

# Energy Conservation: Asian Experiences

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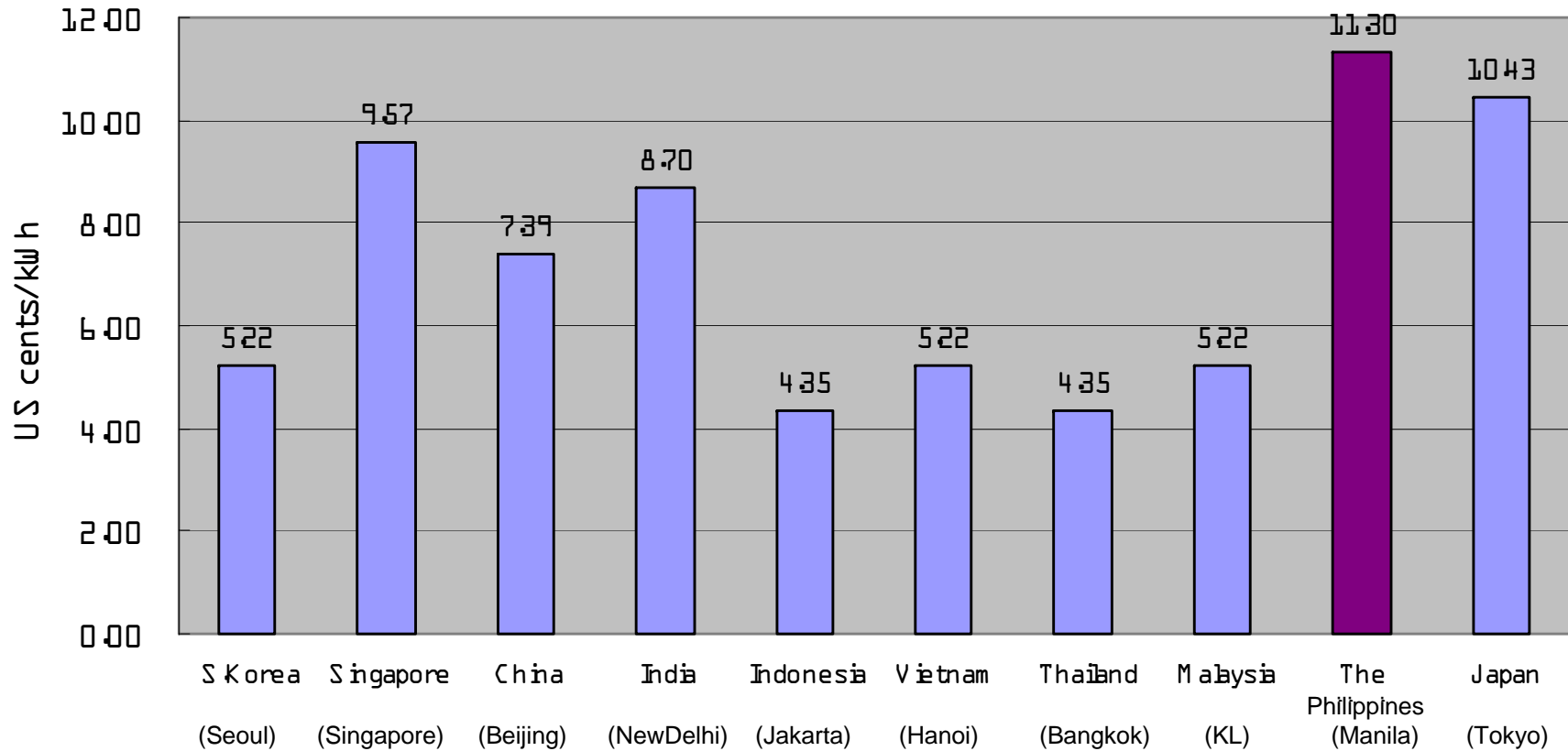
# This presentation

1. Current Status of Energy Efficiency in the Philippines and Asia
2. Energy Conservation Measures in Asia
3. Summary of Lessons Learned from Other Asian Countries' Experiences

# 1. Current Status of Energy Efficiency in the Philippines and Asia

Why is Energy Conservation so important?- The cost of electricity in the Philippines is the highest in Asia.

Figure: Electricity Price



Note1: 1US\$=11.5Yen

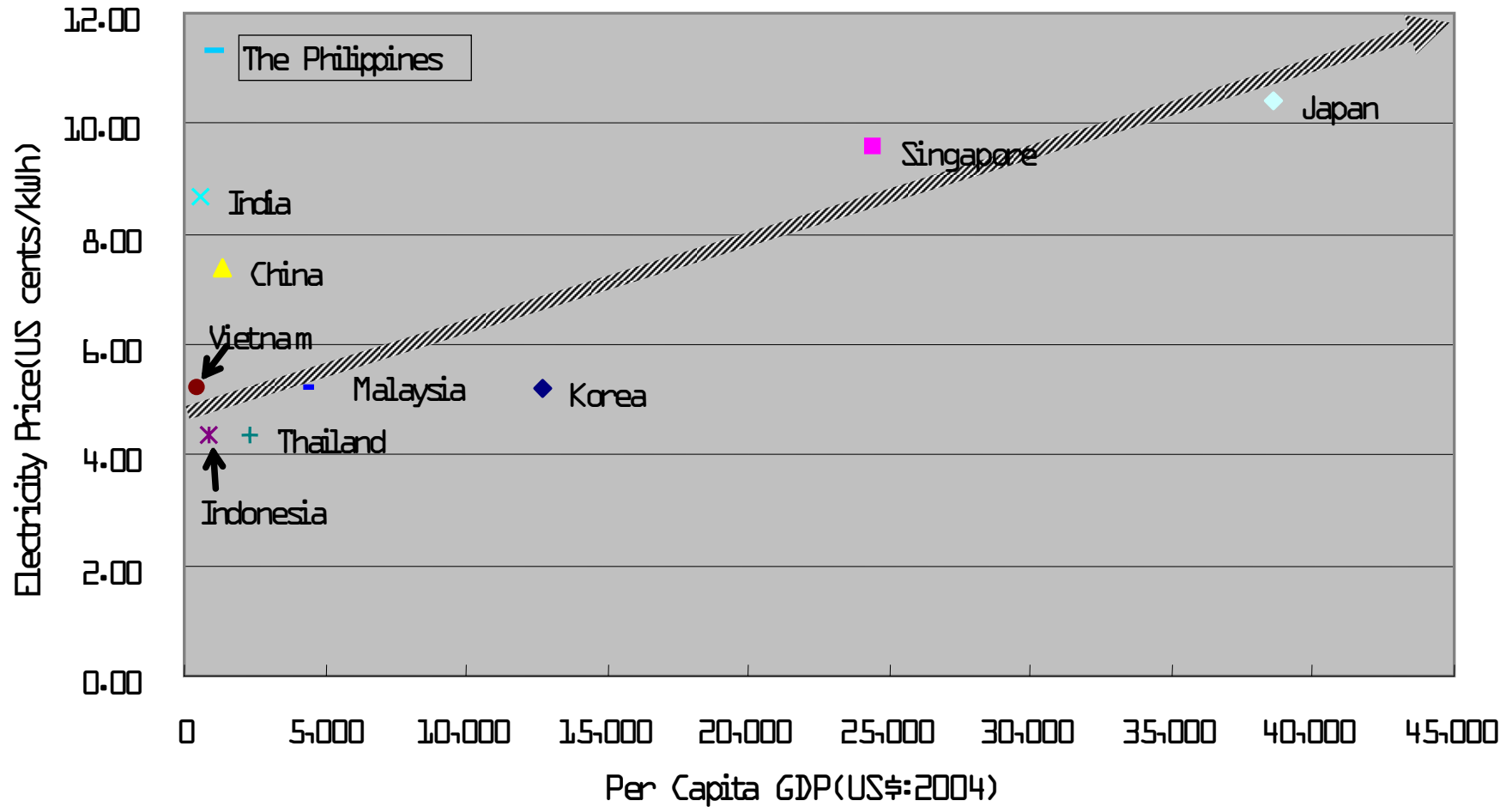
Note2: China: average price of rang 3-14Yen/kWh

Note3: prices of Indonesia, China, Vietnam, India are subsidized price

Source: JETRO (March 2006)

The prices of electricity in the Philippines in relation to per capita GDP is the highest in Asia.

