



Department of Alternative
Energy Development and Efficiency
MINISTRY OF ENERGY



Energy Pathway to Low-Carbon Society: Thailand and ASEAN

Dr. Twarath Sutabutr

Deputy Director-General

Department of Alternative Energy Development and Efficiency (DEDE)

Chairman of ASEAN Plan of Action for Energy Cooperation

Drafting Committee (ADC)

**39th APEC Energy Working Group and Associated Meeting
And Low-Carbon Energy Supply Policies in APEC and Other EWG Related Meeting**

8-13 March 2010 Tokyo, JAPAN

1. Thailand Energy Situation in 2009

2. Low-Carbon Energy Pathway

- **RE, EE, NE**

3. ASEAN Regional Perspective on

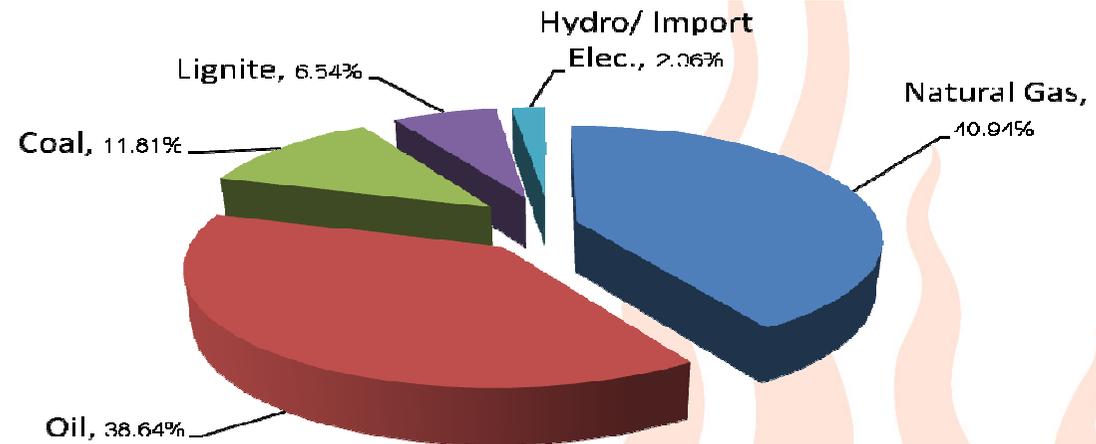
Low- Carbon/RE

4. Conclusions

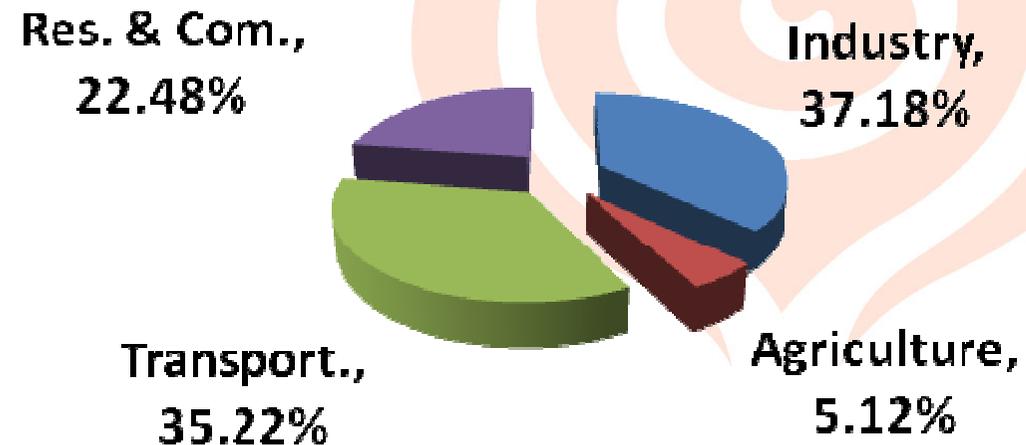


In 2009, Energy Expenses 47 billion USD (import 58%)
Total Commercial Energy Use 1.656 million barrels (oil equivalent) of per day

