Policy and regulation for energy demand management: Experience from East-Asian countries

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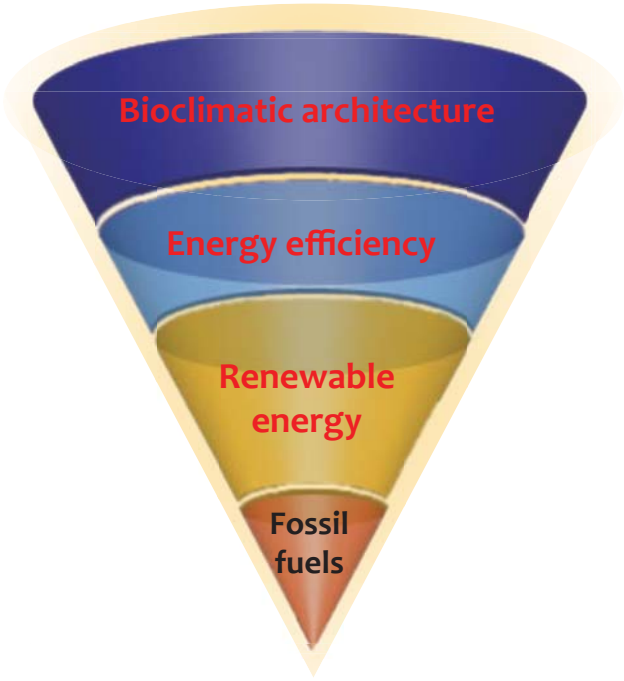
Path to energy sustainability

	1 Energy sufficiency	2 Energy efficiency	3 Renewable energy
Energy strategy			
Policy instrument			
Policy measure			

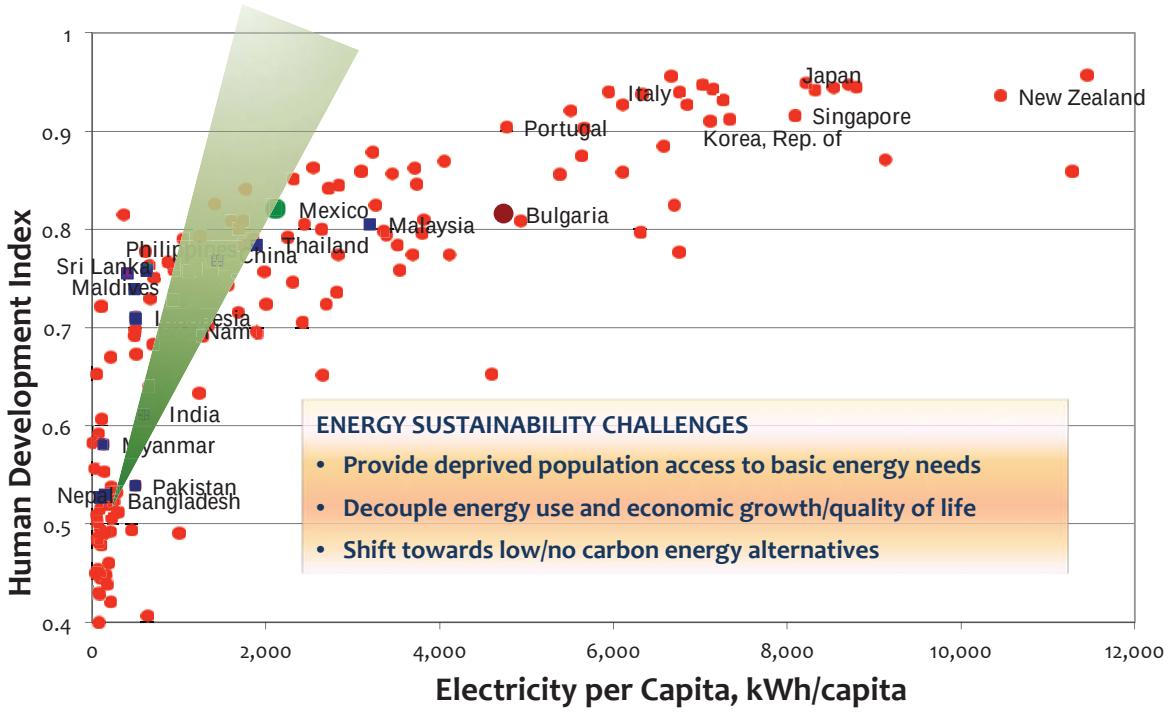
Example of the building sector

	1 Energy sufficiency	2 Energy efficiency	3 Renewable energy
Energy strategy	Reduce energy needs	Reduce energy consumption	Supply with renewable energy
Policy instrument	Land use policy Building energy codes	Building energy policy Standards & Labeling policy	Land use policy Building energy codes S&L policy for equipment
Policy measure	Bioclimatic design principles Use of passive solutions	Mandatory S&L for: • Overall building performance • Building elements & equipment	Mandatory share of supply from renewable energy sources Mandatory S&L for equipment

Adopting sustainable energy strategy in practice



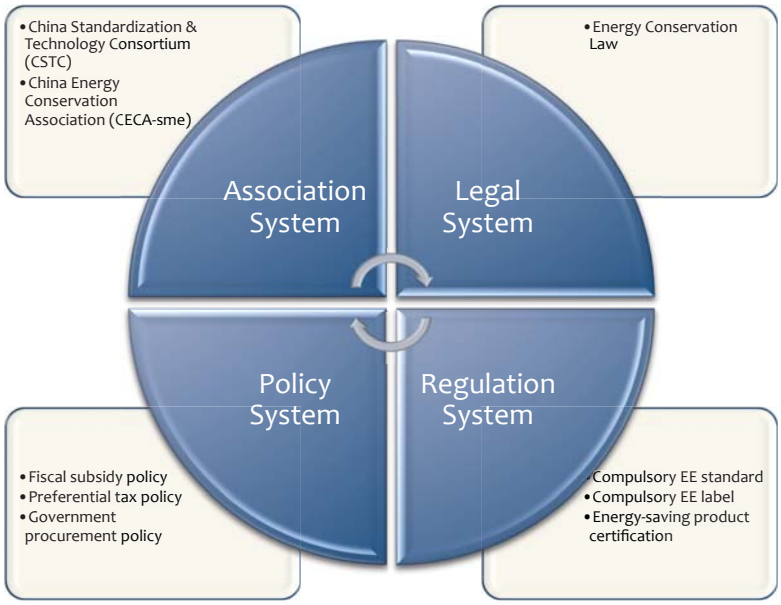
Challenges for Asian developing countries



Sharing experience of selected East-Asian countries

- **Countries covered**

China's energy efficiency system



China's energy saving policy

- **The State Council promulgated the Circular of the State Council on 31 August 2011:**
  - **12th 5-year Comprehensive Energy Conservation and Emissions Reduction Work Plan**
  - **50 specific requirements and 12 aspects, including the overall requirements for energy conservation and emissions reduction**

Sectoral energy efficiency initiatives

- **Residential sector**
  - Building energy conservation
    - Energy conservation in new buildings
    - Energy-saving renovation and RE use in buildings
  - Building codes aimed at up to 65% reduction in consumption
  - Mandatory standards and labels for appliances, lighting products, etc.
  - Green lighting initiatives
  - Subsidies for high efficiency appliances

Sectoral energy efficiency initiatives

- **Industry sector**
  - Export taxes for energy intensive products (up to 15%)
  - Central government initiatives
    - Top 1000-Enterprises program (2006): 38.7 Mtce saved
    - EE performance evaluation (from 2008)
    - Elimination of financial incentives for energy-intensive industries
    - Closure of highly polluting industries
    - Subsidies and grants for EE related projects
    - Stronger regulatory infrastructure
  - Industrial EE standards, benchmarking, energy management system and capacity building
  - Green securities policy to regulate capital-raising of energy-intensive companies
  - Higher energy price

Sectoral energy efficiency initiatives

- **Transport sector**
  - Vehicle fuel economy standards (since 2005)
  - Vehicle excise tax rates (since 2006)
  - Subsidies for new-energy vehicles
  - "Drive one day less a month" program
  - Railway system development: growth of 100,000 km targeted by 2020
  - Mass transit system: Bus Rapid Transit (BRT)

Sectoral energy efficiency initiatives

- **Utilities**
  - Retiring 50 GW of small and inefficient power plants (coal and oil)
  - Expansion of heat supply from CHP (2006)
  - Promotion of ESCOs
  - China Utility-based EE Finance Program (CHUEE)
- **Public sector**
  - Public procurement focus on EE
  - Strong institutional support
  - Energy Conservation Law