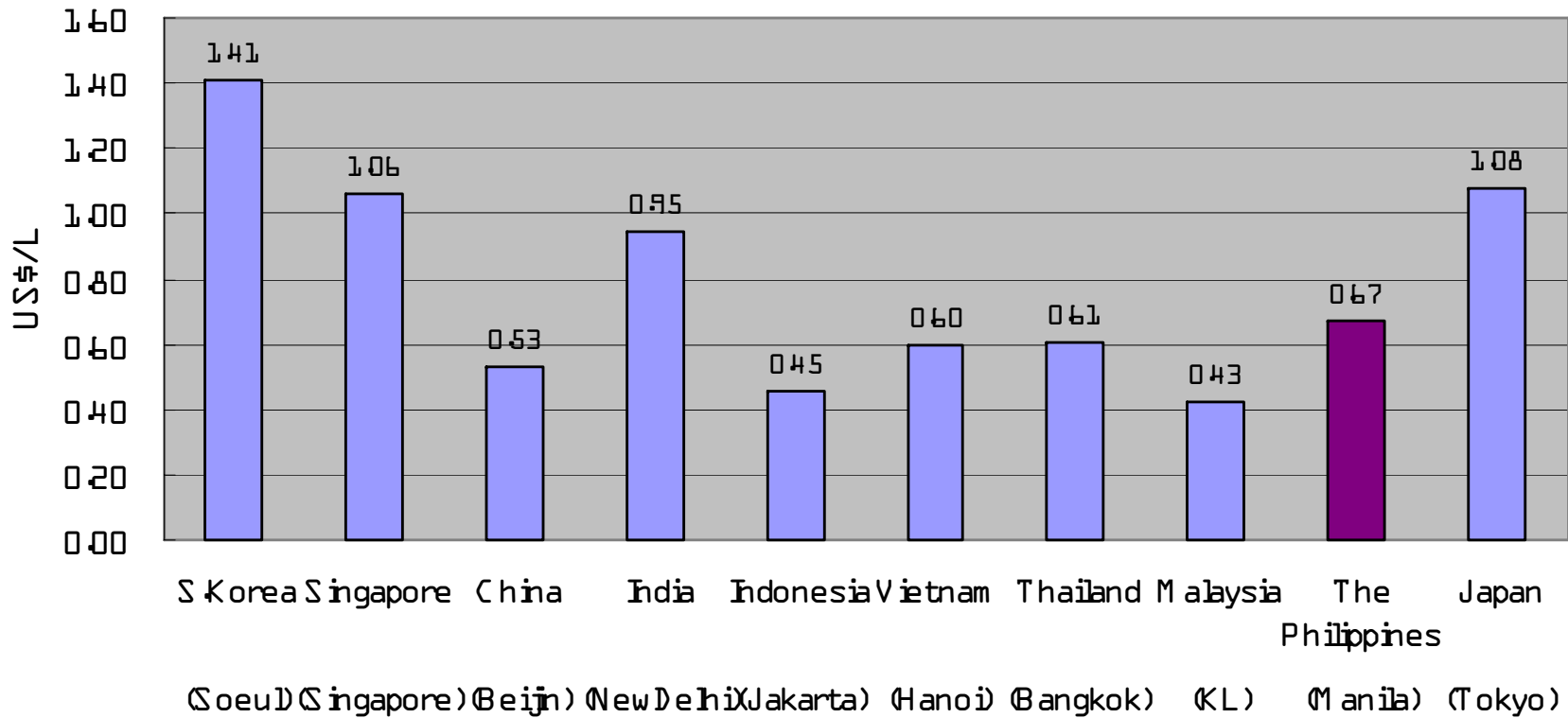
Figure: Electricity price and per Capita GDP



Source:JETRO(March 2006), WDI

The regular gasoline price in the Philippines is at the Asian average.

Figure: Regular gasoline price



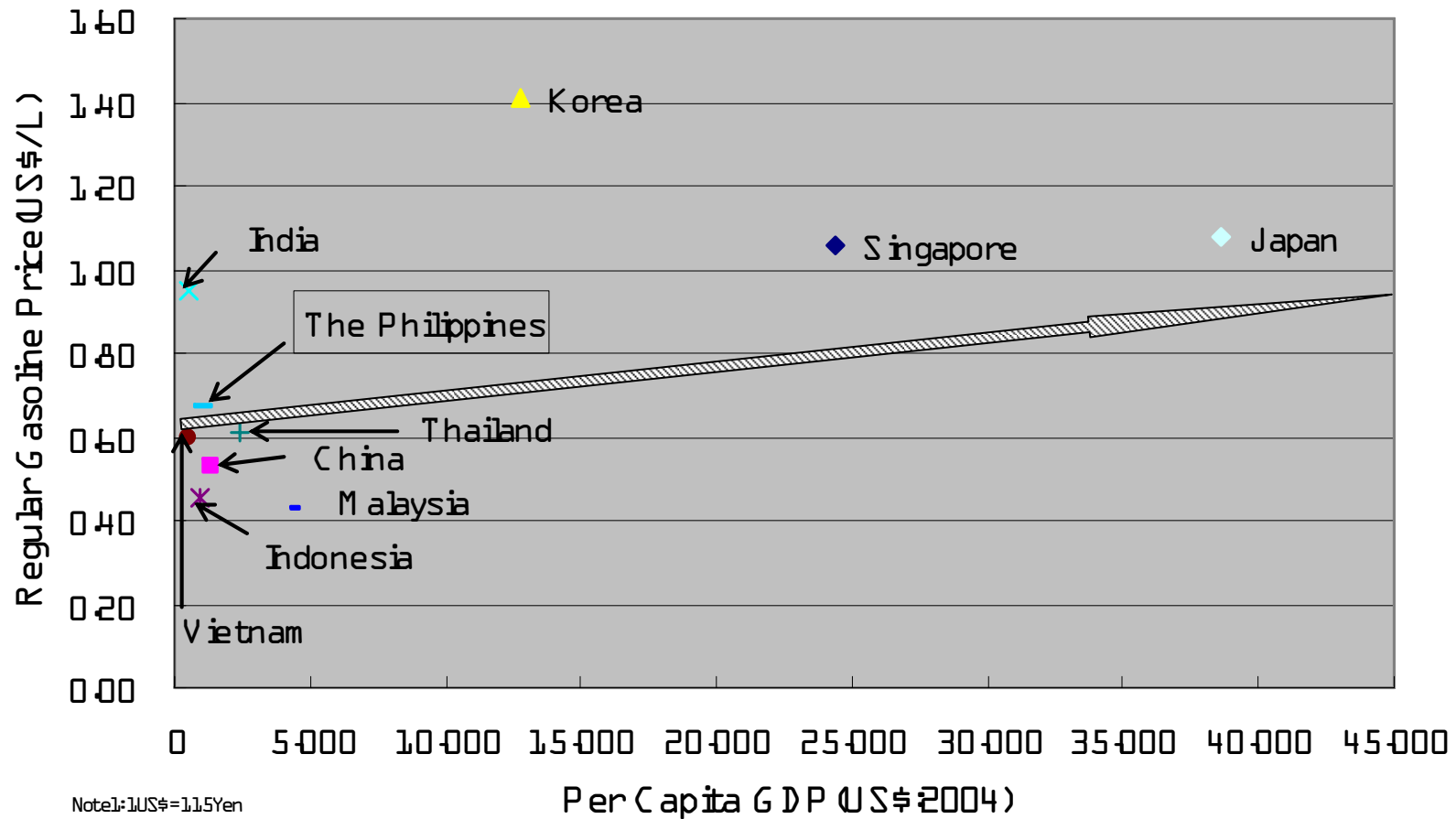
Note1: 1US\$=11.5Yen

Note2: Prices of Indonesia, Vietnam, India, China are subsidized price

Source: JETRO (March 2006)

The regular gasoline price in the Philippines in relation to per capita GDP is relatively high and among the highest in Asia.

