

ETTF Committee Meeting: Energy Efficiency Capacity Building Activities for 2024

December 2023



Points Discussed in Earlier Sessions on Energy Efficiency (EE)

For Strategizing Next Level Interventions for EE

Training Webinar 1 Oct 22

- Importance of EE in GMS
- Role of EE in Energy Transition
- Policy framework to address barriers to EE
- Basics of energy management, efficiency and energy audit

Training 2 - Thailand Feb 23

- India's Energy Transition Journey
 - Supply Side Strategies - Mainstreaming Green H2, RE & Storage,
 - Demand Side Strategies
- Building Decarbonization & Role of Digital Twins

Training 3 – Manila June 23

- Introduction to Standards & Labelling
- Scenario in ASEAN Countries for S&L
- EU Case Study on S&L Harmonization
- Possibilities for Harmonization of S&L in GMS

Support Area Discussed Earlier

- Harmonizing MEPS in GMS region:
 - Increased effectiveness of appliance and equipment EE policies
 - Prioritization of appliances for S&L harmonization

Summary of the Energy Efficiency Discussion, 1st EETF meeting, June 2023



Clear objective of a concrete outcome of the working group, what would be the clear outcome from the harmonization in MEPS and Labeling in the GMS Region?



Exchange of knowledge and lessons learned: Support from the GMS countries that are advanced in MEPS and standards, to support those at the initial stage, e.g., by looking into improving the laboratory testing standard for appliances



Identification of sectors to focus, not only on household appliances but also to EE technologies applicable in power sector, e.g., energy efficient transformers and motors

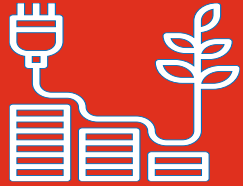


Identification of technologies and appliances: Start from a short-list of appliances and technologies to focus

Further consultations post 1st EETF meeting also suggested to consider and review the scope and appropriate subjects for each country in the region for implementation

Discussions with ACE on their EE&C Activities

Ongoing Efforts of ACE are more in S&L and Building EE interventions



To reduce energy intensity by 32% by 2025 and encourage EE&C efforts, especially in transport and industry

ASEAN Target as Indicated by ACE

Strategy 1 Expand, Harmonize and Promote EE S&L

Strategy 2 Enhance Participation of Private Sector, Financial Institutions, and Clusters

Strategy 3 Strengthen Energy Efficiency in Building

Strategy 4 Pursue Energy Efficiency in Transport

Strategy 5 Advance Energy Efficiency in Industry

MEPS and S&L Activities of ACE

Progress has been made in Harmonization of Test & Performance Standards

Progress

- The Evaluation Method for fixed speed and inverter-based AC is being harmonized as per ISO 16358-1 with CSPF as the energy performance parameter
- MEPS Strengthening Mechanism for AC: Recommended CSPF 3.7 (2023) and CSPF 6.09 (2025)
- Conducted Round-robin Testing for AC testing facilities in 5 AMS
- ACE with UNEP U4E have developed regional product registration database