Energy efficiency label and certification

Compulsory EE Standard (SAC/TC20)

MEPs
- Eliminate low-efficiency products
- Market surveillance

EE Grade
- Energy efficiency labeling

Evaluation of energy saving
- Government procurement of energy saving products
- Energy saving certification for products

Labeling for a wide range of appliances

- 13 • Household appliances
- 8 • Lighting devices
- 4 • Commercial appliances
- 9 • Industrial appliances
- 4 • Office and electronic appliances
- 6 • Transport vehicles

- 4,459 manufacturers and 206,412 models were registered by June 2011
- Within 6 years of implementation, total energy savings over 230 billion kWh

Japan's sectoral energy efficiency initiatives

- **Residential sector**
  - Top Runner Programme
    - EE standards for products
    - Reviewed every 2-3 years
    - 23 categories by 2009
  - EE standards for buildings and houses and annual reporting on EE measures
  - National EE labeling and Energy Star label
  - Retailed assessment system (2003)
  - Home energy management systems
  - Broad range of financial EE incentives

Sectoral energy efficiency initiatives

- **Industry sector**
  - Energy Conservation Law
    - Comprehensive regulations on designated industries
    - Financial incentives
    - Machinery standards and products labeling
  - Tax reductions and subsidies since 1970s
  - Law on Rational Use of Energy (last amended 2009)
    - Benchmarks for energy intensive industries, including energy management
  - For large industries > 500 kW:
    - Restriction on electricity (consumption 15% less compared with same period in the previous year)
    - Penalties imposed for hours during which the target is not met.

Sectoral energy efficiency initiatives

- **Transport sector**
  - Top Runner program (established in 1998)
    - Freight and passenger vehicle EE standards
  - Green taxation for vehicles (until April 2015)
  - EE regulations on carriers and consigners
  - Transportation demand management
  - Telework and modal shift

Sectoral energy efficiency initiatives

- **Utilities**
  - Low interest loan for CHP installations
  - Promotion of ESCOs
- **Public sector**
  - Nation-wide institutional system for EE
  - Green Procurement Law

Japan's target for 2030

- Doubling the energy self-sufficiency ratio (18% at present) and the self-developed fossil fuel supply ratio (26% at present)
- Raising the zero-emission power source ratio to about 70% (34% at present)
- Halving CO_2 emissions from the residential sector
- Maintaining and enhancing energy efficiency in the industrial sector at the highest level in the world
- Maintaining or obtaining top-class shares of global markets for energy-related products and systems

Specific measures to achieve the targets

- **Residential sector (i.e. households and offices)**
  - Net-zero-energy houses by 2030
  - Setting compulsory energy-saving standards for houses
  - Highly efficient water heaters (80-90%) for all family units in 2030
  - Replacing 100% of lights with highly-efficient lights (including LED and organic EL lighting) by 2030

Specific measures to achieve the targets

- **Commercial sectors (i.e. offices)**
  - Net-zero-energy houses in new public building by 2020 and net-zero-energy buildings in average by 2030
  - New integrated standards for energy consumption of all buildings
  - Enhancing support and regulatory measures (including top-runner standards) to diffuse
    - Energy-saving consumer electronics
    - Energy-saving information technology equipment
    - Heat pump water heaters
    - Fuel cells
    - Hybrid construction machines and
    - Other highly efficient equipment.
  - Maintaining or obtaining top-class shares of global markets for energy-related products and systems.

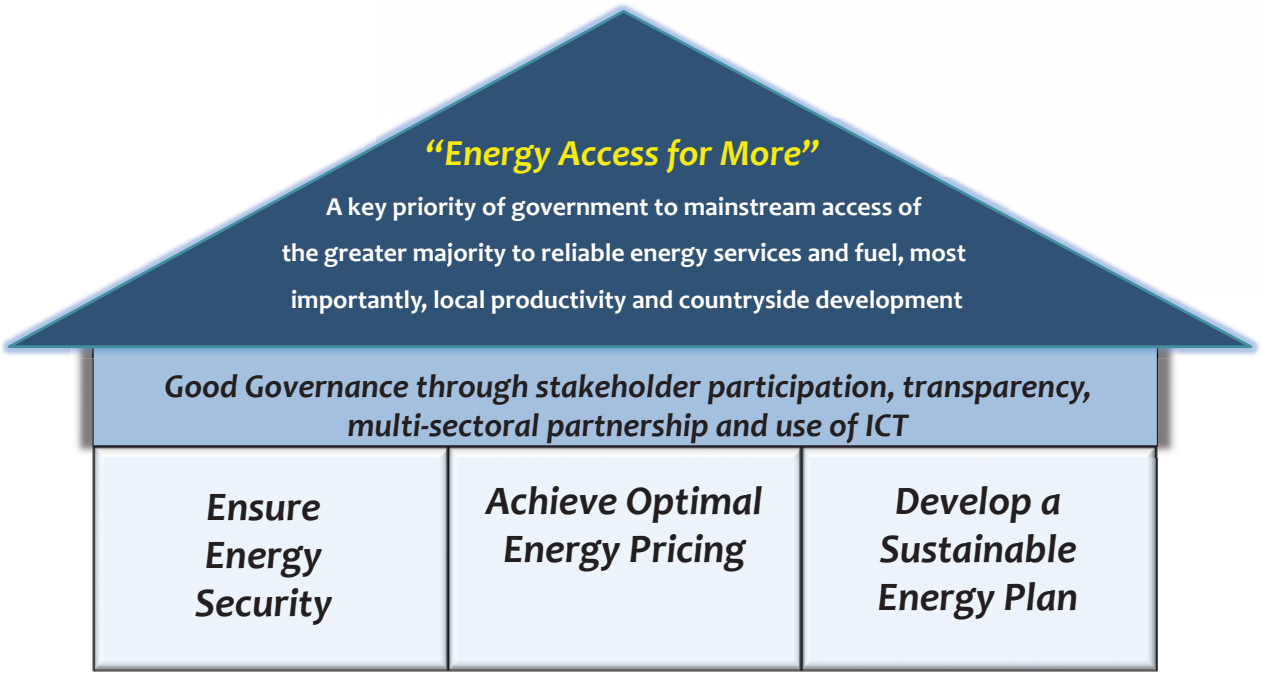
Specific measures to achieve the targets

- **Building next generation energy and social systems**
  - Realizing the smart grid and smart communities by
    - Promoting an intensive cross-sectional mobilization of relevant policies
    - Consideration of special zones
    - Demonstration projects both home and abroad, and
    - Strategic international standardization.
  - Promoting the development, installation of smart meters and relevant energy management systems as early as in the 2020s
  - Diffusing fixed fuel cells and developing a hydrogen supply infrastructure, including hydrogen stations for fuel cell vehicle.

Specific measures to achieve the targets

- **Development and dissemination of innovative energy technologies**
  - Drafting a new energy innovation technology roadmap to accelerate the development of innovative energy technologies
  - Developing public-private cooperation arrangements for supporting international diffusion of highly efficient and low carbon technologies
  - Building a new mechanism to appropriately evaluate how Japan's international diffusion of its technologies, products and infrastructure contributes to reducing global greenhouse gas emissions

Philippine's energy reform agenda



Policy thrust to ensure energy security

- Supply side
  - Accelerate the exploration and development of indigenous oil, gas and coal resoures
  - Intensify development and utilization of renewable and environment-friendly energy sources/technologies
- Demand side
  - Enhance energy efficiency and conservation

Energy Efficiency and Conservation Action Plan Target (2009-2030)

- **Energy savings equivalent to 10% of the annual final energy demand outlook from 2009-2030**

Energy conservation action plan

- **Policy Formulation and Development for Energy Efficiency and Conservation**
  - Advocate the passage of Enercon Bill into Law
  - Amend DOE Cir. 03-93-05
  - Accreditation of Energy Managers and Energy Auditors

Overall Objective

Make energy efficiency & Conservation a way of life !

ec way of life
energy conservation

Seminar for government employees

National EE & conservation program

- Information, Education and Communication
- Standards and Labeling for Household Appliances
- Fuel Economy Run
- Government Energy Management Program
- Energy Management Services / Energy Audit
- Recognition Award
- Voluntary Agreement Program
- Philippine Energy Efficiency Project

Information, education & communication

- Power conservation and demand management
  - Institutionalize the conservation of electricity in the Commercial, Industrial and Household sectors

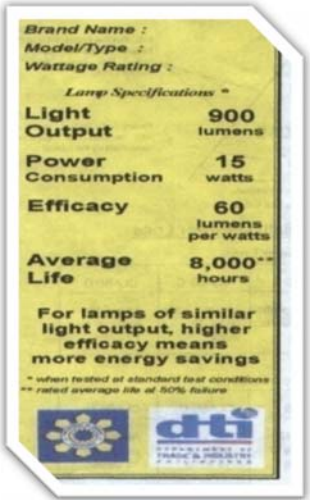
- Fuel conservation & efficiency in road transport
  - Institutionalize the conservation of transport fuel in the Road Transport sector

E-Jeep

E-Trike

Standards and labeling of appliances

- Room Air-conditioner
- Refrigerator and Freezer
- Incandescent/Fluorescent Lamp (including CFL)
- Ballast



Government energy management program

- Spot Check and Posting of Grades in Government Building in compliance with Presidential directives (AO 103) which states that
  - All Government buildings have to reduce electricity and fuel consumption by 10% starting September 2005.

