



Regional & Country Experience in adopting Energy Efficiency

Vijay M Deshpande



Asian Regional Workshop on Roadmaps for Energy Efficiency

Singapore, 27 - 31 July 2015

C2E2 Regional Studies Initiative

- Work in four regions:
 - Asia
 - CIS
 - Africa
 - Latin America & the Caribbean (LAC)
- A total of 52 countries were covered in four regions (Asia 5, CIS 10, Africa 24, LAC 13)
- Studies in the nature of rapid assessments:
 - Status and initiatives on energy efficiency (EE)
 - Barriers to EE
 - Priority sectors and future opportunities in EE

Five South-East Asian Countries:

- ✓ Indonesia
- ✓ Malaysia
- ✓ Philippines
- ✓ Thailand
- ✓ Vietnam

Study carried out by
Asian Institute of
Technology (AIT),
Thailand

Desk study

- Review of relevant policy documents, schemes and legislation, and technology developments and their implementations.

Programs and Policy review

- Review of energy efficiency initiatives undertaken by multilateral/bilateral organisations, research institutions, and review of existing policy instruments.

Questionnaire survey

- Collecting information/ data on energy efficiency initiatives, policy instruments, types of assistance required, and existing and perceived barriers.

Stakeholder consultation

- In-country consultation with various stakeholders to discuss EE opportunities and barriers, and to brainstorm to identify the types of assistance required.

Methodology

Structure

- Initiatives
- Barriers
- Priorities
- Opportunities and Challenges
- Consolidated View
- Achievements
- Support Required
- Observations

Indonesia: Energy Efficiency Initiatives

- Industry and transport sectors are major consumers of energy, together accounting for > 80% of total final energy consumption (2012)
- Directorate of Energy Conservation, Ministry of Energy and Mineral Resources is the focal point for energy efficiency
- National Energy Policy (79/2014)
 - Reducing energy intensity (energy use per unit of GDP) by 1% every year
 - Bringing energy elasticity below 1
- More than 30 years of efforts in the EE area with multiple initiatives
 - 1982: Presidential instruction on road map for energy conservation (91/1982)
 - 1985: Master Plan on energy conservation
 - 2005: Mandatory energy conservation in government offices and buildings (10/2005)
 - 2007: Law of Energy, Part 3, Article 25 deals with energy conservation (30/2007)
 - 2009: Energy Efficiency Labeling - Air-conditioners, refrigerators, lamps (fluorescent) and freezers → Voluntary, except for lamps
 - 2009: Regulation on energy conservation with government being made responsible for EC, preparation of National masterplan for EC
 - 2003-20: National energy policy - appliance standards, promotion of co-generation, DSM in industry, EE standards for motors
 - 2011-14: Presidential and/or MEMR instructions/regulations on/concerning - energy & water saving, electricity saving, energy management
 - On-going: Master Plan preparation

Indonesia: Energy Efficiency Programs

- Capacity building and training (energy auditor and manager certification)
- Awareness creation (seminars, outreach events, awards, competition, guidelines)
- Implementation of ISO 50001 (pilot 20, additional 4) 4 case studies show 7-11.3% saving after 1 year of ISO 50001
- Standards and labeling
- Energy audit of buildings and industries & final implementation of recommendations
- DSM programs providing subsidy/free CFLs to consumers
- Sustainable Tourism through Energy Efficiency with Adaptation and Mitigation Measures (STREAM) - EE approach in all tourist services in Pangandaran, with a view to replicate
- Donor supported programs
 - DANIDA: support to national and regional governments in implementing and monitoring EE and RE initiatives
 - UNIDO industry energy efficiency program in textiles, garments, pulp & paper, food and beverages, and chemical industry sub-sectors

Barriers to EE in Indonesia

Policy (medium)

- Heavily subsidized energy sector
- Lack of regulatory framework
- Lack of financial incentives

Financial (high)

- Technologies are expensive for SMEs
- Lack of smart financing mechanism

Technical (high)

- Limited availability of EE technologies and products
- Lack of advanced EE technologies in the market
- Lack of sector-specific technical expertise

Capacity/Inst (high)

- Lack of proper M&V mechanism
- Lack of whole-of-organization approach
- Accessing fund for EE is cumbersome
- Lack of capacity of personnel to implement EE

Social/cultural

- Lack of energy saving awareness
- Executives do not perceive EE as an investment
- Market mind-set on EE as an environmental issue

Indonesia: Sector Priorities

Sectors	Priority level	Remarks
Transport	High to medium	<ul style="list-style-type: none"> Represents 40.5% of national consumption (2012) Will nearly double by 2035 compared to 2010 Oil is and will remain as the major fuel in this sector (96% in 2035), a major concern in terms of both declining oil production and its contribution to GHG emissions
Industrial and SMEs	High to medium	<ul style="list-style-type: none"> Large industries and SMEs together represent 39.7% of national consumption (2012) Expected to double by 2035 compared to 2010 Future growth in GDP will put more pressure on energy demand in this sector
Energy generation	Medium	<ul style="list-style-type: none"> Very low use of new and renewable energy sources (only 4%) High potential for PV, biomass, biofuel, geothermal, micro-hydro
Building	Medium to low	<ul style="list-style-type: none"> Building sector represents 12% of national consumption Development of an energy-efficient building code will help to reduce energy consumption in this sector
Commercial	Low	<ul style="list-style-type: none"> Very low consumption Standard and labelling are already in place in the commercial sector