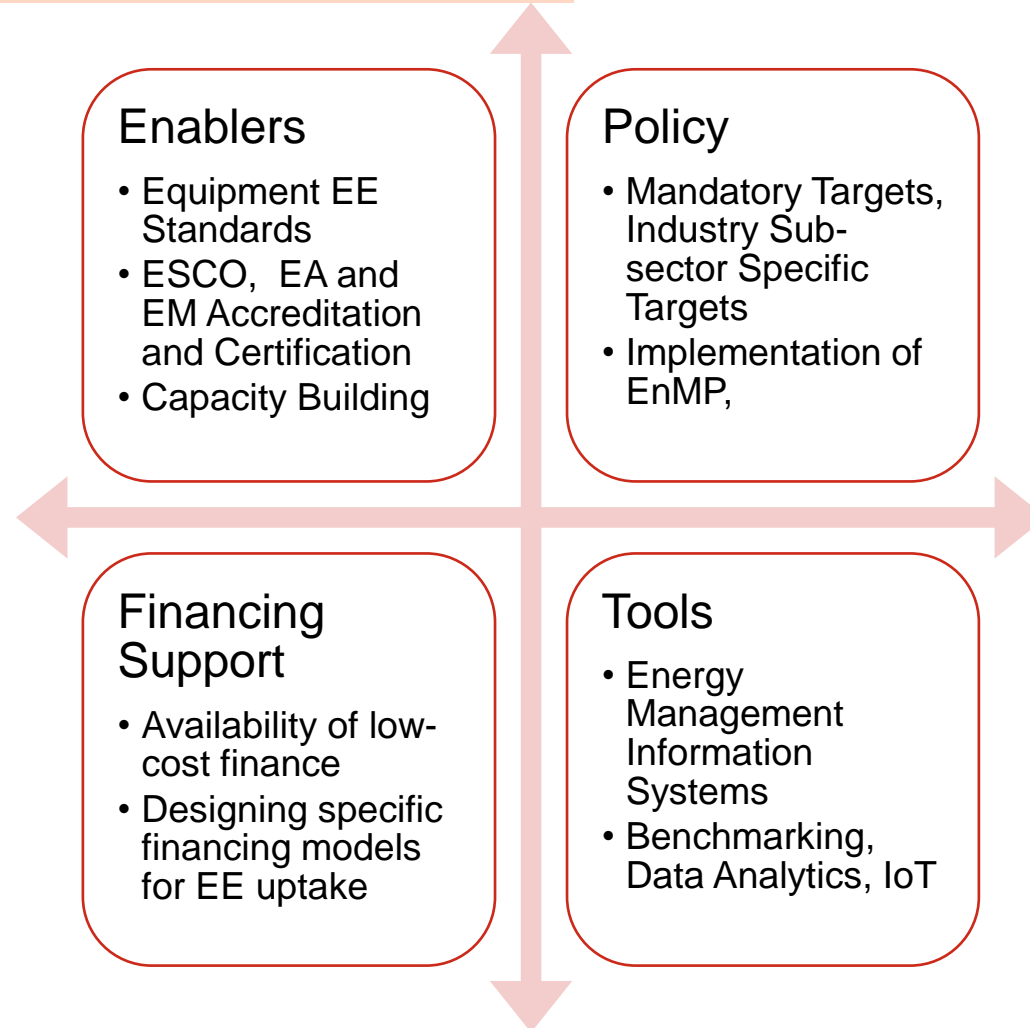
Way Forward

- The regional product registration database lacks connection with national database
- Further work required in developing national EE appliance labelling database, mutual recognition agreement for EE, MV&E mechanism
- And harmonization of S&L for additional appliances

Priority Areas Discussed with ACE for Capacity Building & Future Policy

Industrial Energy Efficiency, Role of Digitalization, EE Financing for Industries are some priority areas

Design Framework for Industrial Decarbonization



Industry Energy Efficiency Highlights in GMS Countries (1/3)

Industrial Energy Efficiency Highlights		
Country	Targets	Highlights
Thailand	25% Reduction till 2037 from 2010.	According to EEP 2022, Thai govt. has estimated an energy savings of 16 MTOE per year.
Vietnam	7-9% improvement in EE by 2030.	VNEEP 3 (2022) aims to save 8-10% of Vietnam's energy consumption and reduce power loss by 6% by 2030.
Cambodia	20% reduction in energy consumption by 2030 from 2020.	The NEEP aims to reduce total energy consumption by 19% by 2030, saving an estimated 12.7 MTOE.
Lao PDR	20% reduction in energy intensity by 2030 from 2012.	NEECP 2016 Laos aims to reduce energy consumption by 10% saving 2.5 MTOE.
Myanmar	6.63% reduction in energy consumption by 2030 from 2015.	Myanmar's NEECP 2020 aims to reduce energy consumption by 20% by 2030, saving 15 MTOE.

Industrial Energy Efficiency Highlights from ASEAN (2/3)

Country	Highlights
Thailand	<ul style="list-style-type: none">✓ Mandatory implementation of Energy Management Systems (EMS) with formation of EnMS teams in DFBs to achieve targets of Energy Conservation Promotion Act 1992✓ Mandatory Energy Audits in > 8000 designated factories and buildings✓ In 2020, the MoE agreed to allocate US\$17m to 16 EE projects through the ENCON fund.✓ Grants for industries to conduct energy audits and financial support for conservation planning
Malaysia	<ul style="list-style-type: none">✓ Energy Audit Regulation 2014 mandates designated consumers (industries & buildings) to report and implement energy management practices.✓ Ministry of Mineral & Natural Resources under 12th Malaysian Plan (RMK-12) has allocated USD 18,515,107 for energy audits with ESCOs.✓ The EE program under RMK-12 is for 2021-25 involving 630 industry and 230 commercial premises for EE projects.✓ It is provided as a conditional grant so that it acts as a catalyst for Energy Audits.