Voluntary agreements

- Partnership with the business sector
  - Disseminate EE&C applicable technologies, programs and measures
  - Conduct in-house seminars and energy audit service;
  - Recognize energy efficient establishment

- Vehicle use reduction program
  - Encourages vehicle owner to use public transport
  - Car less day
  - Car pooling

Philippines Energy Efficiency Project (PEEP)

- **Reduce cost** of power production by reducing peak demand (through energy efficiency)
- **Reduce GHG** emissions

PROJECT Cost: $46.5 million

- **ADB Loan – $31.0 million**
- **ADB Grant – $ 1.5 million**
- **Government – $14.0 million**

Component 1:

Efficient Lighting Initiative
- Retrofit Government Office Building
- National Residential Lighting Program
- Public Lighting Retrofit Program
- Energy Efficiency Testing and Lamp Waste Management

Component 2:

Efficiency Initiatives in Buildings and Industries
- **Super ESCO**
- **Efficient Building Initiative**

Component 3:

Communication and Social Mobilization
- **Communication for Efficient Lighting**
- **Promoting Efficiency in Everyday Life**

Component 4:

Project Implementation Support

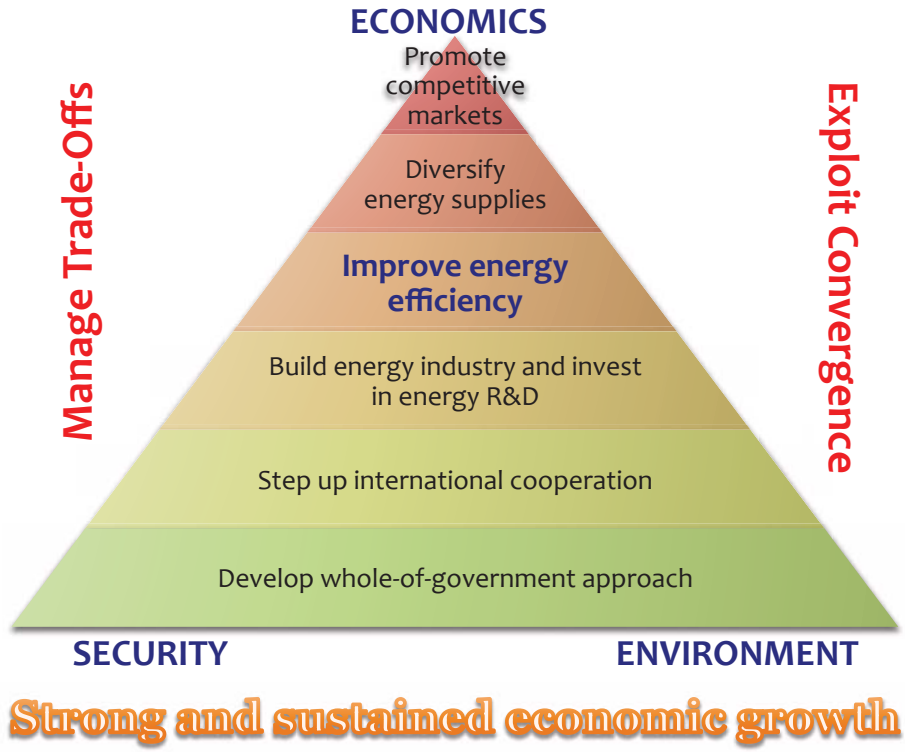
Philippines Energy Efficiency Project (PEEP)

- **Key project target outputs**
  - Retrofit of lighting systems in 42 government buildings
  - Nationwide distribution of 13 million CFLs
  - Retrofit of public lighting systems
  - Rating scheme for green buildings
  - Installation of energy efficiency testing and lamp waste recycling facilities
  - Establishment of super energy efficiency service companies
  - Communication and social mobilization programs
- **Project quantification**
  - Reduce peak demand by about 450 MW
  - Defer power generation investment of $450 million
  - Reduce oil imports by about $120 million per year
  - Generate revenue through CDM (350 ktons reduced CO_2)

Legal and regulatory framework (plans)

1. Energy Conservation Bill	Re-submit the bill to Congress
2. "Energy Conserving Design Guidelines for Buildings and Utility System"	For promotion to City Building Officials, Architectural Associations
3. New DOE Memorandum Circular to supersede DOE MC 93-03-05 to enhance monitoring & compliance of the building sector and industry	For drafting; to include provision for the Accreditation of Energy Manager by DOE.
4. Policy framework for Demand Side Management (DSM)	For review and recommendation to electric utilities
5. Energy Management Standard (EMS) based on ISO Framework	To standardize EMS in the Corporate Management System [DOE/DTI-BPS/UNIDO project

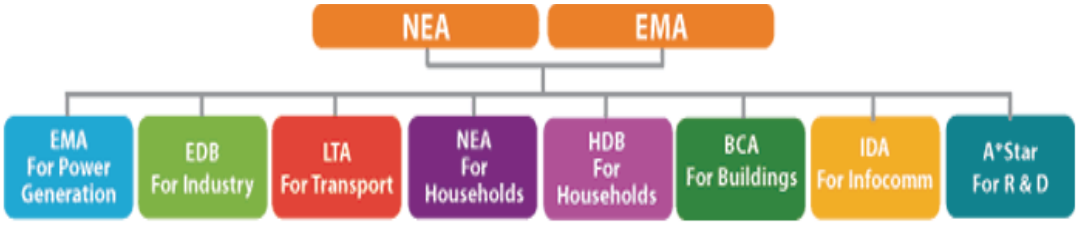
Singapore's energy policy



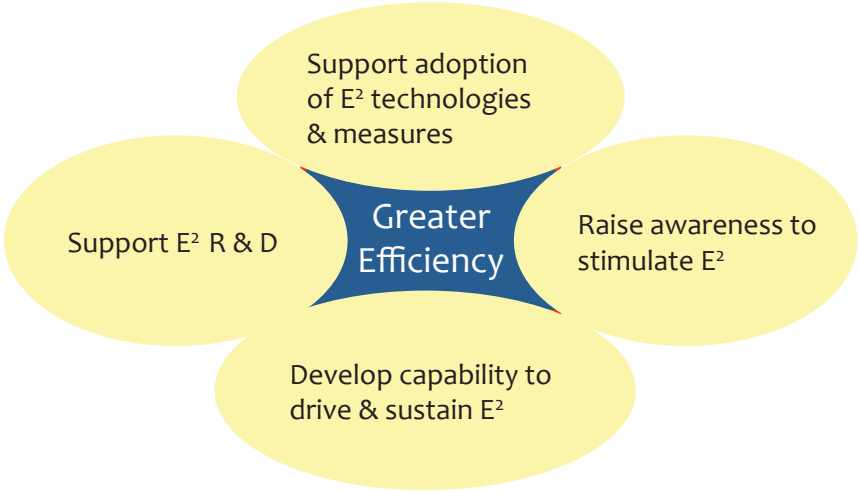
Singapore's Energy Conservation Act

- An Energy Conservation Act (ECA) will be introduced by 2013;
- Existing energy conservation legislation currently found in various other Acts such as the Environmental Protection and Management Act will be consolidated under the ECA;
- Among others, new legislation to introduce energy management practices in facilities that consume >15 GWh of energy per annum will be introduced :
  - Appointment of Energy Managers
  - Development of energy efficiency plans
  - Reporting of energy consumption annually