Figure: Regular gasoline price and per capita GDP



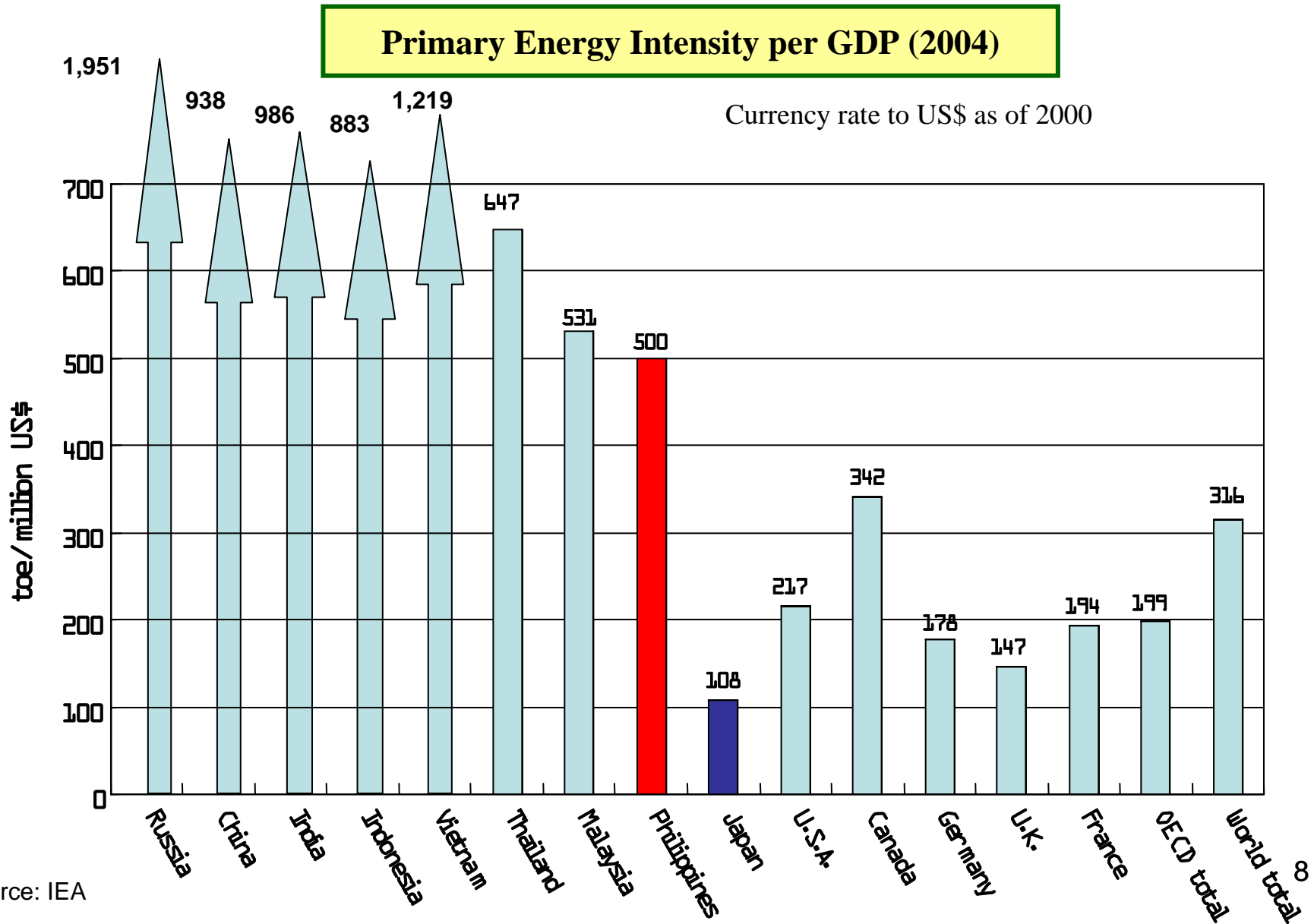
Note1: 1US\$=11.5Yen

Note2: Prices of Indonesia, Vietnam, India, China are subsidized price

Note3: Constant 1995 Price: 2004 figures

Source: JETRO (March 2006), WDI

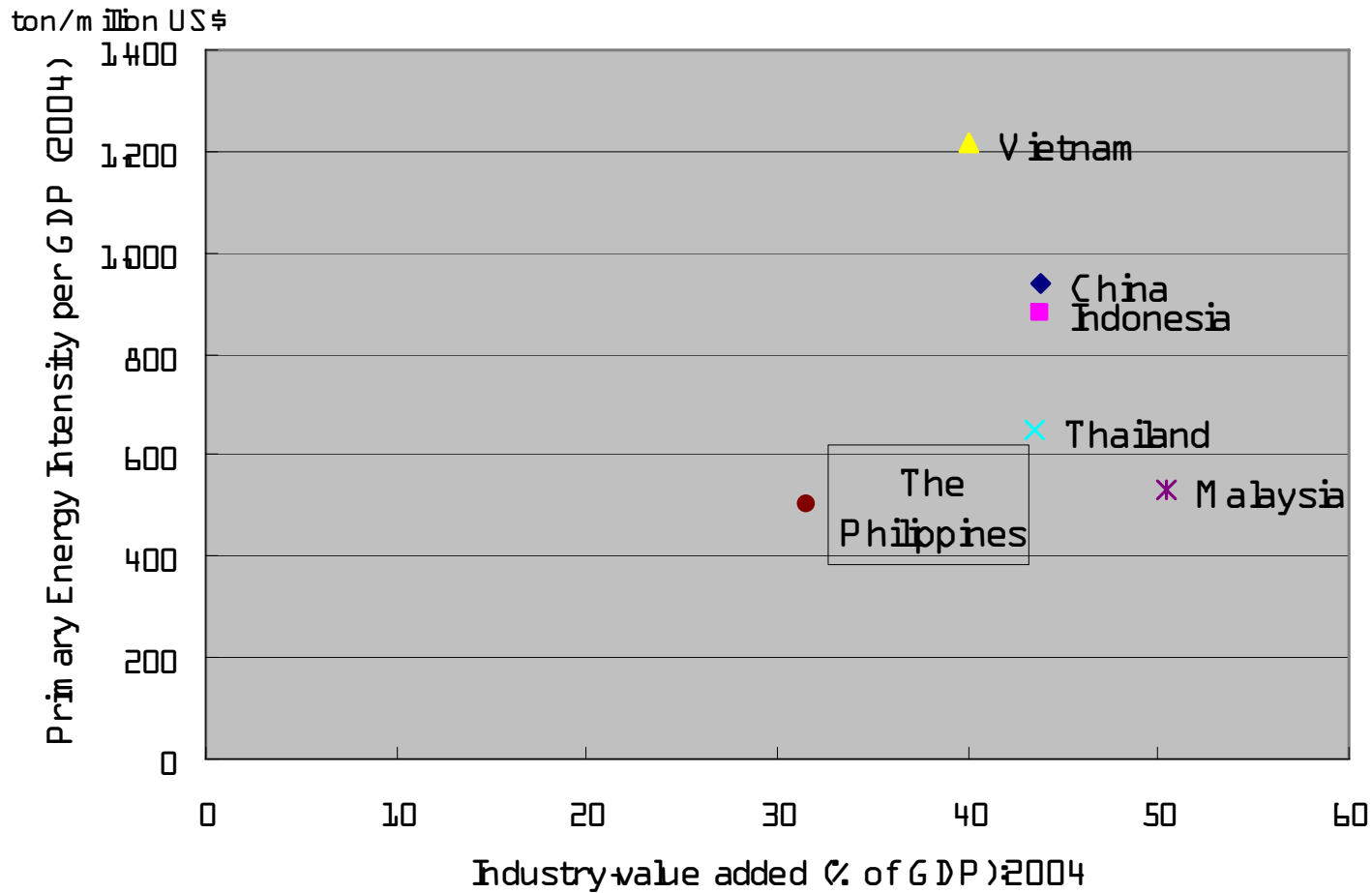
The energy intensity of the Philippines is one-fifth that of Japan. Compared with other Asian countries, The Energy intensity of the Philippines is better than the neighboring Asian countries.