Industrial Energy Efficiency Highlights from ASEAN (3/3)

Country	Highlights
Vietnam	<ul style="list-style-type: none">✓ MOIT enacted Law No. 50/2010/QH12 of 2011 act on Economical and Efficient use of Energy.✓ 2961 DEC's in 2020 out of which 90% belong to industry sector. Large industries mandated for energy audits every 3 years.✓ Industries consuming > 1000 TOE energy per year and buildings consuming > 500 TOE of energy p.a. are designated for implementation of energy management program✓ MOIT is nodal agency for EE and sustainability and has implemented programs across sectors
Indonesia	<ul style="list-style-type: none">✓ Gol with the help of MEMR has set up a Law No. 30 of 2007 on Energy, which acts as the EE act.✓ Under the scheme of NEP(RUPTL) 2021-2030, the Gol has targets to allocate USD \$800 million on EE programs.✓ Govt imposed energy management program through which large energy users of 6000 TOE & more had to appoint a energy manager each, perform regular energy audits.✓ The Ministry of Energy and Mineral Resources provides capacity building to train auditors and energy managers.

Approaches for Industrial Energy Efficiency

Approaches towards energy efficiency

Voluntary

- Industry see's scope to reduce energy cost by improving efficiency
- Gets detailed energy audit conducted through experts
- Implements recommendations for improving energy efficiency

Mandatory

- Government schemes
- Example: PAT (Perform Achieve and Trade) in India
- Example: Mandatory energy audits are also part of schemes in Australia, Thailand, Taiwan, etc.

Approaches towards energy efficiency in SME's

Saturation

- Aims at reaching large number in shorter time
- Energy saving measures involve no/low to medium investments
- Do not address process modifications
- Leads to smaller energy savings with bundling of a number of ECMs

Innovative

- Focuses on major energy consumption areas
- Requires design modifications through R&D efforts, resource pooling...
- Require more time but provides holistic solutions
- Leads to major energy saving, need for long time engagement at cluster level

Decarbonization Strategies in Industries

Increasing Order of Investments

Energy Efficiency

- Strategic energy management, thermal heat optimization, and smart manufacturing for efficient GHG reduction.

Recycle/Reuse of Waste Materials

- Recycling and reusing waste materials contribute to sustainability by minimizing environmental impact and promoting resource efficiency.

Digitalization of Processes

- Enables better use of data, analytics, and machine learning leading to streamlined workflows, enhanced collaboration and cost reduction

Industrial Electrification

- Electrifying heat processes, high-temperature industrial procedures, and shifting thermally-driven processes to electrochemical methods.

Fuel Switch/Feedstock

- Adopting fuel-flexible processes, integrating hydrogen, and incorporating biofuels and bio feedstocks for sustainability.

Carbon Capture & Storage

- Capture, utilize & store CO₂ for value-added products, involving chemical absorption, optimized materials & manufacturing processes.

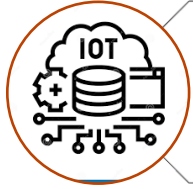
Renewable Energy

- Cleaner alternative, reduces carbon emissions in energy production fostering a sustainable, environmentally friendly energy landscape.

Digitalization in Industrial Decarbonization



Digital tools for EMS help to monitor, control energy consumption in real time



IoT technologies allow accurate data collection with min. losses, offers analytics capabilities



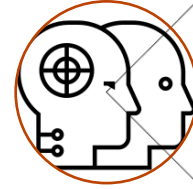
Big Data Analytics offers processing of large datasets from industrial processes



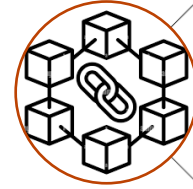
Predictive Maintenance offered by digital solutions prevents downtime due to eqpt failure



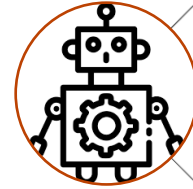
Smart Grids & Demand Response allow industries to adjust energy use w.r.t grid conditions, ensuring grid stability, etc.



Digital Twins enable simulation & optimization of processes, allowing testing & implementation of EE measures



Industries can use **Blockchain** to track and verify origin of RE, support energy trading, ensure emission data integrity



Automation & Robotics can optimize manufacturing processes & reduce waste.