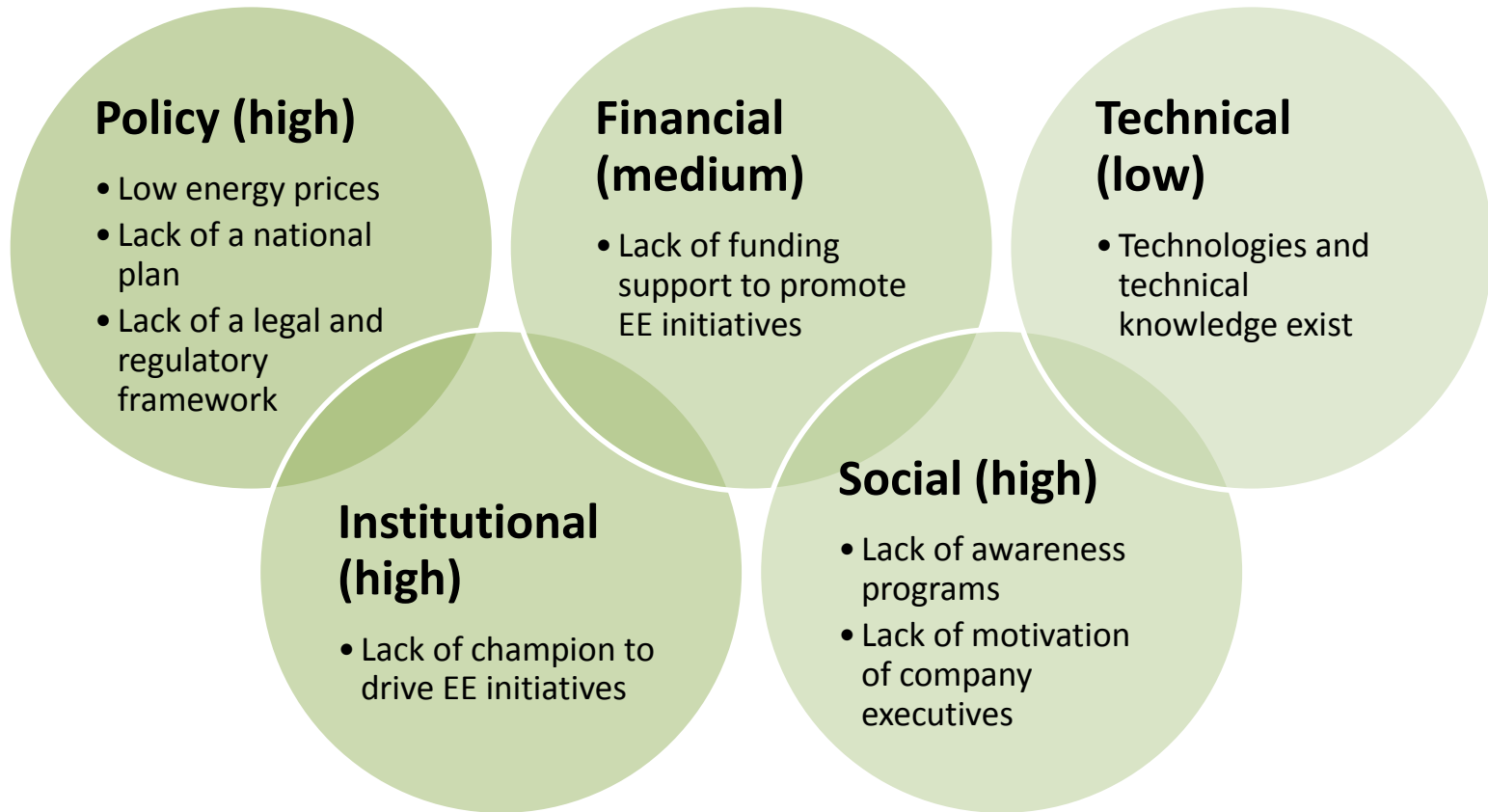
Indonesia: Opportunities & Challenges

	Description	Assistance required
OPPORTUNITIES	High energy consumption in industrial and transportation sector. This is expected to grow in future.	Technical and financial
	The government is aiming for ambitious GHG emissions reductions through the implementation of renewable energy technologies and energy efficiency.	Financial and technical
	The government has developed guidelines for energy smart street lighting. Financial support is needed for the implementation of this program.	Financial
	There are significant opportunities to develop the capacity of government and the public sector to provide effective EE services.	Capacity development
CHALLENGES	Limited domestic production of EE technologies and products. Also a lack of energy-efficient technologies in the market.	Technical
	Technology and energy-efficient equipment in general are expensive, and the financial mechanisms needed to purchase them are limited.	Financial
	Energy prices are relatively cheap due to energy subsidies.	Policy
	Policies on cleaner production and sustainable consumption and production are not mandatory.	Policy
	A lack of financial incentives, especially for SMEs.	Policy
	Policy and implementation mechanisms are not decentralized for a large country like Indonesia.	None
	A lack of mandatory requirements for sustainable waste management is a barrier to waste-to-energy initiatives.	Policy
	Evaluation and monitoring of energy conservation programs is weak.	Institutional
	A lack of information and understanding of the financial and qualitative benefits.	Capacity development
	Obtaining loans or funds for energy efficiency is a very cumbersome process.	Institutional
The focus of the top management of industries and companies is entirely on production. Energy efficiency is not seen as a strategic business investment.	Capacity development	
Knowledge and capacity to implement EE measures in local government are very low.	Capacity development	