Source: IEA

The energy intensity of the Philippines is better than other Asian countries. However, the industry sector occupies a lower share of the GDP.

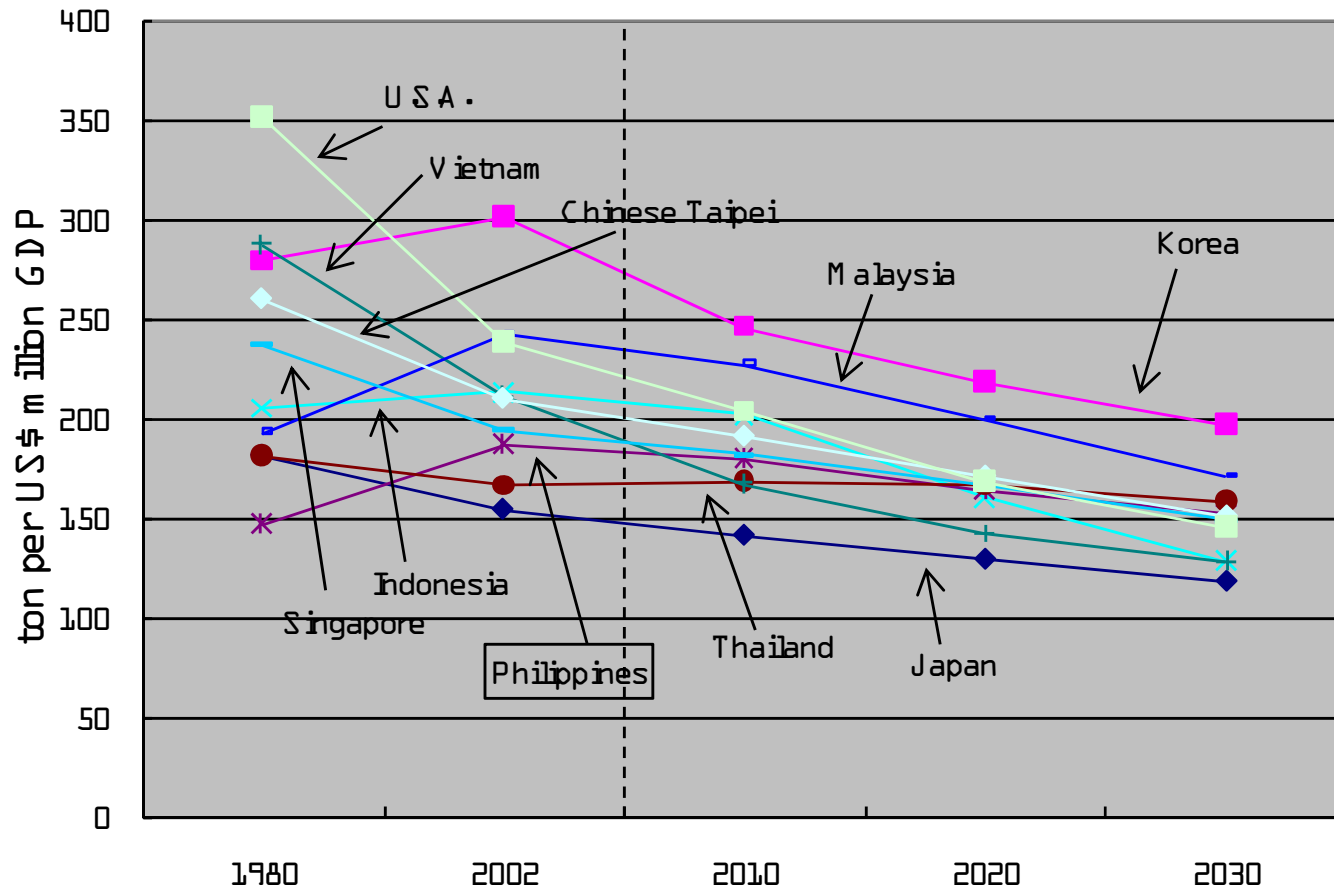
Figure: Primary Energy Intensity and Industry value added (% of GDP)



Source :IEA for Primary Energy Intensity, :Currency rate to US\$ 2004 figures as of 2000  
WDI for Industry value added (% of GDP) 2004 figures

The overall energy intensity in the Philippines in 2002 (2000 priced PPP) is better than Indonesia, and Vietnam, but not Thailand. In 2030, the Philippines will be overtaken by Indonesia and Vietnam in total energy intensity (PPP).