Energy Storage Integration to align energy usage with periods of lower carbon intensity or higher RE availability



Digital Platforms enable collaboration & information sharing among industry stakeholders (sharing of best practices, etc)

Workable Business Models for EE in Industries (1/2)

Business models offer structured framework for planning, implementing and sustaining EE efforts

Key Features

- Combine Low-Cost Capital (grants, soft loans, crowdfunding, green bonds, etc), technical assistance as well as risk mitigation instruments for supporting investible Energy Efficiency Initiatives in Industries
- Incorporate mechanisms such as payback period, return on investment calculations for standardized energy efficiency interventions
- They establish standardized metrics for monitoring the performance of EE projects with defined KPIs that allow tracking of project impacts and cost savings

Governments can further offer the following incentives to create enabling environment for EE in Industries

Regulatory Frameworks (Standards, Baseline, Targets)	Tax credits & rebates for investing in EE	Performance based Mandates & Incentives for industries
Establish Benchmarks for Continuous Improvement	Allocate funding for R&D in EE Technologies	Introduce Emission Trading System to create incentives
Information & Awareness Campaigns	Training & Certification of Energy Managers & Auditors	Promoting specific technologies tailored to industrial sub-sectors

Workable Business Models for EE in Industries in SEA (2/2)

A Variety of Business Model Options have proven successful for EE in Industries

Common EE Models

Energy Savings Performance Contracting

- It is a partnership between ESCO and client without the need of upfront capital investment from client

Energy Efficiency Revolving Fund

- Mechanism that facilitates investments in EE projects through creation of self-sustaining fund that continually finances new EE projects as older projects pay back their initial costs

Sovereign Lending

- These projects involve government providing financial support in the form of low-cost loans to promote EE measures. It can be used to facilitate PPP where private entities implement projects with govt. support

Utility led On-bill Financing

- A mechanism through which utility companies fund EE projects for their customers. Instead of customers paying for improvements directly, costs are added to utility bills over time

Case Study: Energy Efficiency Revolving Fund in Thailand

Energy Efficiency Revolving Fund for Commercial Buildings, Residential Buildings & Industries in Thailand

Business Model Type: Concessional Loan Facility with Revolving Fund for EE investments in buildings and industries for energy conservation and energy efficiency

Objective: In Thailand, the Energy Conservation Promotion Fund (ENCON Fund) was established to provide financial support to designated factories and buildings for investment in and operations of energy conservation programmes.