Malaysia EE Initiatives

	Title	Details	Sectoral coverage
POLICIES	MEPS and EE Rating Labelling (STAR Rating) for electrical appliances	This initiative is based on the Electricity Regulation 1994 (Amendments 2013) regulation 101A (3). The initiative requires all manufacturers of televisions, refrigerators, domestic fans and air conditioners to affix energy efficiency labels onto the products before the can be sold to customers (Energy Commission Malaysia 2013b).	Commercial
	Efficient Management of Electrical Energy Regulations (EMEER)	This initiative requires certain energy consuming and generating facilities, exceeding 3,000,000 kWh for six months, to implement measures for the efficient management of electrical energy. Among others, the regulation also requires such facilities to appoint an Electrical Energy Manager (EEM) to facilitate an accountable energy efficiency management process. The facility also need to ensure that the EEM has access to a Continuous Development Program (Energy Commission Malaysia 2013a).	Commercial/ industrial
	Fiscal incentives for EE & REE projects	This initiative provides financial incentives to companies that provide energy conservation services and sell or manufacture energy efficient equipment. The incentives include, for example, income tax exemption, import duties and sales tax exemptions on energy conservation equipment that is not produced locally, and investment tax allowances (Energy Commission Malaysia 2013c).	Commercial
	Energy Performance Contracting (EPC) Projects for Government Buildings	This initiative came into effect in January 2013 to overcome the capital costs and financing barriers in implementing cost-effective energy efficiency measures, and to provide customers with a set of energy efficiency, renewable energy and distributed generation measures.	Building
PROGRAMS	Sustainability Achieved via Energy Efficiency (SAVE)	This program, funded by the Malaysian Government under the Economic Transformation Programme, aims to stimulate the economy. It focuses on five key areas: (a) government taking the lead in energy efficient practices, (b) stimulating sales of energy efficient appliances, (c) making co-generation economically viable, (d) improving regulation on building insulation, and (e) stimulating sales of energy-efficient vehicles (source: Mr. Wahab, Head of SAVE).	
	Building Sector Energy Efficiency Project (BSEEP)	This initiative aims to make energy-efficient low carbon buildings, to achieve 55% energy efficiency implemented in buildings by 2015, to develop a market for energy retrofits for existing buildings by 2015, and to promote a general acceptance of EE principles in the building industry (Kristensen 2012).	Building
	Industrial Energy Efficiency for Malaysian Manufacturing Sector	This is a GEF-funded program implemented by UNIDO. The program aims to promote energy efficiency improvements in the Malaysian manufacturing sector through the implementation of national energy management standards and the introduction of system optimization. The program ensures that two essential criteria are met: (i) it must reflect national priorities and have the support of the country; and (ii) it must improve the global environment or improve the prospects of reducing risks to it (IEEMMS 2014).	Industry

Malaysia: Barriers to EE



Malaysia: Priorities

Sectors	Priority level	Remarks
Industrial and SMEs	High to medium	<ul style="list-style-type: none"> • Highest energy consuming sector – will represent 40% of national consumption in 2035 • There is no legal or regulatory framework or enforcement measures • Need to develop a Monitoring and Verification (M&V) mechanism
Transport	High to medium	<ul style="list-style-type: none"> • Another top consumer of energy, expected to reach 30% of national consumption in 2035 • Number of vehicles and other transportation equipment is increasing steadily • Need for regulatory and financial instruments to conserve energy in this sector
Energy generation	Medium to low	<ul style="list-style-type: none"> • This sector is fairly well regulated • Sufficient acts and regulations are in place
Building	Medium to low	<ul style="list-style-type: none"> • Under BAU, energy demand is expected to grow in this sector • A Green Building Index has been developed, but still needs an enforcement mechanism
Agriculture	Low	<ul style="list-style-type: none"> • Very low consumption, and expected to remain low

Malaysia: Opportunities and Challenges

	Description	Assistance required
OPPORTUNITIES	There are many energy-intensive industries. Energy consumption in the industry sector will grow in future in line with the country's economic growth.	Technical and financial
	Need to demonstrate EE technologies for all three sectors (industrial, residential and commercial, and transport).	Technical
	The large number of vehicles and transportation equipment in the country, which are increasing.	Technical
	The power sector is well regulated but represents a high energy saving potential through shifts in fuel.	Technical
	Industries and businesses have affordability in EE investment, and just need the right motivation.	Awareness and capacity-building
CHALLENGES	Low energy price resulting from high energy subsidy.	Policy
	Insufficient skill of government employees to develop and monitor EE programs.	Capacity development
	The lack of a proper M&V mechanism to drive results.	Institutional
	The lack of a solid national plan backed by a regulatory framework.	Policy/institutional
	A lack of funding support to promote EE initiatives.	Financial