Energy Efficiency Programme Office (E^2PO)



Member agencies implement EE initiatives in their respective energy sector for the following:

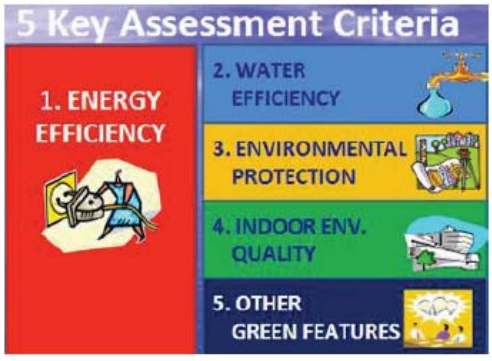


Green Mark (Building & Construction Authority)

- A green building rating system launched in 2005 to evaluate building performance and its environmental impact
  - Target: to green 80% of all buildings by 2030
  - Current challenge: green existing stock of buildings

BCA GREEN MARK

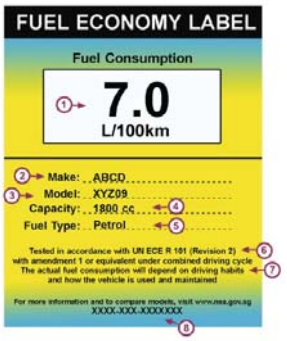
- Energy efficiency accounts for 50% of the GM rating system



Green Mark	Try Again	Certified	Gold	Gold Plus	Platinum
Score	0-49	50-74	75-84	85-89	90-100

Transport energy efficiency initiatives

- Some of the existing initiatives include;
  - Fuel Economy labels;
  - Green vehicle rebates;
  - Green rail transit system;
  - LED for traffic lights;
  - Efficient public transport (integration of bus-rail systems, diesel-hybrid buses, etc)



- New electric vehicle test-bedding programme
  - To examine infrastructure requirements and new business models arising from EVs, and
  - To identify industry development and R&D opportunities.

Intelligent energy system (IES)

- Singapore has a high-quality power system but there is still scope to leverage on new technologies to develop a 'smarter grid'
- IES pilot project to test a range of smart grid technologies (e.g. smart meters) to enhance the power grid capabilities
- IES pilot project, to be implemented in phases at multiple sites, seeks to develop and test:
  - Advanced metering (smart meters) & ICT infrastructure ;
  - Demand response management Systems; &
  - Enable integration & management of distributed energy sources (DER) such as solar PV, mini-cogen plants, EVs charging stations, etc.

South Korea's green growth strategy

Vision	**A Model Green Country** - creating virtuous harmony between environment & economy		
Objectives	**Low Carbon Society And Energy Security**	**New Engine for Growth**	**Enhanced Quality of Life & Int'l Leadership**
10 Key Agenda	• Build Low Carbon Society • Greater Energy Security • Address Climate Change	• R&D for Green Tech. • Foster Green Industry • Green the Industry • Lay the Foundation for Green Economy	• Green Transportation & Land Management • Green Life-style • International leadership

▪ National green growth strategy and 5-year action plan

✓ **Investment plan for green growth('09~'13): 86 billion USD (2% of GDP)**

✓ **Induce production values to 165 billion USD and create more than 1.5 million new jobs**

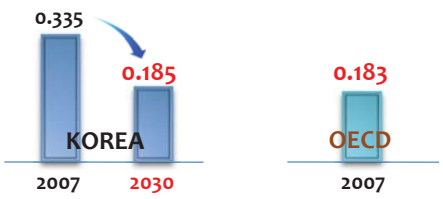
Long-term green energy policy

* Excerpt from the National Energy Basic Plan

Low Energy Consumption and Low Carbon Society

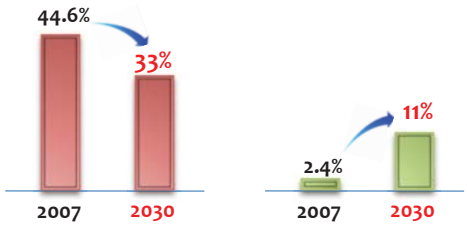
▪ Reduce energy intensity in Korean economy drastically (46% reduction by 2030)

Energy Intensity (Unit : toe/1,000$)



Fossil Fuel-free Society

▪ Deviate from the fossil fuel dependent energy system



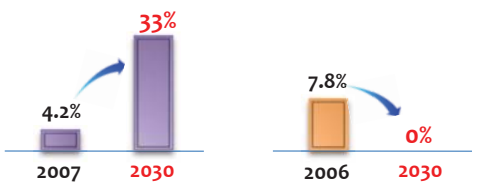
Industrialization for Green Energy

▪ Secure world's best energy technology by 2030

▪ Promoting green energy industry by developing advanced technologies

Competitiveness of core energy technology :
60% → **World Best**

Energy Independence and Energy Welfare



Sectoral energy efficiency programs

Industry

- **Energy and GHG Target Setting (ETS) negotiation for heavy energy consuming companies**
- **Mandatory Energy Audit for heavy energy consuming workplaces** (since Jan. 2007)
- **Investment in energy efficient facilities through Soft Loans or ESCOs**

Transport

- **Average Fuel Economy for the newly produced passenger cars** (since Jan. 2006)
- **Fuel Economy and Grade Labeling for passenger cars, micro buses and small trucks**
- **Incentives for light duty vehicle or hybrid cars** (tax reduction, discounted parking rates, etc.)

Building

- **Building Energy Efficiency Certification for newly constructed apartments**
- **Diffusion of small scale CHP and District Heating** (community energy systems)
- **LED Lighting 15/30 Project: replacing 30% of lighting devices with LED by 2015**

Appliances

- **Energy Labels and Standards including MEPS(Minimum Performance Standards)**
  - ✓ High Efficiency Equipment Certification, Energy Efficiency Labels(1-5 grade), e-Standby
- **Rebates and Incentives to phase in high efficiency products**

Energy standards and labeling program

Energy Efficiency Label and Standard Program (including MEPS)

- Mandatory (since 1992)
- MEPS & 5-grade labeling
- Refrigerators, Automobiles, etc. (24 items)

Programs for Standby power

Energy Standards & Labeling

High-efficiency Appliance Certification Program

- Voluntary (since 1996)
- LED traffic lights, Pumps, etc. (41 items)

e-Standby Program

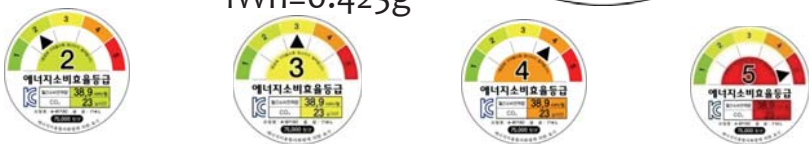
- Voluntary (since 1999)
- Mandatory (from 2009)
- TVs, STBs (20 items)

Energy standards and labeling program

Evolution of the label:

- annual energy expenses and hourly CO_2 emissions

1Wh=0.425g



3 phase electric motors
(only MEPS)

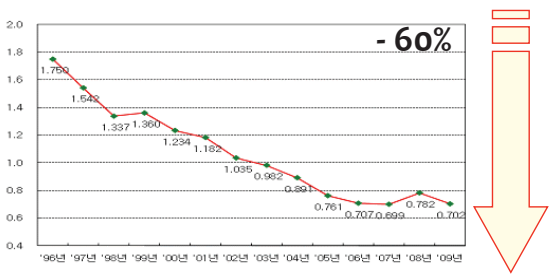
Refrigerators, freezers, kimchi refrigerators, air conditioners, washing machines, drum washing machines, dish washers, dish driers, coolers, rice cookers, vacuum cleaner, electric fans, air cleaners, incandescent lamps, fluorescent lamps, CFLs, Automobiles

Energy standards and labeling program

• Performance improvement over time

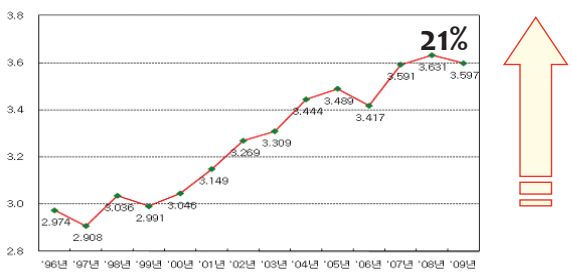
Power consumption is reduced 60%

- kWh/L per year : 1.750 (1996) – 0.702 (2009)



Energy efficiency ratio go up 21%

- EER : 2.974 (1996) – 3.631 (2009)



Thailand's energy policy

Thailand's Energy Conservation Promotion Act

- ECP Act was enacted in 1992.
- Revised ECP Act 2007 became effective from June 2008.