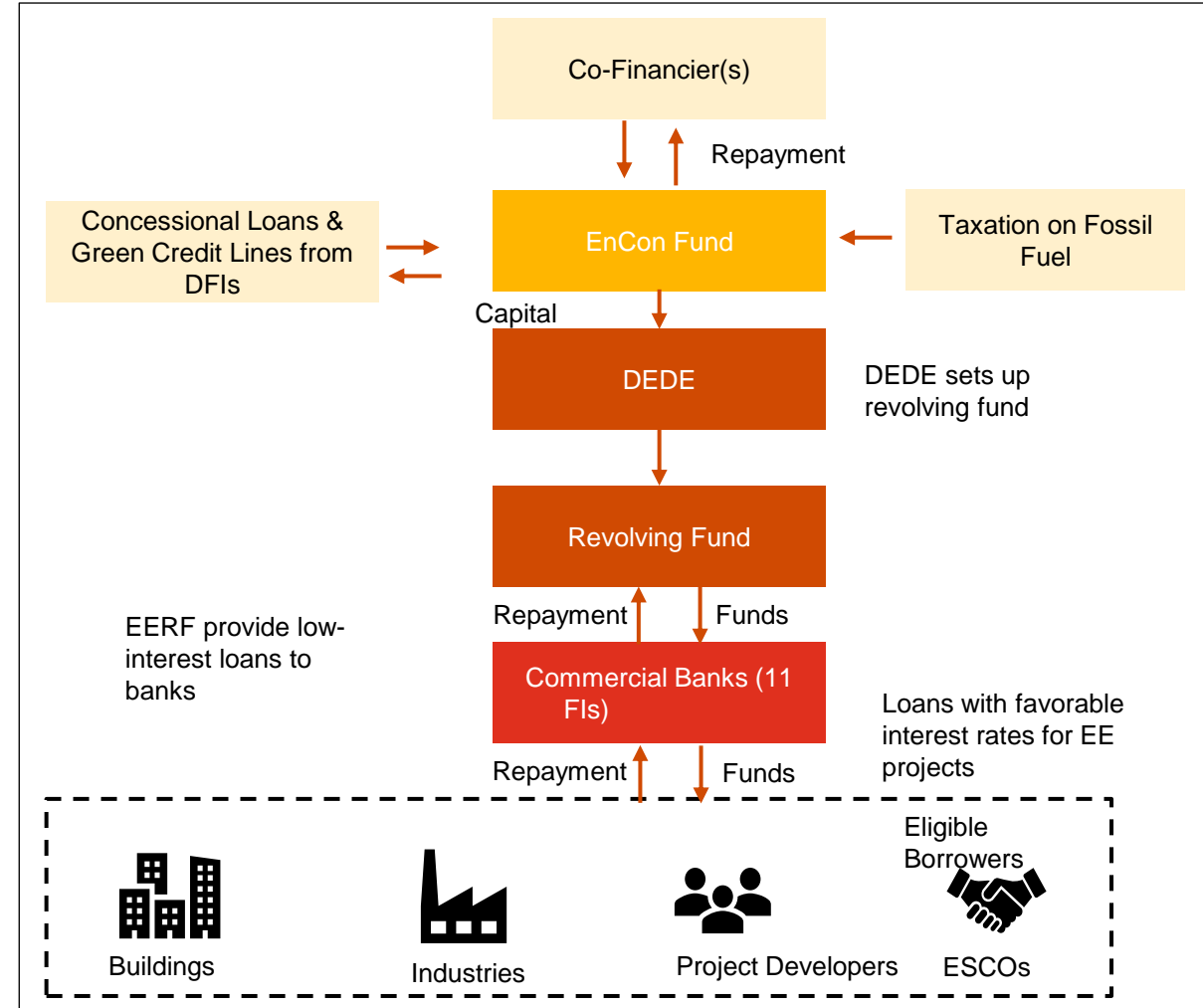
Features: (Source: Gruning et al. (2012))

- Interest rate on loan for commercial borrowers – max. 4% p.a
- Credit lines to banks / FIs – USD 2.5 to 10 million per bank (total FIs 11)
- ROI charged to FIs for repayment to EERF @ 0.5% p.a

Impact:

The fund was active during the period of 2003 to 2010 with below impact statistics:

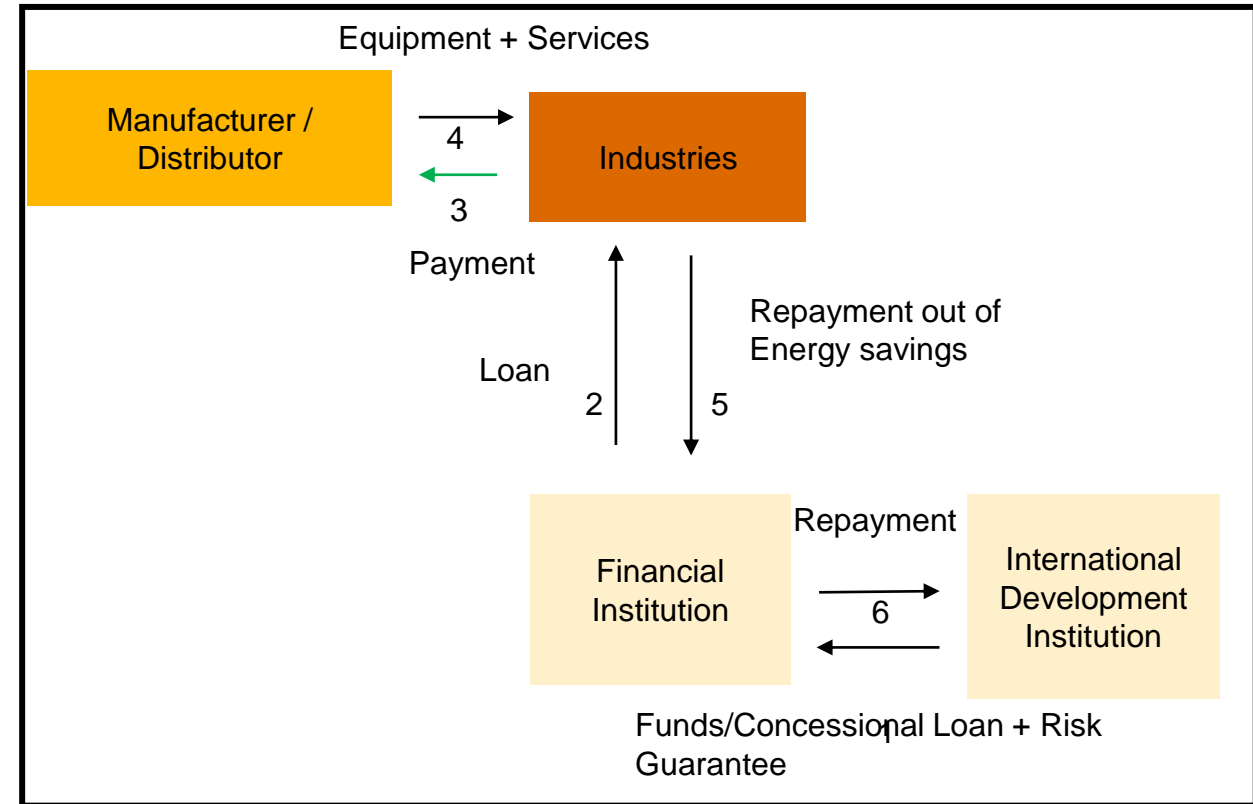
- Number of Projects funded - 335 projects (across RE and EE)
- Total investments – 453 Million USD
- Loan from EERF – 210 Million USD
- Average Pay-back – 3 years
- Electricity savings – 1,170 Million kWh/year
- Total Energy Savings – 154 Million USD / year