Philippines: EE Initiatives

POLICIES	Energy Efficiency and Conservation Bill 2014 (upcoming)	The Philippines has not yet established an Energy Efficiency policy. The Energy Efficiency and Conservation Bill has been in the discussion for the past few years and is expected to be enacted soon.	All sectors
PROGRAMS	Information, Education and Communication Campaign	This program aims to increase awareness about EE in the country through a range of targeted approaches, including media programs, seminars, workshops, etc.	All sectors
	Standards and Labelling for Household Appliances	DOE and DOST, in collaboration with a number of government and private organizations, is implementing a standards and labelling program for households and commercial sectors.	Residential and commercial
	Government Energy Management Program (GEMP)	This program is aimed at reducing the monthly consumption of electricity and transport petroleum products of all government offices and vehicles by at least 10% on annual basis.	Building and transport
	Philippine Industrial Energy Efficiency Project (PIEEP)	This is a UNIDO-GEF funded project (2011–17) implemented with co-financing from DOE and national commercial banks. It aims to introduce an ISO 50001 Energy Management System Framework along with a system optimization approach for the improvement of industrial energy efficiency in the Philippines.	Industrial
	Philippines Chiller Energy Efficiency Program	The GEF-funded Philippines Chiller Energy Efficiency Program is being implemented by the Department of Environment and Natural Resources and aims to replace inefficient CFC-based chillers with new and efficient non-CFC chillers.	Industry
	High Efficiency Motor program	The High Energy Efficiency Motors (HEM) program, funded by USD1.9 million from the EU's SWITCH-Asia Programme, is being implemented by a consortia of a number of organisations, including IIEE, ICA, and ASSIST. This program aims to showcase and promote high-efficiency motors and drive systems in the dugar industry.	Industry

Philippines: Barriers to EE

Policy (high)

- Need for immediate introduction of regulatory framework (e.g. enactment of EE&C bill)

Financial (low to medium)

- High energy price makes EE a good business case
- Minor financial support needed to pilot and test new EE technologies

Technical (low to medium)

- Technical knowledge and expertise exist
- Minor technical support in the electrical distribution network is required

Capacity building (high)

- Lack of capacity of service providers to engage energy consumers
- Absence of a knowledge management platform

Social/cultural (high)

- Hard to obtain executive's buy-in on EE
- Industries/companies do not perceive EE measures as business investments

Philippines: Priorities

Sectors	Priority level	Remarks
Industrial and SMEs	High to medium	<ul style="list-style-type: none"> • Second highest energy-consuming sector (28%) • Need to develop a systematic monitoring and verification (M&V) mechanism • Need to demonstrate new and advanced technologies
Transport	High to medium	<ul style="list-style-type: none"> • The top energy-consuming sector • No significant activities undertaken • Growing number of vehicles and other transportation equipment
Building	Medium	<ul style="list-style-type: none"> • Energy demand is high and expected to grow • Building code and standards are absent • Reduction potential is low compared to the industry and transport sectors
Commercial	Medium to low	<ul style="list-style-type: none"> • Relatively low energy consuming sector • Standards and labelling program in place • Need for a quality testing infrastructure
Agriculture	Low	<ul style="list-style-type: none"> • Very low consumption, and expected to remain low

Philippines: Opportunities & Challenges

	Description	Assistance required
OPPORTUNITIES	Many large corporates with the financial capacity to invest in energy efficiency.	None
	Need for the piloting and testing of advanced technologies.	Financial & technical
	High energy prices make a good business case for EE and will be the market driver.	None
	A need to expand the existing standards and labelling program to cover more appliances.	None
	A well-constructed, targeted and on-going support mechanism needs to be established to educate stakeholders from all sectors.	Institutional
	The introduction of electric vehicles would be an appropriate measure to address high energy consumption in the transport sector. The existing capacity to develop high efficiency motors can be useful in assembling and manufacturing electric vehicles.	Financial
	The training of energy managers, as in the program being delivered by ENPAP, would need to be expanded to cover staff from smaller companies. Financial support to make such training affordable to SMEs would be useful.	Financial
CHALLENGES	The absence of a regulatory framework is hindering progress in EE implementation.	Policy development
	Support from bilateral and multilateral agencies is mostly in the form of technical and institutional capacity-building.	Others
	A lack of capacity of EE service providers: capacity-building, both technical and financial, for ESCOs and energy auditors needed.	Capacity-building
	The lack of a systematic information portal for EE is hindering potential users in implementing measures.	Institutional
	There are no capacity-building programs for CEOs to improve their understanding of energy efficiency.	Capacity-building
	Lack of expertise to implement EE measures in the building sector.	Capacity development
	Lack of awareness across all sectors in the Philippines of the needs and benefits of implementing energy efficiency, e.g. financial savings.	Capacity-building
	It is difficult to convince top management to make energy efficiency investments because they do not perceive EE actions as an investment opportunity but only as an item of expenditure.	Capacity-building
	The lack of an effective institutional or regulatory mechanism to support the implementation of existing programs is limiting the progress of EE implementation.	Institutional
	Energy-efficient appliances are expensive, and are not affordable for residential consumers.	Financial
Lack of expertise of technical staff to present EE intervention as a business case to top management (e.g. CEO, CFO).	Capacity-building	