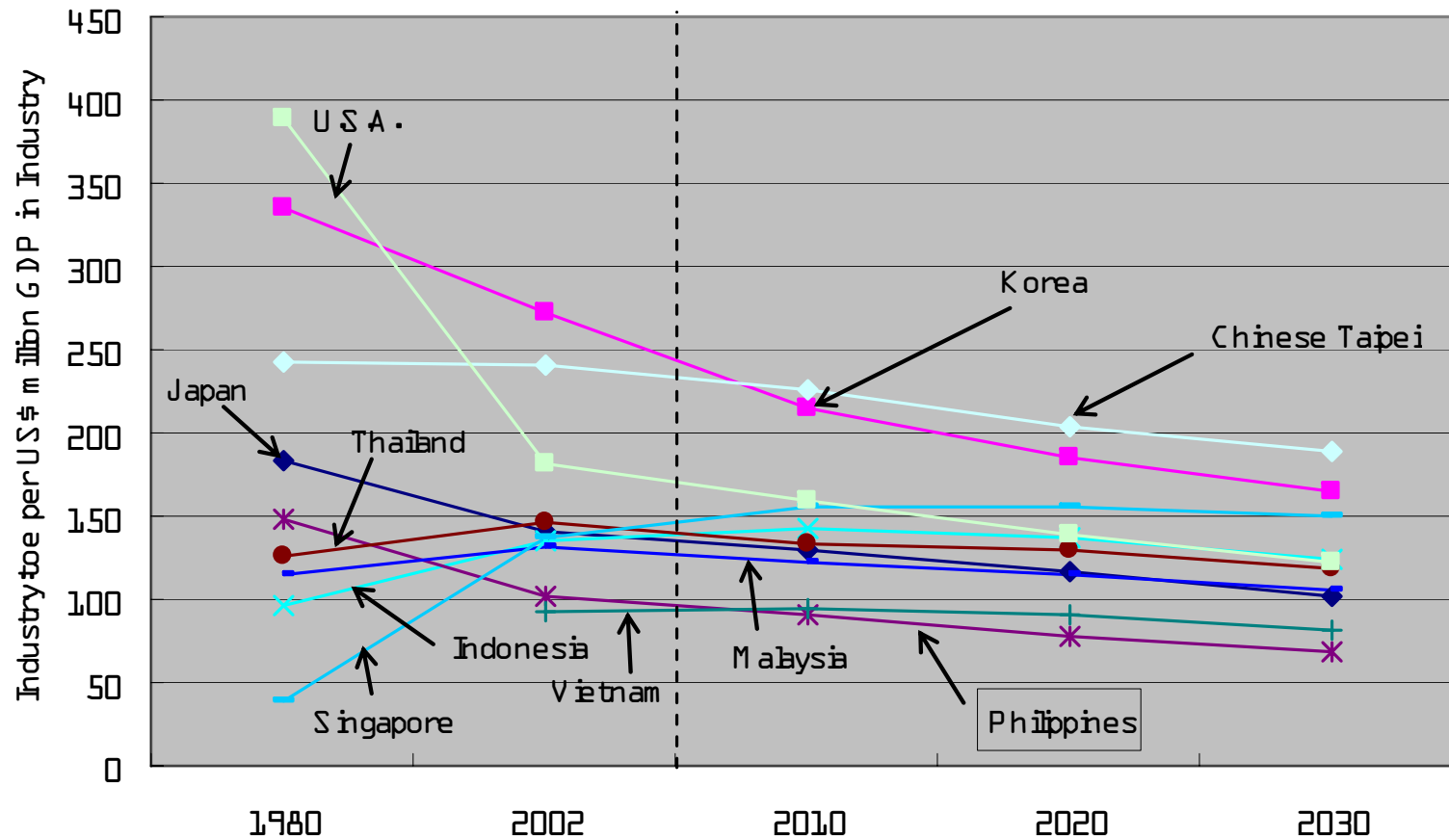
Figure: Energy Intensity (ton per US\$(PPP) million GDP)



Source: APEC Energy Demand and Supply Outlook 2006  
 Note: Data(1980-2002): Actual; Data(2010-2020-2030): forecasted by APERC

Energy intensity for the industrial sector in the Philippines is second in all of Asia next to Vietnam. However, by 2030, the Philippines will have the best energy intensity in Asia.

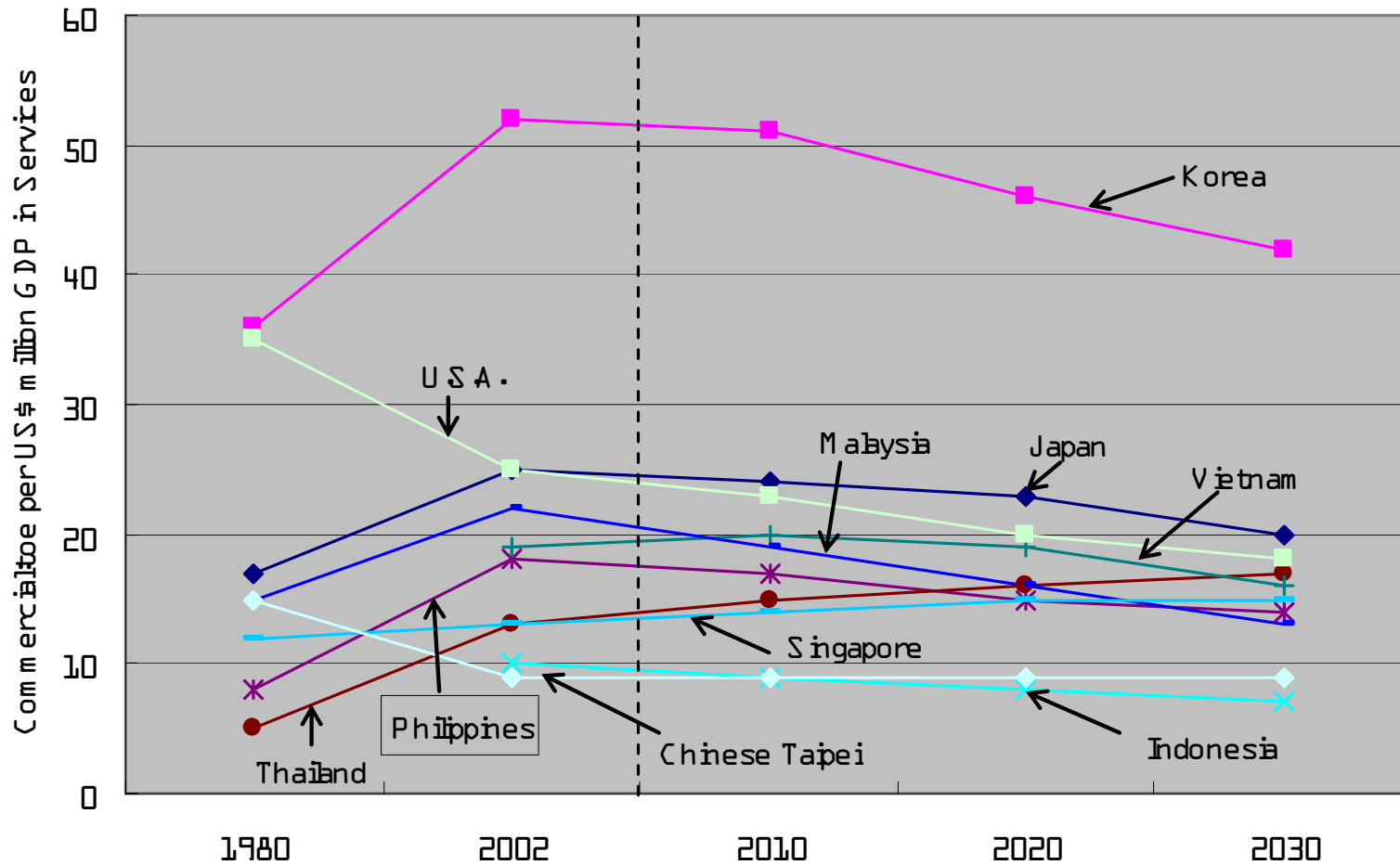
Figure: Energy Intensity (Industry :toe per US\$ million GDP in Industry)



Source: APEC Energy Demand and Supply Outlook 2006  
 Note: Data (1980-2002): Actual; Data (2010-2020+2030): Forecast by APERC

Energy intensity in the commercial sector in the Philippines in 2002 is better than Malaysia and Vietnam. In 2030, the Philippines will be overtaken by Malaysia.