Case Study: Concessional Loan through FIs (For MSMEs)

1) Innovative Loan product through Financial Institution (FIs)

- FIs develop innovative loan product (short-term and low interest compared to market rates) for industrial enterprises for financing energy efficient projects/ technologies
- Loans are provided based on credit worthiness of the industrial enterprises and in some case based on the project cash flow.
- Supporting mechanisms may include 'Guarantees' in the form of loan loss reserves that can support more clients to access loans by decreasing risk of client default to lenders.
- List based finance (positive lists) can help simplify FIs / bank's due diligence process for concessional loans
- FIs receives concessional loans from development/multi/bi-lateral institutions for developing such loan products

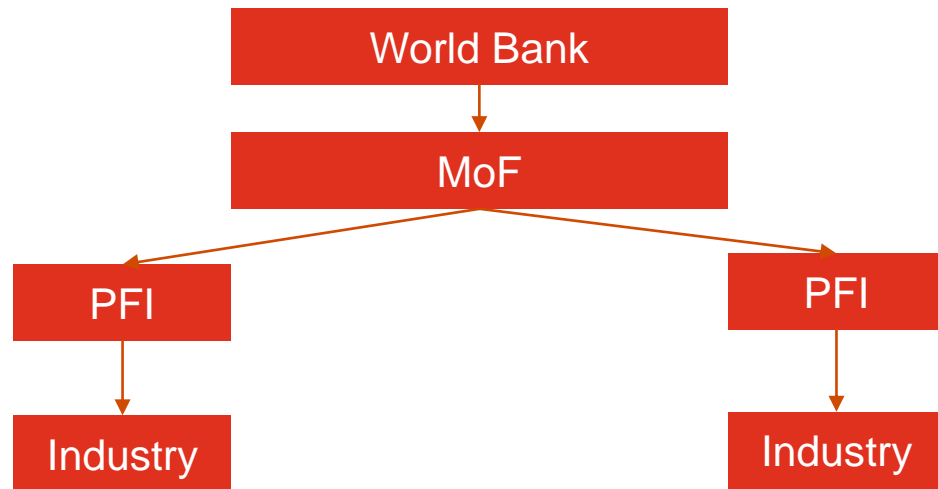


Structure of Concessional Loans through FIs

In India, Japan International Cooperation Agency (JICA) extended a Line of Credit to Small Industries Development Bank of India (SIDBI) for financing Energy Saving Projects in MSME sector. Under this scheme, financing is provided through SIDBI as well as through refinance to banks/SFCs and NBFCs for encouraging MSMEs to invest in energy saving plant & machinery/production processes.