Main components

- Appointment of Energy manager (PRE)
- Implementing Energy Management System
- Annual submission of EM report
- Monitoring and Evaluating for better improvements
- Enforcing on large energy consuming buildings and factories (over 1 MW peak)

Results 2003 - 2008

- **Overall compliance rate of 84%**
- **1,964 Designated Buildings**
  - PRE appointed 93%
  - EC Report 92%
  - T&P submitted 82%

  3,313 Designated Factories
  - PRE appointed 86%
  - EC Report 83%
  - T&P submitted 69%

Plan in Progress

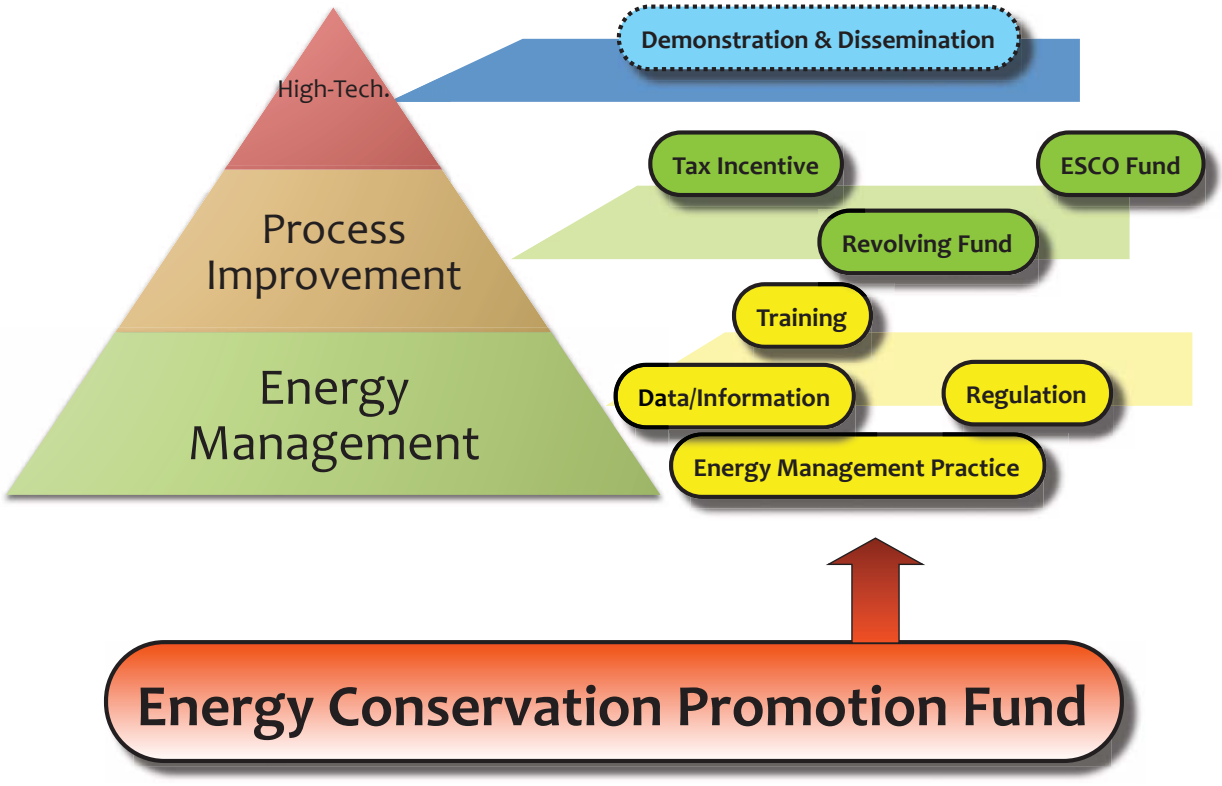
- **Modify the law**
  - Use different measures/criteria for public / private buildings
  - Issue Energy Management Standards
  - Issue new building codes for each type of buildings (Hotel, Office, Hospital, Department store)

Energy Saving Potential 261 ktoe/year

Thailand's Energy Conservation Promotion Fund

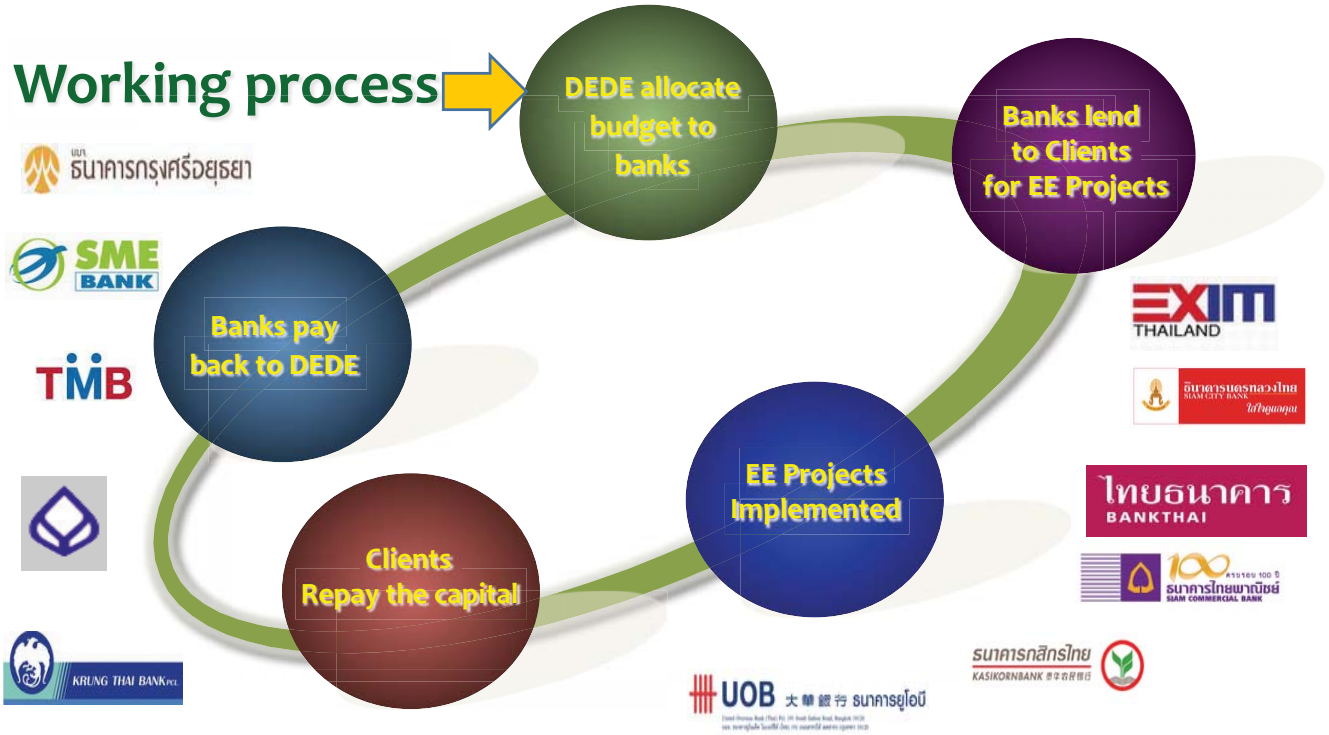
- **Objective and source of the fund**
  - Collect a small levy (**0.04 – 0.25 baht per liter**) from the sale of gasoline, diesel, fuel oil, and kerosene
  - Annual Revenue around **2 – 5 billion baht**
  - Supervised by Energy Conservation Promotion Fund committee – *Chaired by Deputy Prime Minister*
  - For energy conservation promotion including research, study, development, demonstration, incentives (grants/soft loan), capacity building, and policy study

Promotion of energy efficiency in industry



Revolving fund for energy saving projects

Working process



Revolving Fund (RF) for energy saving projects

Size of Revolving Fund	2 billion Baht (62.5 million USD) each for phases 1&2, and 4 billion Baht (125 million USD) for phase 3
Loan Period	7 years maximum
Eligible Borrowers	Facilities' Owners, ESCOs and Project Developers
Eligible Projects	EE improvement or RE development and Utilization
Loan Size from RF	Up to 50 million Baht (1.56 million USD) / project
Interests charged to customers	Not more than 4% (negotiable)
Interests charged to banks	Phase 1: 0%; Phases 2 & 3: 0.5%

Revolving Fund (RF) for energy saving projects

- **Eligible Investment costs**
  - **Equipment and Installation costs**
  - **Consulting Costs – design, control, supervision, guarantee fees**
  - **Civil works, piping, or necessary components specifically and necessary for the project**
  - **Associated Costs necessary – removal of existing equipment, transportation, taxes, VATs**

Not Eligible: Land Costs, Land Improvement Costs, building construction, Costs not specifically needed for the project – main transformers, substation

Revolving Fund (RF) for energy saving projects

Description

Low interest loan for Energy Efficiency via financial institutes

- Less than 4% interest
- Loan period of 7 years with one year grace period
- Up to 50 million baht (1.3 million USD)

Results 2002-2008

- Support over **240 EE/RE** projects
- Total investment around **500 million USD** – from which **150 million USD** from Government's Revolving Fund
- Energy savings of **120 million USD** per year.