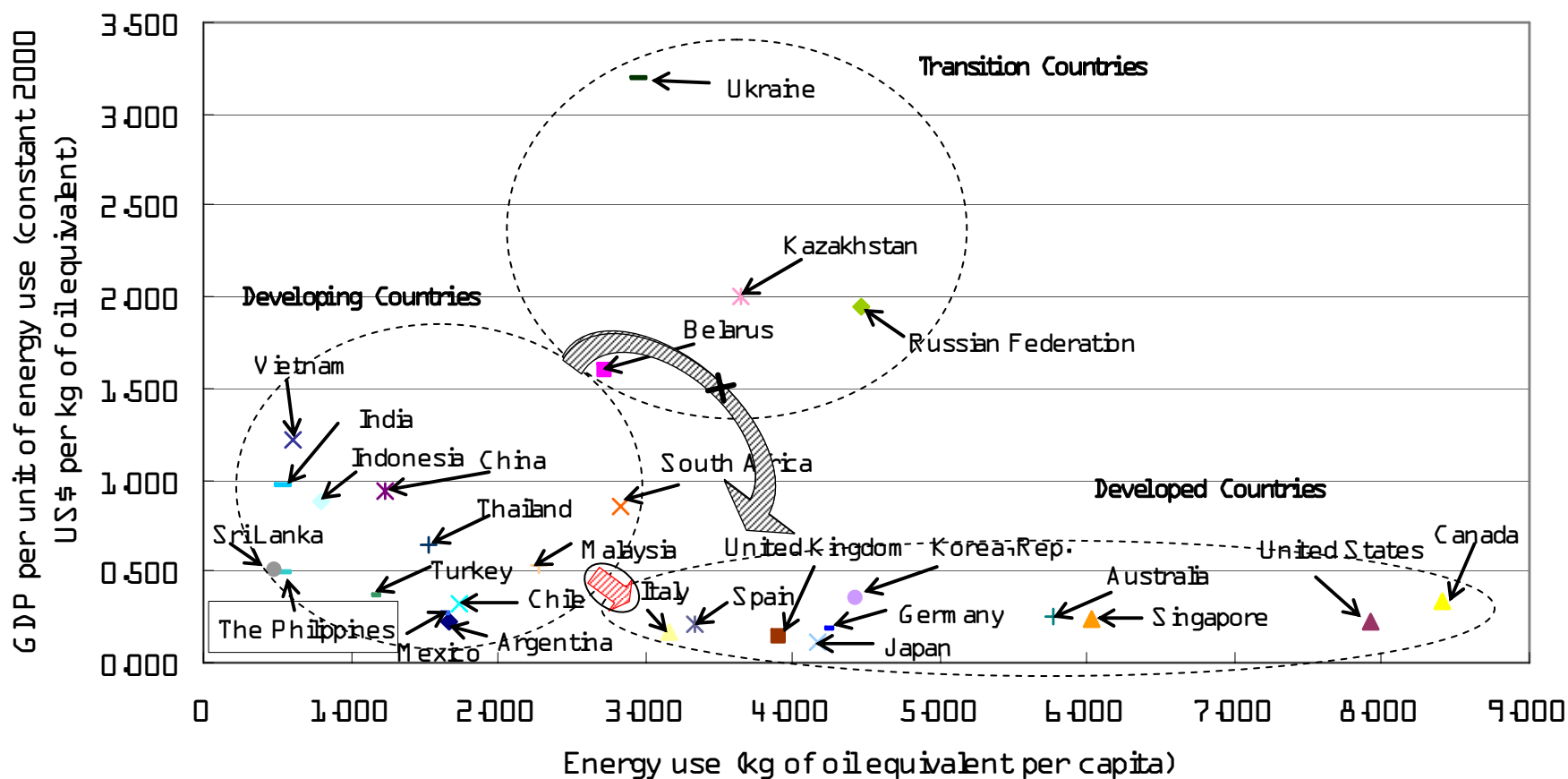
Figure: Energy Intensity (Commercial: toe per US\$ million GDP in Services)



Source: APEC Energy Demand and Supply Outlook 2006  
 Note: Data (1980-2002): Actual; Data (2010-2020-2030): Forecast by APERC

In order to realize low energy intensity (per GDP) while maintaining economic growth, more efforts toward energy conservation will be required in the Philippines.

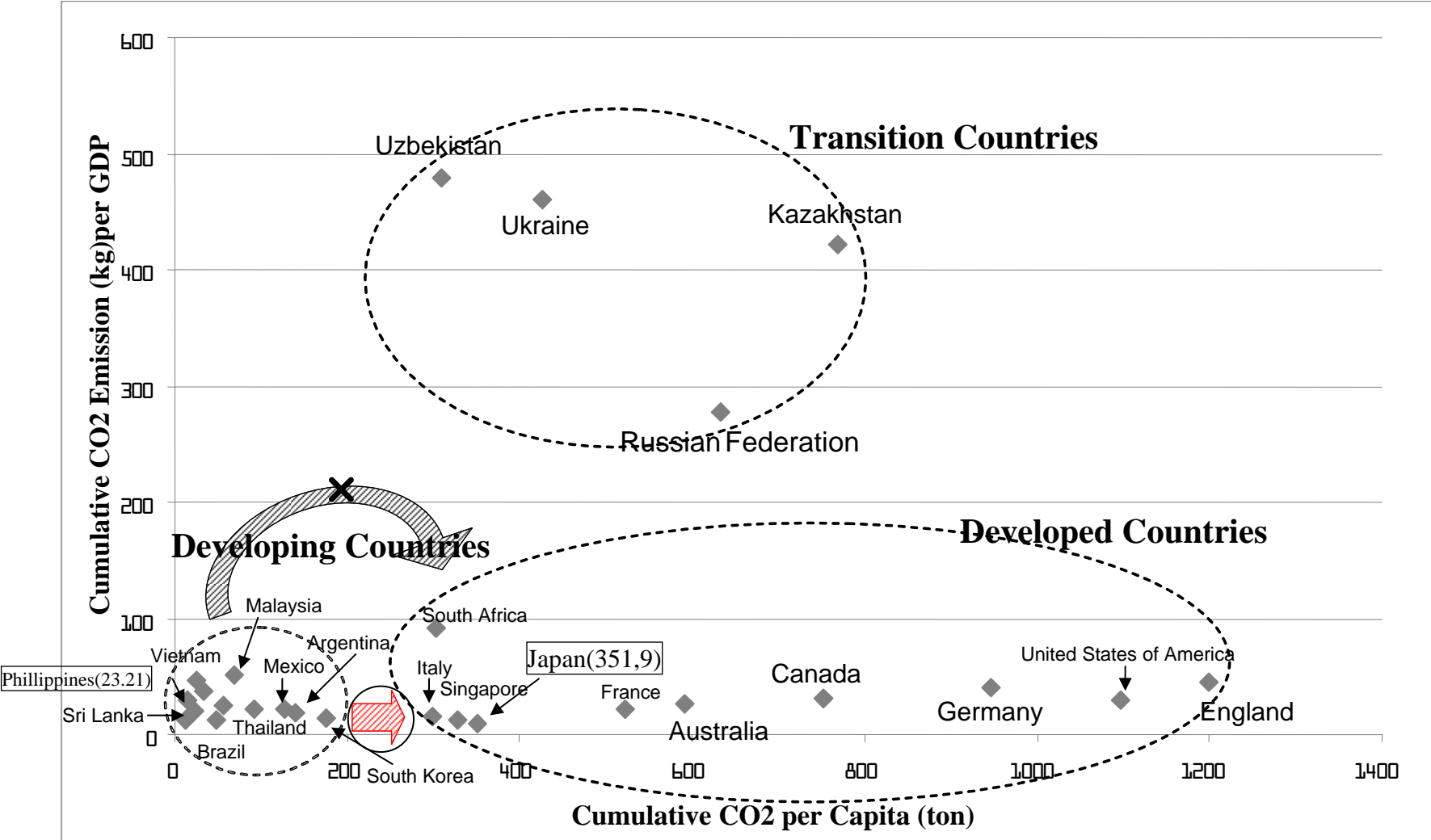
Figure: Energy use per capita vs GDP unit of energy use



Source: World Development Indicators (WDI)

In order to realize low CO<sub>2</sub> emission intensity (per GDP) while maintaining economic growth, adopting new technology for energy conservation will be necessary in the Philippines.