Case Study: Sovereign Lending Examples in Vietnam & Bangladesh

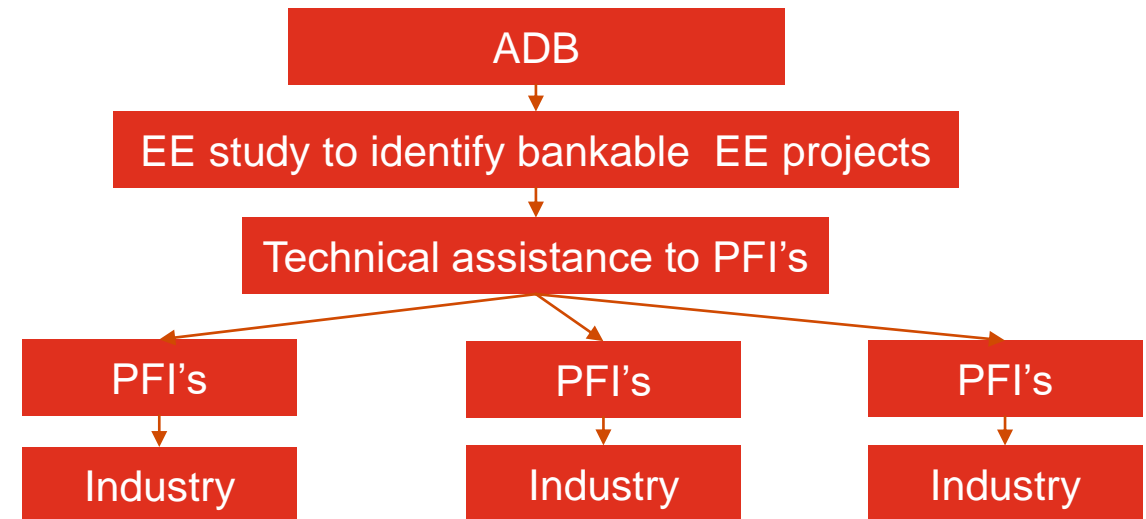
Case examples of Financing Industrial Energy Efficiency in Bangladesh and Vietnam



Vietnam Energy Efficiency for Industrial Enterprises (VEEIE) (2018-23)

Under this assignment World Bank extended a sovereign lending facility to MoF for disbursement to PFI's.

The PFI's to implement their work under overall Project coordination, implementation, and monitoring and evaluation of the Ministry of Industry and Trade.



Bangladesh Industrial Energy Efficiency Finance Program (2011)

The Bangladesh Industrial Energy Efficiency Finance Program by Asian Development Bank (ADB) extended a non-sovereign loan facility and technical assistance to the Industrial and IIDFC and other financial institutions for on-lending to eligible energy efficiency projects.

PFI: Project Financing Institutions

What would GMS countries like
to be included for EE
Trainings/Workshop in 2024
under the EUTF activities?

Possible Ideas For Way Forward (1/2)

The following topics could be explored for Policy Support Work & Online Trainings in 2024

- **Trainings/Support energy efficiency in both supply and demand side Power sector**
 - Developing standards/improving efficiency of transformers/electric motors
 - Demand response and other strategies to reduce network losses to promote Utility side initiatives
 - Align with other standards harmonization initiatives in the region

- **Trainings on developing ESPC Market Development**
 - Policy & Regulatory Support
 - ESCO Business Models (deemed savings, equipment leasing, ESA, variable term contract)
 - Standardizing M&V Process, Technical Specifications, Transaction Templates

Possible Ideas For Way Forward (2/2)

The following topics could be explored for Policy Support Work & Online Trainings in 2024

➤ **Work towards supporting implementation of Energy Management Systems (EnMS)**

- Policy Development (Incorporate EnMS Standards, ISO 50001 into national energy strategies)
- Market Assessment to Identify Large Energy Consumers for EnMS implementation
- Support training and certification for Energy Managers / Auditors,
- Capacity Building on Digital Tools for enhanced implementation of EnMS in Industries
- Engage with Industry Associations to promote implementation of EnMS in key industries with TA support

➤ **Supporting Financing for Energy Efficiency in GMS and ASEAN**

- Capacity Building on Financing Mechanisms for Energy Efficiency in Industry, Buildings, Transport, etc.
- Support with Establishment of Energy Efficiency Funds (identification of implementation arrangements, etc.)
- Support with pilot demonstrations and roll-out of EE financing programs



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Thank You