Thailand: EE Initiatives

POLICIES	High energy efficiency standard for equipment and machinery	This policy requires the supply market to offer energy efficient equipment and machinery through the implementation of standards and labelling programs.	Commercial
	Energy management in designated buildings in factories	About 2,800 buildings and 5,400 factories have been designated that are required to implement energy efficiency measures and submit an annual report to DEDE to demonstrate on-going improvement in EE.	Industrial
	Persons Responsible for Energy (PRE)	All companies that meet an energy consumption threshold are required to appoint staff to oversee the development and management of energy efficiency programs.	Industrial and commercial
	Building energy code (upcoming)	This policy aims to introduce special building codes for new buildings to ensure efficient energy use in them. This policy is currently being developed.	Building
	Tax incentives	DEDE works with the Revenue Department to facilitate tax incentives for the purchase of EE products. It also cooperates with the Board of Investment (BOI) to exempt corporate income tax and import duties for EE purposes. This is done on ad hoc basis, and there is no ongoing support.	Industry and commercial
PROGRAMS	Technical assistance	The government provides support, through the Energy Conservation Promotion Fund, to a range of capacity-building activities, including seminar and training, demonstration projects on advanced technologies, in-depth energy audits for buildings and industries, establishing an energy display centre, and a practical training centre.	All sectors
	Energy efficiency networking	Through a voluntary agreement with major corporates (such as the Thai Chamber of Commerce, the Federation of Thai Industry, commercial banks, etc.), the government develops public-private partnerships (PPP) to strengthen EE promotional activities.	All sectors
	Creating awareness	Under this program, the government supports the organization of energy fairs and develop promotional materials for the media. The government also provides annual awards to high achievers of energy efficiency.	All sectors
	Revolving fund	This fund supports energy investors concerning capital investments in energy efficiency and encourages commercial banks to include energy efficiency in their list of financial products. Following the success in creating a sustainable market, DEDE has now exited from this program.	All sectors
	Energy management auditor	The government aims to develop an accreditation process for energy auditors to provide EE services to all sectors. This policy is currently being developed.	All sectors
	Government co-investment program (ESCO fund)	The ESCO fund was created to allow access to financing for smaller businesses, which would otherwise be unable to obtain funding from commercial banks. Thailand now has an ESCO Association that allows networking among ESCOs.	Industry

Thailand: Barriers to EE

Policy (medium)

- High subsidy in energy sector
- Current EE plan does not focus on all sectors

Financial (low)

- The Energy Conservation Fund has allocated a significant amount of money

Technical (medium)

- Technical knowledge and expertise needed
- Some technology demonstration and transfer activities would be useful

Institutional (high)

- Proper monitoring and verification (M&V) framework is essential

Social (high)

- Need to change the mind-set of business owners
- Need to undertake targeted awareness programs

Thailand: Priorities

Sectors	Priority level	Remarks
Industrial and SMEs	High to medium	<ul style="list-style-type: none"> • Highest energy consuming sector • Expected to grow rapidly to support future GDP growth • The government is seriously considering energy conservation in this sector under the EE Plan 2010-2030
Transport	High to medium	<ul style="list-style-type: none"> • Another top consumer of energy. • Growing numbers of vehicles and increasing amount of kilometres travelled. • No significant action has been undertaken in this sector
Building	High to Medium	<ul style="list-style-type: none"> • Many high energy consuming buildings • The government is already taking actions through the Energy Conservation Promotion Act. • Building energy codes are currently being developed to regulate new buildings.
Residential and commercial	Medium to low	<ul style="list-style-type: none"> • Relatively low energy consuming sector • Standards and labelling program is in place

Thailand: Opportunities & Challenges

	Description	Assistance required
OPPORTUNITIES	Many large corporates with the financial capacity to invest in energy efficiency.	None
	Need for demonstration of advanced technologies.	Technical
	Less support has been offered to SMEs and the transport sector compared to large industries.	Financial & technical
	The government alone may not be able to support six thousand designated buildings and factories. External support would be helpful.	Financial & technical
	It is important to implement targeted capacity-building programs to complement DEDE's financial support program.	Capacity-building
	The companies and factories need to be provided with advanced knowledge of data analysis and management practices.	Capacity-building
CHALLENGES	High subsidies in the energy sector are a disincentive to business owners to invest in energy-efficient technologies and services.	Policy development
	Business owners think that EE is only a matter of environmental welfare and that it does not have any financial benefits. This attitude needs to be changed.	Capacity-building
	Hard to obtain buy-ins from executives for energy efficiency investments. A targeted program needs to be developed and implemented.	Capacity-building