2009-10 & beyond

2009-2010

- Secured additional **60 million USD** of budget

Long term Plan

- Reduce DEDE's role in Funding Sources – providing more technical assistance
- More co-financing from the banks
- Training banking officers on EE technical knowledge

ESCO fund for energy saving projects

Description

Co-investment fund with private sector/investors

- Equity Investment
- Venture Capital
- Equipment Leasing
- Carbon Credit Trading
- Technical Assistance
- Credit Guarantee Facility

Results 2008

- Set up the Fund (initial budget of **15 million USD**
- Selected 2 Fund Managers
  - **Energy Conservation Foundation of Thailand**
  - **Energy for Environment Foundation**
- Approved **17 projects** for the total investment of **125 million USD**. The investment from ESCO Fund is around **8.8 million USD**, generating energy saving of around **14 million USD /year**

2009-10 & beyond

2009-2010

- Promoting and Marketing the Fund
- Support at least 20 projects
- Leverage minimum of 50 million USD
- Energy Savings of 10 million USD/year

Long term Plan

- Increase the Fund to 100 to 200 million USD
- Corporatize the program to be Investment Company
- Open for private investors

Energy efficiency training & capacity building

Curriculum

- **General courses**
  - PRE
  - Senior PRE
- **Specialized Courses**
  - Energy Management
  - Energy Audit
  - Energy Efficiency in Major Systems such as air conditioning, lighting, heating, etc.
  - Energy Efficiency in Specific groups of industries (e.g. Textile, paper, Cement, etc.
- Cooperate with Vocational Study Department to add EE study in regular curriculum

Results 2002-08

- Trained over 4,000 PREs
- Trained 250 Senior PREs
- Trained over 15,000 people in other courses
- Added 4 EE courses in vocational study
- Trained 40 college teachers to deliver EE course

Future plan

- Train over 12,000 engineers and building operators
- Over 10,000 students attend EE courses every year

Next Step

- DEDE to develop curricula and allow private sectors to deliver the courses and charge trainees
- Train 500 vocational school teachers all over the country

Collaborative efforts for energy conservation

Main components

- On-site Technical Assistance to embed Sustainable energy management system in facilities
- Establish EC Team and assess energy situation
- Identify EE opportunities
- Implement EE Projects
- M&E

Results 2002-08

- implemented in over 3,000 facilities including
  - 1250 Designated factories (Metallic, Food, Chemical, Textile)
  - 600 Designated buildings (hospitals, hotels)
- Over 1200 SMEs
- Energy savings 80 million USD/ y (housekeeping, low cost measures)

2009-10 & beyond

2009-2010

Implement in over 600 buildings and factories

- Savings of 450 million baht per year

Long term plan

- Cost Sharing between government and private sector
- Develop Energy Management Standards as Ministerial Orders

Energy efficiency information & knowledge dissemination

Various ways to provide information & consultation

- **EE Display Center**
  - Display over **54 EE technologies** for building, industry and residential sector
  - EE Demonstration houses
  - Energy Conservation building

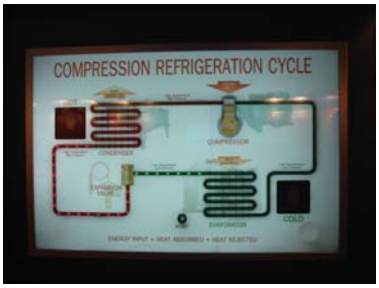
- **EE and RE Knowledge center :**
  - Center of Data and Information concerning EE and RE development
  - Compile EE/RE data for planning and evaluation
  - Disseminate information through internet web-based
    - EE Clinics
    - EE One-Stop Service
    - EE Consulting Centers and Branches