Figure: Cumulative CO<sub>2</sub> per capita and per GDP



Source: Carbon Dioxide Analysis Center (CDIAC)  
World Development Indicators (WDI)

Major observations from the energy efficiency figures are:

In the Philippines

- 1) There is much room for promotion of energy conservation efforts, especially in the Commercial Sector.

→Promote such measures as

Loss reduction in T&D, energy efficient building design for new buildings, energy efficient vehicle engine.

- 2) Due to fewer energy-intensive industries, the energy intensity of the industrial sector in the Philippines is low.

→A bench mark on energy efficiency by sectors, and by industries should be collected for further analysis.

## 2. Energy Conservation in Asia

## Energy Conservation Laws in Asian Countries

- **India, China, Vietnam and Thailand have the energy conservation laws.**

### **India**

- Energy Conservation Act was enacted in 2002.

### **China**

- Energy Conservation Law was enacted in 1997 (in effective 1998 ).

### **Vietnam**

- Energy Conservation Decree was enacted in 2003.
- Supportive measures such as tax incentive, periodical reporting, energy audit system was introduced.

### **Thailand**

- Energy Conservation and Promotion Act E.E 2535 was enacted in 1992.

## Progress of Energy Conservation in Thailand (1)

- 1. Goal of Energy Conservation under 10th National Economic and Social Development Plan**
  - (1) Consumption of alternative energy shall be increased from 0.5% to 8%.**
  - (2) Ensuring energy security for coming 50 years**
  - (3) GDP elasticity shall be improved from 1.4 (1985-2001) to 1.0 in 2011.**
  - (4) Energy intensity in transportation sector shall be reduced.**

# Progress of Energy Conservation in Thailand (2)

## 2 Schemes

2-1 Energy Conservation Center of Thailand (ECCT) was established in 1985.

2-2 Energy Conservation and Promotion Act E.E 2535 was enacted in 1992.

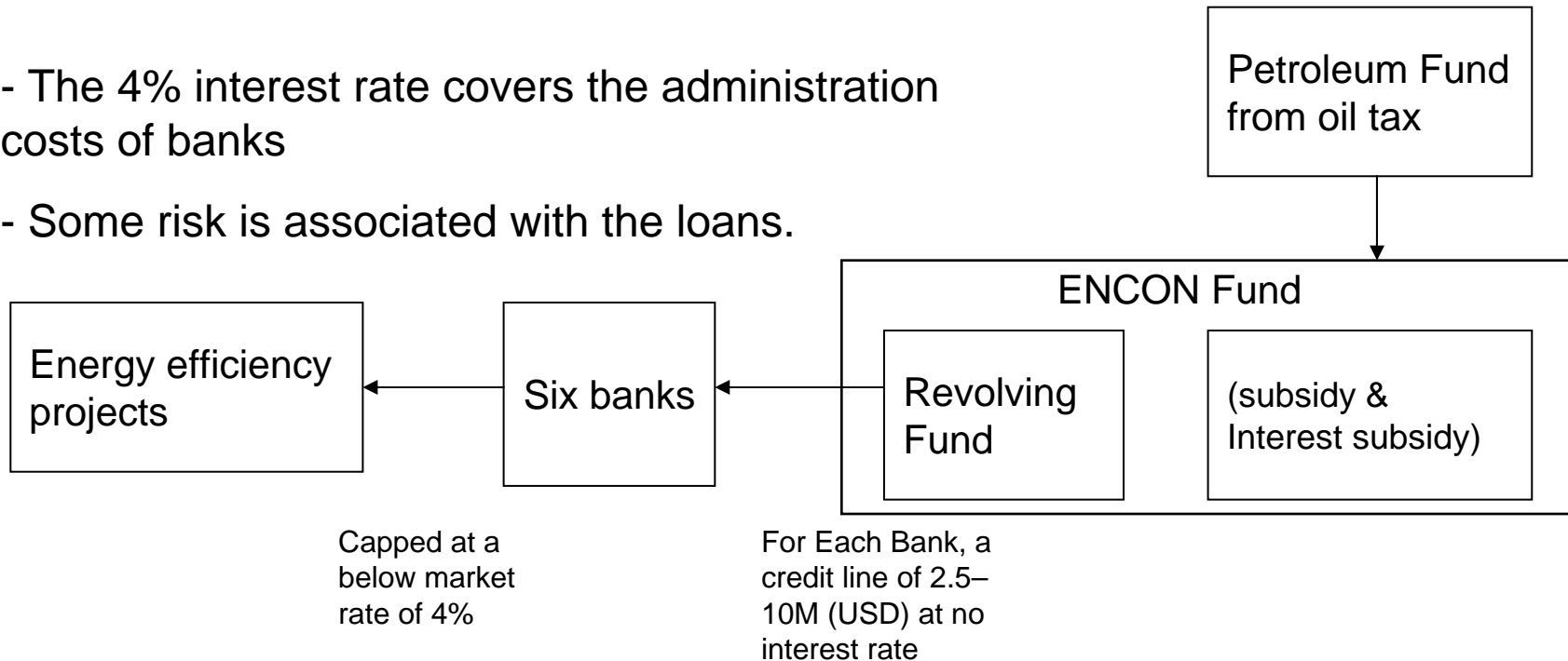
Chapter	Title	Description
1	Energy management in designated factories, and appointment of energy manager	-Submission of periodical report and mid-term plan -Energy manager can be accredited after graduation of advanced training course with 3 year working experience, or bachelors degree.
2	Same as above for designated buildings	ditto
3	Promotion of EC Products and equipment	Designation of EC equipment and supportive measures
4	ENCON Fund	Financial support and subsidy program for implementation of EC measures

## ENCON Fund

Thailand:(Energy Efficiency Revolving Funds)

(1st Phase):2003~2006

- The 4% interest rate covers the administration costs of banks
- Some risk is associated with the loans.



(2nd Phase):2006~

A low interest rate of 0.5 percent is to be charged to the banks instead of no interest rate.

## **Progress of Energy Conservation in Thailand (3)**

### **2-3 DSM Pilot Project by EGAT (Electricity Generating Authority of Thailand)**

- (1) Energy Label Products**
- (2) Peak Cut Project**
- (3) Energy Conservation Consultant Program**
- (4) ESCO Pilot Project**

### **2-4 A compulsory program for large energy users' designated facilities\* must**

- (1) Appoint an energy manager**
- (2) Collected and submit energy data**
- (3) Conduct energy efficiency audits**
- (4) Develop energy use reduction targets**
- (5) Develop and submit plans for energy efficiency improvements**

**\* Designed facilities are companies with over 1MW peak energy demand or which consume more than 20TJ of energy annually.**

## Progress of Energy Conservation in Thailand (4)

**Government policy and regulations in combination with EGAT DSM Project lead the success of energy conservation in general.**