Vietnam: EE Initiatives

	Title	Details	Sectoral coverage
POLICIES	Vietnam Power Development Plan 2011-2020	The Vietnam Power Development Plan (Power Master Plan VII) 2011-2020 provides a clear and measurable target for a 2030 vision for country's power development. It sets out six directions and four targets, listed in Appendix E. The plan puts strong emphasis on energy security, energy efficiency, renewable energy development and power market liberalization. The targets, in relation to improving energy efficiency, include reducing the average energy elasticity ratio from the current 2.0 to 1.5 in 2015 and 1.0 in 2020.	All sectors
	National Energy Efficiency Programme	The Vietnam Energy Efficiency Program (VNEEP) is a ten-year program, approved in April 2006 by the Prime Minister of the Socialist Republic of Viet Nam. It is a targeted national program and the first-ever comprehensive plan to implement measures for improving energy efficiency and conservation across all sectors of the Vietnamese economy. The overall aim of the program is to make initial savings of 3–5% in 2006–2010 and a further 5–8% in 2011–2015.	All sectors
PROGRAMS	Energy Efficiency Promotion in the Building Sector	The USAID Vietnam Clean Energy Program – Energy Efficiency Promotion in the Building Sector supports the Government of Vietnam's (GVN) Green Growth Strategy and related action plan. The project partners with the Ministry of Construction (MOC) to reduce electricity consumption in the country through improved energy efficiency in the building sector by implementing the Vietnam Energy Efficiency Building Code (VEEBC) and promoting a green building program.	Building
	Vietnam Energy Efficiency and Cleaner Production Financing	Funded by the IFC, the Vietnam Energy Efficiency and Cleaner Production (EECP) Financing Program aims to reduce greenhouse gas emissions and improve resource utilization by increasing the financing available for cleaner production and energy efficiency investments. The project works with selected commercial banks to build market strategies and tailored financial products, and targets enterprises looking to upgrade their production systems and technologies to achieve greater energy efficiency, cost savings, productivity, and environmental performance.	Industry
	Energy efficiency improvement project by WB	The State Bank of Vietnam and the World Bank signed a US\$ 500 million loan for a US\$ 731.25 million operation in support of Vietnam's energy sector. The investment will fund the construction of over 1,000 kilometres of transmission lines and implement smart grid technologies to improve the reliability and quality of electricity supply.	Power sector

Vietnam: Barriers to EE

Policy (low)

- Vietnam has already developed policies to address energy efficiency. However, energy subsidy needs to be reduced or eliminated.

Financial (high)

- High cost of EE technologies and services limiting EE uptake

Technical (high)

- Lack of knowledge about advanced EE technologies

Capacity/ institutional (high)

- Limited availability of specialized knowledge about EE technologies and services

Social (medium)

- Lack of awareness about EE measures and their benefits among businesses and enterprises