Results 2002 – 2010

- Over 20,000 people have used the services
- Completion of EE Display Center

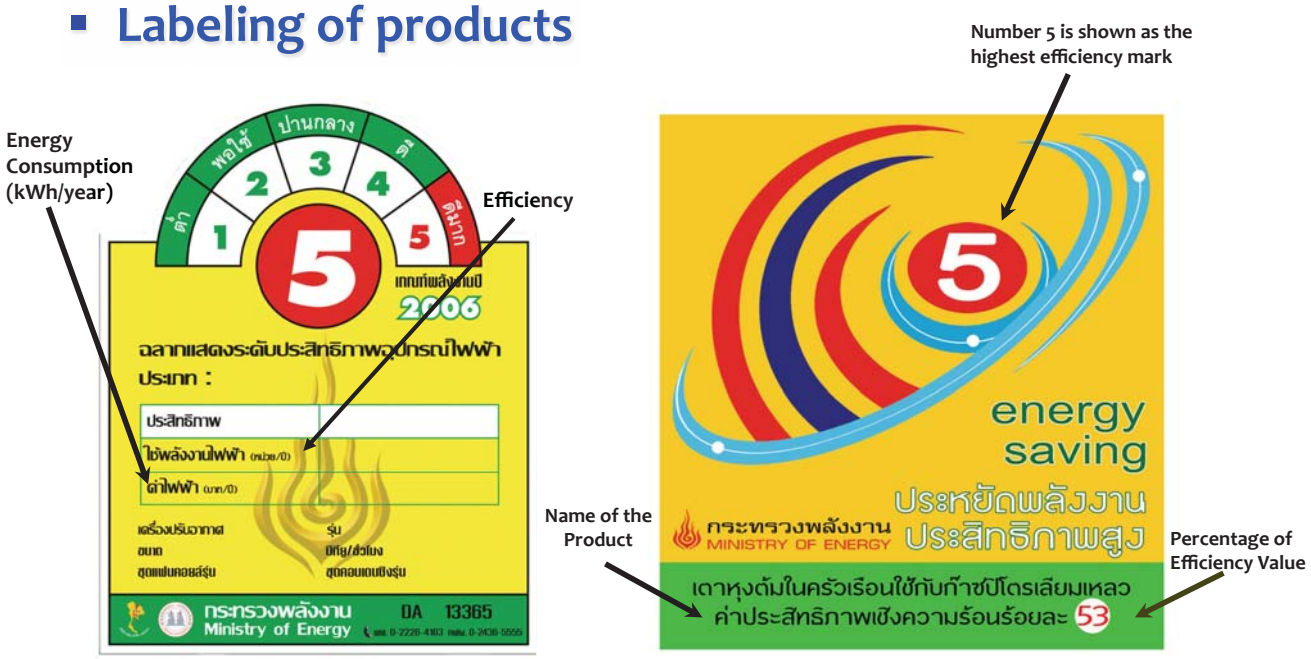
Future Plan

- Develop Thailand EE/RE Knowledge Network



Standards and labeling policy

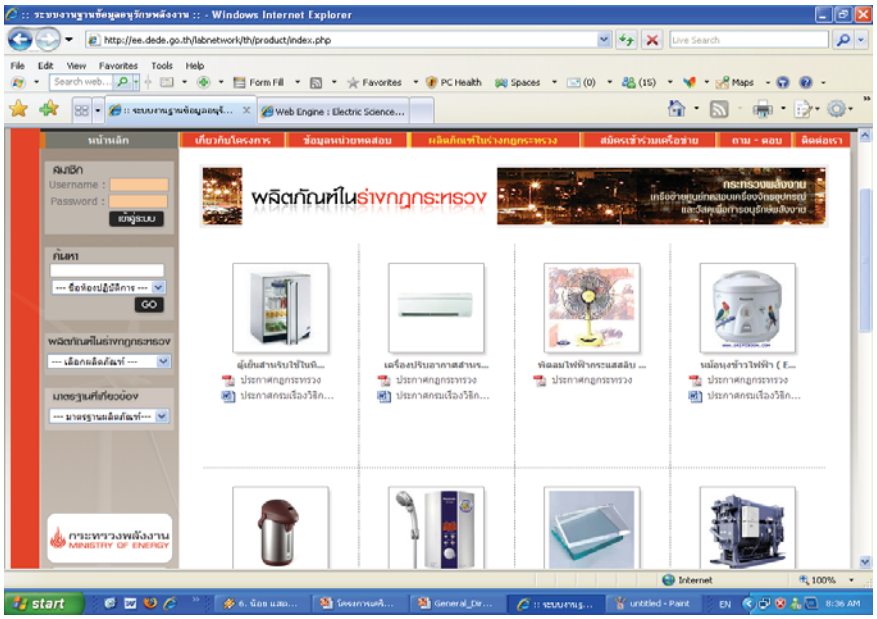
- **Labeling of products**



Electrical products

Non-electrical products

Accreditation requirements for the products



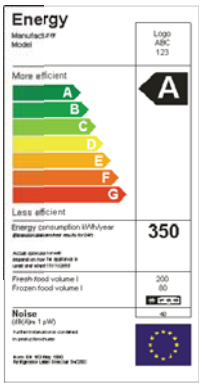
Type	Certified Laboratory	Accreditation Requirement
1	Government organization	TIS – 17025 or TISI – R – TL - 01
2	Private organization	TIS - 17025

Demand side management (DSM) program

- **DSM Program philosophy**
  - Maintain or improve customers benefit on electricity use but less consumption and/or less electricity bill
- **DSM Program objectives**
  - Educate consumers about energy conservation and create energy-saving awareness among the public.
  - Persuade local manufacturers and importers to produce and import energy efficiency appliances at affordable prices.
  - Support and pursue energy efficiency and load management technologies to ensure highest benefit for consumers and the country as a whole.
  - Help enhance capabilities for the electricity organizations and energy-related private sector to provide effective energy services to consumers nationwide.

Demand side management program

- **Implementation strategy: The "AAA" concept**
  - A1: Energy Efficient ***Appliances***
  - A2: Energy Efficient ***Architecture***
  - A3: Energy Efficient ***Attitude***



Demand side management program

- **Program implementation & achievements**

1. Putting an end to the fat tubes and helping the emergence of thin tubes

Demand side management program

- **Program implementation & achievements**

2. Driving the development of high efficiency appliances

Demand side management program

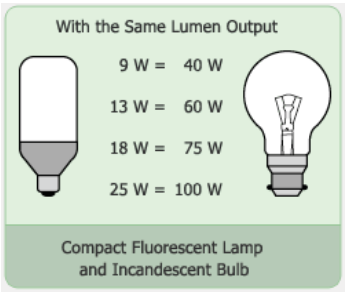
- **Program implementation & achievements**

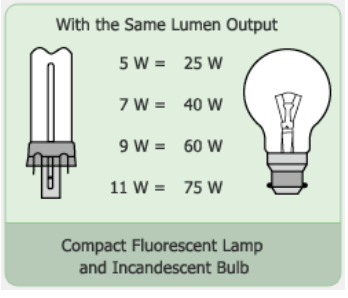
3. Introduction of load management and promoting the use of standby generators to reduce the peak load

Demand side management program

- **Program implementation & achievements**

4. Promoting the use of compact fluorescent lamps in place of incandescent lamps

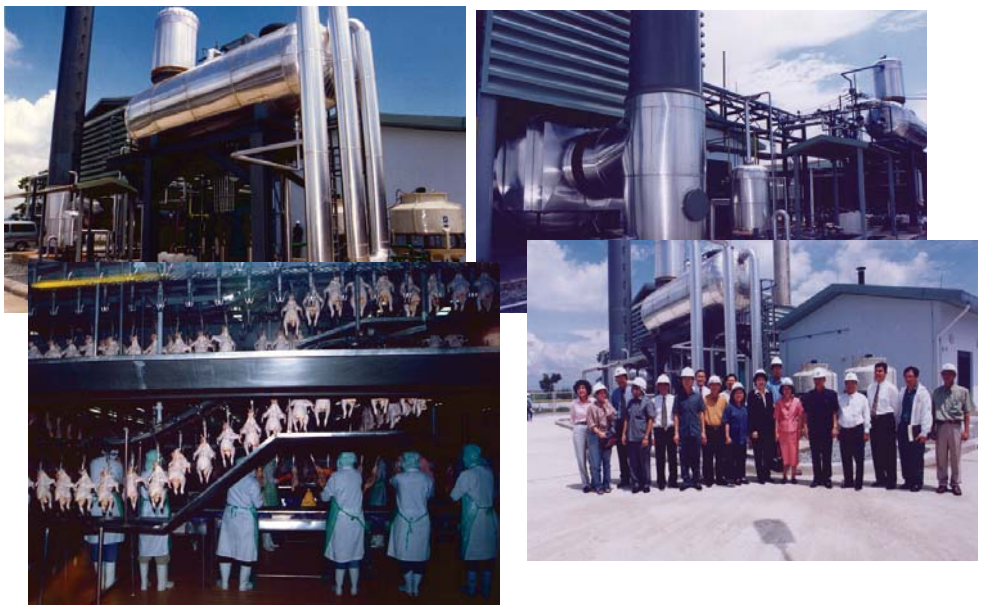




Demand side management program

- **Program implementation & achievements**

5. Undertaking ESCO pilot projects



Demand side management program

- **Program implementation & achievements**

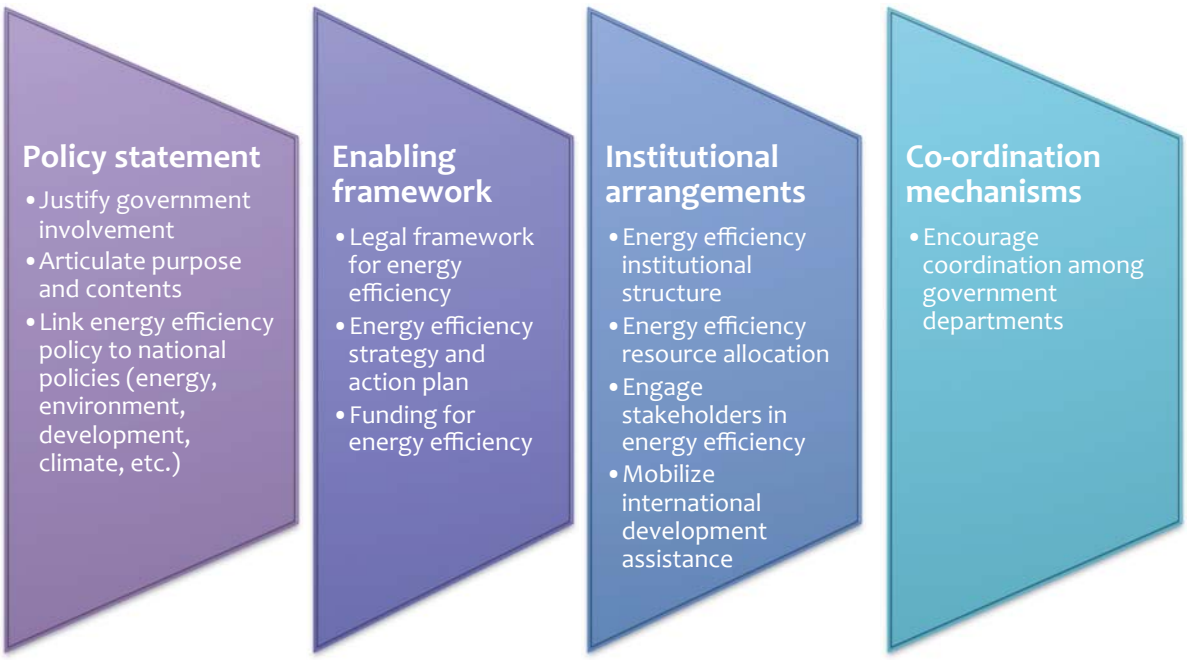
6. Inculcating energy efficiency awareness in young minds