**–JICA/ECCJ contributed to “The Project on the Practical Energy Management Training Center”.**

## Energy Conservation Laws in Asia(1)

	The Philippines	Malaysia	Indonesia	Thailand	Vietnam	China	India
Energy Conservation Law	“House Bill No. 4839. An Act Institutionalizing Energy Conservation” yet to be in effect	Energy Efficiency Regulation on Electricity is in the process.	Energy Law (Preparation for draft since 1999)	Energy Conservation Promotion Act (1992)	Energy Conservation Decree is in effective (2003/09)	Energy Conservation Law(1998)	Energy Conservation Law (2002/3)
Presidential Decree	<input type="checkbox"/> E0123 (1993) “Institutionalizes the Committee on Power Conservation” <input type="checkbox"/> E0472 (1998) “Fuel Conservation and Efficiency in Road Transport”		<input type="checkbox"/> Presidential Regulation No. 5 / 2006 Energy elasticity <1 by 2025 <input type="checkbox"/> Presidential Instruction No. 10 / 2005 Instruction on Central and Regional Government on EE&C				
Ministerial Decree	<input type="checkbox"/> A0110 (2004) Institutionalization of a Government Energy Management Program <input type="checkbox"/> A0126 (2005) Enhanced Implementation of the Government’s Energy Conservation Program <input type="checkbox"/> A02013 (2004) “Adoption of Austerity Measures in Government” <input type="checkbox"/> A0183(2005) “Lighting System in the Government Facilities” <input type="checkbox"/> DTI: Department Order No39 <input type="checkbox"/> DOE ; Memorandum Circular No 93-03-05: Energy Conservation Monitoring		<input type="checkbox"/> Ministerial Regulation No. 0031 / 2005 Procedure of EE&C in government offices, etc.  <input type="checkbox"/> Ministerial Regulation No. 100.k / 48 / M.PE / 1995 Obligations for energy users		MOI Circular (Guideline) 2004/07		
Energy conservation	NEECP(2004)	MIEEIP 1999 ~ 2006 (UN/GEF)	<input type="checkbox"/> Green Energy Policy 1) Conservation Program 2)Public Awareness Creation 3)Education and Training 4)DSM Activities 5)Standardization 6)Energy Efficiency Labeling 7)Partnership Program		Vietnam Energy Conservation Program (VECP) (2006/04 Authorized)	Long-term Energy Conservation Plan(2004/11) 11 <sup>th</sup> 5year Plan (2006-2010) 10 Energy Conservation programs at national level	
Inter-governmental Organization for EE&C		Energy Commission (EC) PTM, CE TREE	BAKOREN organize Energy Resource Committee				<input type="checkbox"/> Bureau of Energy Efficiency <input type="checkbox"/> State Designed Agency plus ESCO

Note1: Administrative Order, RA: Republic Act, EO: Executive Order, EE&C (Energy Efficiency and Conservation)

Note2: In the Philippines, hierarchy of laws are RA→EO→AO→DOE Circular

Source: Various sources made by the author

# **Lessons Learned from Energy Conservation Laws in Asia**

**□ India, China, Vietnam and Thailand have the energy conservation laws.**

**□ Even in the country where law has not been enacted yet (ex. Malaysia, Indonesia), the inter-government committee has been organized.**

# Energy Conservation Measures in Asia (1)

## 1. Energy Conservation Center

An Energy Conservation Center was established in Malaysia, Thailand, and Vietnam.

	The Philippines	Malaysia	Indonesia	Thailand	Vietnam
Energy Conservation Center		PTM		Energy Conservation Center of Thailand (ECCT)	Energy Efficiency & Conservation Office (ECCO)

# Energy Conservation Measures in Asia (2)

## 2. Financial Incentives

In Thailand, comprehensive financial incentives are provided.

	The Philippines	Malaysia	Indonesia	Thailand	Vietnam
Energy Conservation Fund		Green Energy Business Fund		Energy Conservation Fund (ENCON)	
Subsidy	TTEM-DLF funded by USAID *			ENCON	
Interests subsidy or Low interest loans	Existed in the past	Malaysia Development Bank SME Bank	PT PNM (National Investment Productivity) to SME	ENCON	

Note: \*TTEM-DLF (Technology Transfer for Energy Management Demonstration Loan Fund)

Source: Various sources made by the author

# Energy Conservation Measures in Asia (3)

## 3. Utility companies

DSM Measures have been implemented in public utilities in Indonesia, Thailand, and Vietnam

	The Philippines	Malaysia	Indonesia	Thailand	Vietnam
DSM	1996 Regulation framework 2001 Amendment by ERC		PLN Energy-Intensive Industries (Steel, Cement, Textiles)	EGAT supported by WB/GEF	(The WB/GEF sponsored) Vietnam Efficiency Project
CFL	PELMATP and individual activities by the users		PLN	EGAT	EVN

# Energy Conservation Measures in Asia (4)

## 4. Energy management system

Energy management guidelines, Labeling, and Energy Audits have been done in the respective countries.

	The Philippines	Malaysia	Indonesia	Thailand	Vietnam
Energy Management Guidelines	Government Energy Management Program (GEMP)	MIEEIP Program	MEMR	PRE (Person Responsible for Energy)	
Energy Audit	DOE, DOST, ENPAP etc	Energy Audit Program under MIEEIP	KONEBA, registered companies	Training of PRE	
Labeling	Labels for window type air-conditioner, refrigerator freezer, and CFL		Labeling on electric appliances by Product Certificate Institution	Labeling of consumer products	EE standard labeling accreditation

# Table Benchmark Figures of Energy Conservation & ESCO in Asia

	Population	ESCO Market (2004)	ESCO Association	Electricity Rate 電料	Energy Conservation Laws	Laws relating ESCO	Training	Loan Guarantee	ESCO Market	Main Responsible Agency	International; Institution Involved	CDM
Unit	(Millions)	(Million USD)	-	US cents/kWh	-	-	-	-	-	-	-	-
Japan	120	27-36	○	16.4	○	◎	◎	×	○	-	-	-
China	1,300	18	○	9.1	○	△	△	○	○	NDRC	GEF/WB	◎
India	1,100	Few	○	10.0	○	○	○	×	○	FICCI, BEE or PCRA	USAID, GEF/WB	◎
Thailand	60	2	×	8.2 or above	○	◎	○	Under preparation	○	DEDE	GEF	△
Philippines	90	0	○	18.2 or above	×	×	△	×	×	DOE	-	○
Malaysia	30	2 (Biomass)	○	5.8 ~ 6.4	×	△	△	×	×	PTM	GEF	○
Sri Lanka	20	Few	×	14.5 or above	×	△	△	○	○	ECF	UNDP/WB/JBIC	○
Kenya	30	0	×	6.4(1999) or above	×	○	○	×	×	MTI	GEF/UNDP	△
Cambodia	13	0	×	16.4 or above	×	△	△	×	×	MIME	JETRO	○

Note 1: Training of EESC ◎Frequent, ○Existing, △Few

Note 2: NBRC ( National Development and Reform Commission )

Note 3: 1USD=110yen

Source: JICA / J-Power (2006)

# 3. Lessons Learned from Other Asian Countries' Experiences

## Key Lessons from Experiences of other Asian Countries (1)

- ***Enactment of Energy Conservation Law (or Act) is one of the most essential elements required for the effective promotion of energy conservation***
  - Without clear enforcement from government, other supportive measures face difficulties in realization.
- ***Energy Conservation Fund is the vehicle for facilitating other financial incentives***
  - For example: in Thailand, the ENCON Fund has played an important role in providing interest subsidies.
- ***Bench mark on energy efficiency by sectors, and by industries should be collected for analysis. (ex., Malaysia-MIEEIP)***
  - Energy data should be collected and submitted by the government.

## Key Lessons from Experiences of other Asian Countries (2)

- ***Eventually, EC (Energy Conservation) will be promoted by private companies and general consumers.***
  - Awareness and cultural background to accept EC shall be raised. (Ex., Thailand)
  - Support for initial investment for EC will facilitate and motivate private companies and general consumers (especially in developing countries) to introduce energy-efficient equipment.
  - Revolving funds (Ex., Thailand) is worth considering.
- *Other*
  - Adopt low carbon technologies
  - Capacity building

Thank you