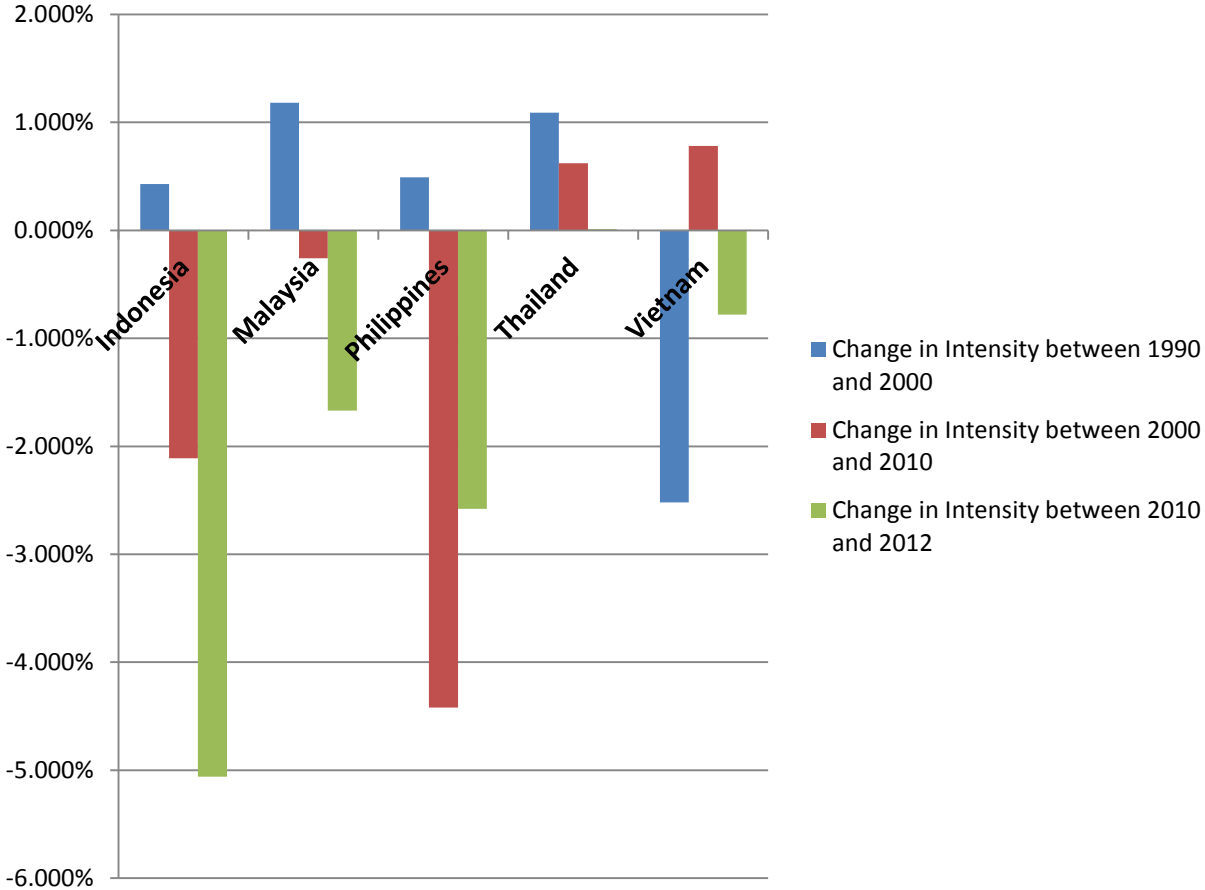
Vietnam: Priorities

Sectors	Priority level	Remarks
Industrial and SMEs	Medium to high	<ul style="list-style-type: none"> • Rapidly growing sector that will put pressure on national energy supply • Energy efficiency needs to be promoted for the key export-oriented sectors e.g. the apparel industry
Transport	Medium	<ul style="list-style-type: none"> • Second highest energy consumption (31.7% in 2012) • Oil is the main fuel, opportunity for GHG emissions reductions exists
Building	Medium	<ul style="list-style-type: none"> • An energy efficiency building code has been developed by the Ministry of Construction • Need for assistance with implementation of the building code
Residential and commercial	Medium	<ul style="list-style-type: none"> • The lowest energy consuming sector (14.9% in 2012) • No significant program exists in this sector. • There are opportunities for standardization and benchmarking.

Vietnam: Opportunities and Challenges

Description	Assistance required
NATIONAL TARGET TO REDUCE ENERGY ELASTICITY TO 1.0 BY 2020.	Policy, technical
There are still a number of old coal-fired thermal power plants that have lower efficiency. A significant number of coal fire thermal power plant will be constructed. Selection of suitable technology will be required to improve energy efficiency.	Technical
There are still a huge number of traditional brick kiln and ceramic kilns using coal or wood as a fuel with low efficiency. Most of these cement factories have huge thermal waste in the form of kiln flue gas without proper use of waste heat, e.g. through cogeneration.	Technical
Boilers in Vietnam mostly using coal, oil and biomass as a fuel and working at low efficiency.	Technical
There is a need to demonstrate EE technologies in all three sectors (industrial, residential and commercial, and transport).	Technical
Vietnam's export-oriented industries (e.g. apparel factories – Vietnam is one of the world's top ten apparel exporters) should be supported with EE to make them more competitive in the world market.	Financial & technical
A need to create awareness, on a national basis, of the importance and benefits of conserving energy. Development of a "knowledge management" centre for energy efficiency to allow sharing of information, ideas and best practices.	Institutional
A need for the development of standards for appliances and equipment to promote energy efficiency in the residential and commercial sectors.	Technical and institutional.
Financial support, in the form of soft loans, is needed to help industries, particularly SMEs, implement energy efficiency measures. This can be done by introducing a revolving fund and engaging commercial banks in the mechanism.	Financial
The government has developed a new building code for energy efficient buildings. Mandatory energy saving requirements for new buildings are to be introduced.	Policy and technical
Lack of professional capability, superficial knowledge of technology and equipment and the inequality of EE service providers have led to underperformance of EE in Vietnam.	Capacity development
Energy management in industries has improved in recent years, but most of enterprises still do not apply energy management standards such as ISO 50001.	Institutional, financial
There is a lack of awareness about energy efficiency and conservation measures.	Institutional
High capital cost of EE technologies puts a limit on sector-wide EE measures.	Financial
There is a lack of information on energy-efficient technologies and services to large energy consumers.	Institutional
Limited energy management and conservation expertise.	Capacity development
Energy prices need to reflect the market price to turn energy efficiency interventions into a good business case, and to enable executives make informed decisions to implement energy efficiency measures.	Policy (advocacy)

Rate of change of Energy Efficiency



Perception of Barriers

Perception of Barriers to EE					
Country	Nature of Barrier				
	Policy	Financial	Technical	Institutional/Capacity	Social
Indonesia	M	H	H	H	M/H
Malaysia	H	M	L	H	H
Philippines	H	L/M	L/M	H	H
Thailand	M	L/M	M	H	H
Vietnam	L	H	H	H	M/H

Key Barriers

- Policy
 - Low tariffs
 - Regulatory framework/National plan/Action plan
- Financial
 - Mechanisms
 - Funds
- Technical
 - Knowledge about EE/sector specific EE technologies
- Capacity building
 - M&V (lack of)
 - Implementation of EE (lack of capacity to)
- Social
 - Awareness about benefits of EE
 - EE not considered strategic to business

Priority Sectors and Initiatives

Country	Sector					Energy Generation
	Industry	Buildings	Transport	Commercial	Residential	
Indonesia	M/H	L/M	M/H	L	L	M
Malaysia	M/H	L/M	M/H			L/M
Philippines	M/H	M	M/H	L/M	L/M	
Thailand	M/H	M/H	M/H	L/M	L/M	
Vietnam	M/H	M	M	M	M	

