public funding mechanism

Mapping of financial mechanism available for municipal Energy Efficiency projects in SAARC nations (1/2)

	Grants	General Budget	Budget Capture	EE funds	Credit Lines
Afghanistan	✓	-	✓	-	-
Bangladesh	✓	-	✓	-	
Bhutan	✓	-	✓	-	
India	✓	✓	✓	✓	✓
Maldives	✓	-	✓	-	
Nepal	✓	-	✓	-	
Pakistan	✓	-	✓	✓	
Sri Lanka	✓	-	✓	-	

Note	✓		-
	Available for EE projects	Present in other sectors	NA

Mapping of financial mechanism available for municipal Energy Efficiency projects in SAARC nations (2/2)

	Credit Guarantee	Vendor Credit	Lease an Asset	Commercial Loans	Municipal Bonds
Afghanistan					-
Bangladesh				✓	-
Bhutan					-
India	✓	✓		✓	✓
Maldives					-
Nepal					-
Pakistan					-
Sri Lanka					-

Note	✓		-
	Available for EE projects	Present in other sectors	NA

Way Forward



Collaborative approach will have greatest impact

- While incentives for energy efficiency, business models, and finance mechanism are key aspects for mobilization of funds, these should be complemented alongside with policies, regulations, awareness on EE, and initiatives leading to behaviour change.
- The integrated approach needs to be guided by a national strategy to ensure long-term transformation of EE products.
- To achieve investments at a scale needed to meet the targets, financing from both Private and Public investors can achieve a multiplying effect .

Business models should adapt to local market conditions

- As each of the SAARC nations poses different challenges, financial mechanism and business model should be tailored fit according to the local market.
- Mechanisms that work for different set of end users can also vary significantly depending on the sector such as residential, public or private.
- New mechanism are better suited as Energy Efficiency and financial market matures over a period of time.

Business models and mechanisms are most effective when they are consumer-focused

- Developing trust, and removing financial or administrative barriers, will create demand and unlock investments for the right products from the consumers.
- The benefits of the Energy Efficiency products as well as programs should be communicated and highlighted to the end users to create awareness.
- Business models to include risk mitigation instruments that can reduce the risks perception for consumers, lenders, technology providers and other stakeholders in the project.

Focus on developing a long-term market-based view

- As Grants or subsidies are used to develop a market while encouraging private investments, the investment strategy of Grants or subsidies should aim to catalyse future growth.
- Various steps can be taken to unlock new technologies and encourage significant investments in technology innovation.

Thank you

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