Demand side management program

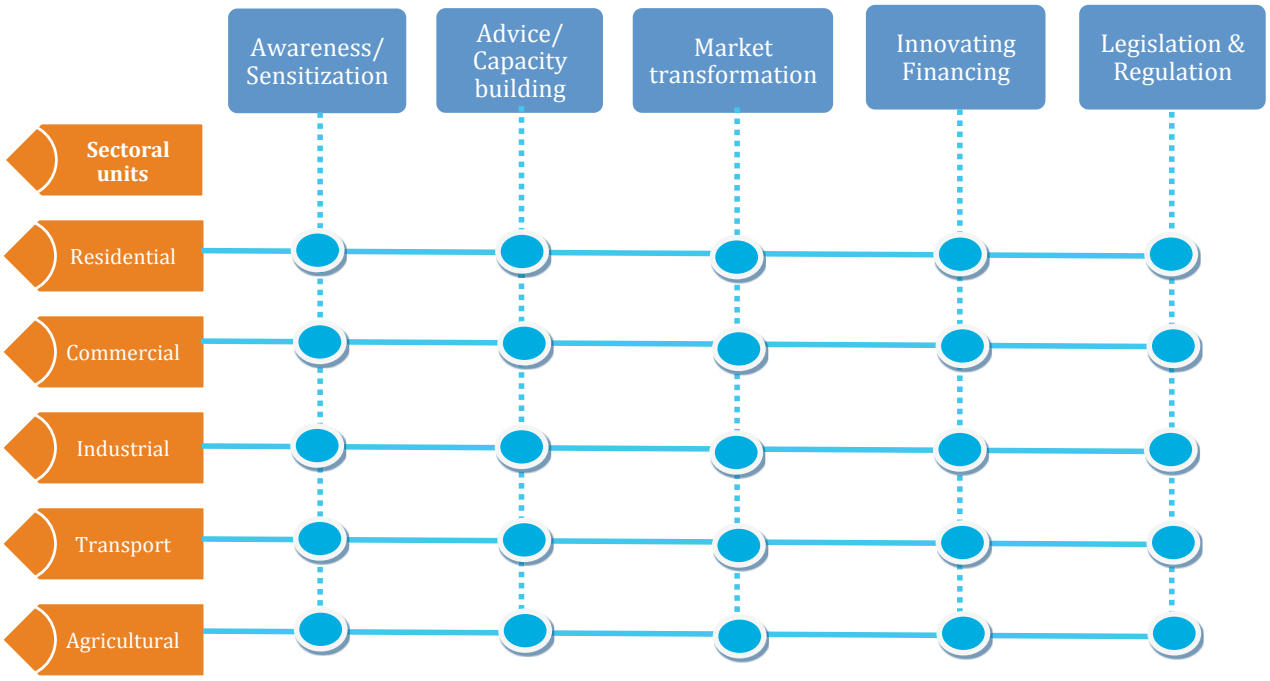
- **Program implementation & achievements**

Programs	As of June 30, 2004		
	Peak Demand Reduction (MW)	Energy Consumption Reduction (GWh)	Carbon Dioxide Emission Reduction (Million tons)
1. 36 and 18 Watt Fluorescent Lamp Program	401.5	1,957.5	1.45
2. Energy Efficient Compact Fluorescent Lamp Program	10.0	57.2	0.04
3. Energy Efficient Refrigerator Program	196.0	1,992.1	1.47
4. Energy Efficient Air-conditioner Program	382.5	1,454.5	1.07
5. Street Light Program	-	17.2	0.01
6. Energy Efficient Ballast Program	7.0	43.4	0.03
7. High Efficiency Motor Program	0.2	1.2	-
8. Green Building Program	2.6	10.3	0.01
Total	999.8	5,533.4	4.08

National commitment for Demand management action



Demand management: sectors and activities



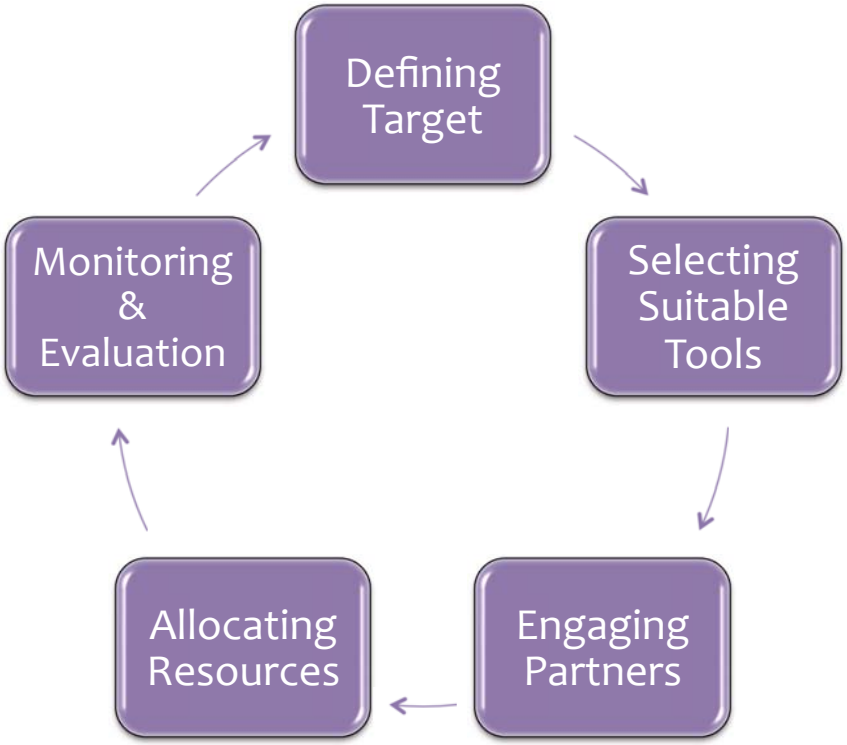
Strategic energy demand management

Ideal path for energy efficiency promotion

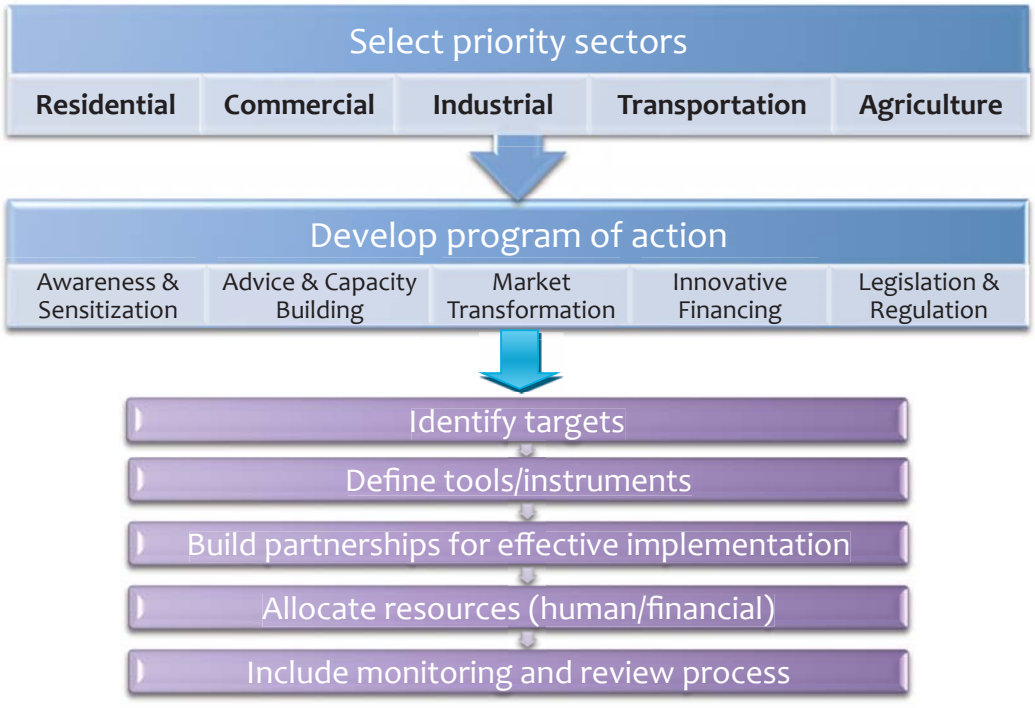
Awareness & Sensitization

Developing partnership with stakeholders

Process of energy efficiency promotion



Strategic management of energy efficiency programs



Thank you for your attention.

Any Questions?