Area-wise Support Requirement

Support area	Action	Description	Applicable countries
Awareness and capacity-building	Provide targeted capacity-building support to engage top management.	Innovative programs need to be developed and delivered to engage top management (CEOs, executives, CFOs, etc.). This should be done by involving a global role model (e.g. an EE ambassador). Domestic experts are unlikely to have the required influence on executives. Communications should use business language to provide a clear message that energy efficiency is a solid business investment capable of meeting the usual IRR/payback requirements.	All
	Support to develop a targeted, long-term and result-driven awareness program to increase knowledge about energy efficiency.	This program should be tailored to provide information to different sectors. It is important to involve relevant stakeholders in the process to understand the cultural and social orientation of the target group and to design and deliver the message appropriately. Special attention should be given to the language of communication. For example, to engage business entities, monetary savings should be highlighted more than energy and/or greenhouse gas emissions reductions.	All
	Capacity development for government employees	Capacity development programs to be delivered to empower government employees to enable proper monitoring and evaluation of the implementation of government program, as well as to develop new programs to address sectoral specific needs. The training program should include technical and financial knowledge, learning from other countries, information about advanced technologies, monitoring and evaluation, and basic knowledge about ISO and other certifications. Accredited ISO certification training is not seen to be essential for this target group.	All

Area-wise Support Requirement

Capacity Building	Support capacity-building programs to develop energy mangers and energy auditors	Capacity-development programs to be developed to build the expertise of energy mangers of industries and companies who are responsible for driving EE improvements. They should be trained in EnMS, ISO 50001 and ISO 50015. Specific programs need to be developed and delivered based on the needs of target sectors and industries. Training programs needed to be conducted to develop certified energy auditors to provide services to assess energy efficiency opportunities. For increased credibility, a nationally recognized accreditation program should be established for the energy auditors.	All
	Deliver capacity-building programs for ESCOs	Capacity-development programs are to be delivered to empower ESCOs. These programs should focus on improving their technical capacity to assess EE needs appropriately and formulate an effective solution, provide clients with a proper financial analysis of their investment, and undertake monitoring and evaluation (M&E) of the entire process.	All
Technical and financial	Assistance in the demonstration of energy-efficient technologies.	Support to demonstrate new and advanced technologies designed for specific target groups would be very useful. Demonstration systems for priority sectors and industries (for example, sugar mills in the Philippines) would lead to the development of case studies, which would increase knowledge across the sector or industry. Lessons learned from the demonstration systems should be documented for future reference.	All
	Support the development of energy-efficiency programs for the transport sector	The transport sector has been identified as one of the major energy-consuming sectors in all countries except Vietnam. While programs are available to support the industrial, residential and commercial sectors, no significant activities have been noticed in this fast-growing sector. For example, in the Philippines, energy consumption in the transport sector is set to exceed the industrial sector to become the most highly energy-consuming sector. The number of vehicles in most countries is expected to increase in future as the affordability of personal vehicles increases. Types of intervention may include the introduction of electric vehicles, switching to biofuel and improving access to public transport.	Indonesia, Malaysia, the Philippines and Thailand

Area-wise Support Requirement

Technical and financial	Develop energy-efficiency programs for the building sector	While the building sector is one of the major energy-consuming sectors in all countries, a complete building code to drive energy efficiency effectively in this sector is only available in Vietnam. Support should be provided to develop building codes to introduce mandatory energy performance requirements for all new buildings and retrofitting measures for existing buildings. This work should be undertaken with the relevant government departments and the relevant building or construction association.
Financial	Provide financial support to assist with capital investment	Financial assistance to offset high capital investments should be provided for smaller companies (e.g. SMEs). This is particularly important because this group has limited access to commercial financing and is thus unable to make the required capital investments.
Policy	Support to develop an enabling policy environment	Appropriate policy advocacy is needed to reduce the energy subsidy and to reflect the true cost of energy. This is very essential as the subsidised energy cost is a disincentive to businesses in undertaking EE measures. If energy tariffs reflect the true cost of generation, EE investments will make a good business case and will help motivate the stakeholders from all sectors.
Institutional	Support to develop a central repository of information on energy efficiency	A central database needs to be developed with information on programs, initiatives, technologies and services. Such a database would be a one-stop source of information for anyone seeking support to implement EE measures. This database should also include information about EE service providers, including accredited professionals. Such a database could be administered by government agencies or a recognized body of professionals with various anchor points around the country to feed in with updated information.
	Support to establish a quality testing infrastructure	The establishment of a quality infrastructure, such as an appliance testing laboratory, is important for all countries to effectively promote a standards and labelling program. This would help countries test electrical and electronic products against their name plate specifications.

Observations

- Political will
- Overarching framework and commensurate institutional structure
 - Regulations
 - Targets
 - Potential - priorities
 - Instruments and policies & tools for decision making
- Dedicated resources- personnel, funds

Observations

- Baseline data collection and in fact entire need to do load research, energy use research
 - Consumption & load shapes: sector, segment, end-use, technology (TOD, seasonal)
 - Savings
 - Costs
 - Technologies
 - Markets
 - EE Auditors, managers, M&V professionals, ESCOs, consultants
- Interventions
 - Roadmaps
 - Action plans with dedicated programs
- Focus on motivating financiers and facilitating supply chain entities
- Target based approach with constant monitoring and course correction
- Need for focus on transport and building sector

Thank you for your attention!



- **Ksenia Petrichenko** **Vijay Deshpande**
- **Copenhagen Centre on Energy Efficiency (C2E2)**
- UN City
- Marmorvej 51, 2100 Copenhagen Ø, Denmark
- Email: ksepe@dtu.dk
- Direct +45 4533 5317
- www.unepdtu.org