Commercial Energy Consumption by fuel

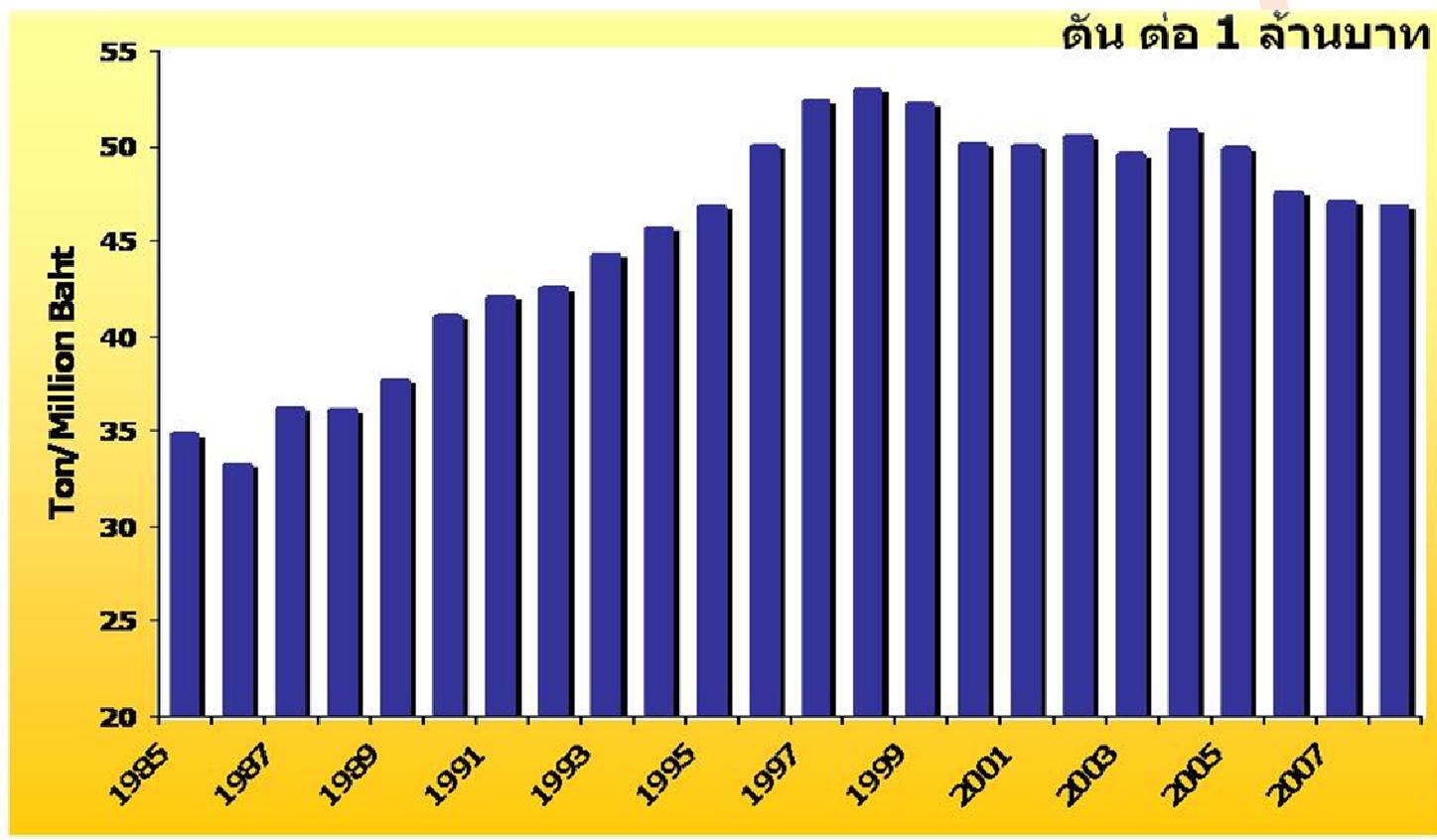


Energy Use by sector





Thailand Co₂ Intensity (Co₂ emission/GDP)



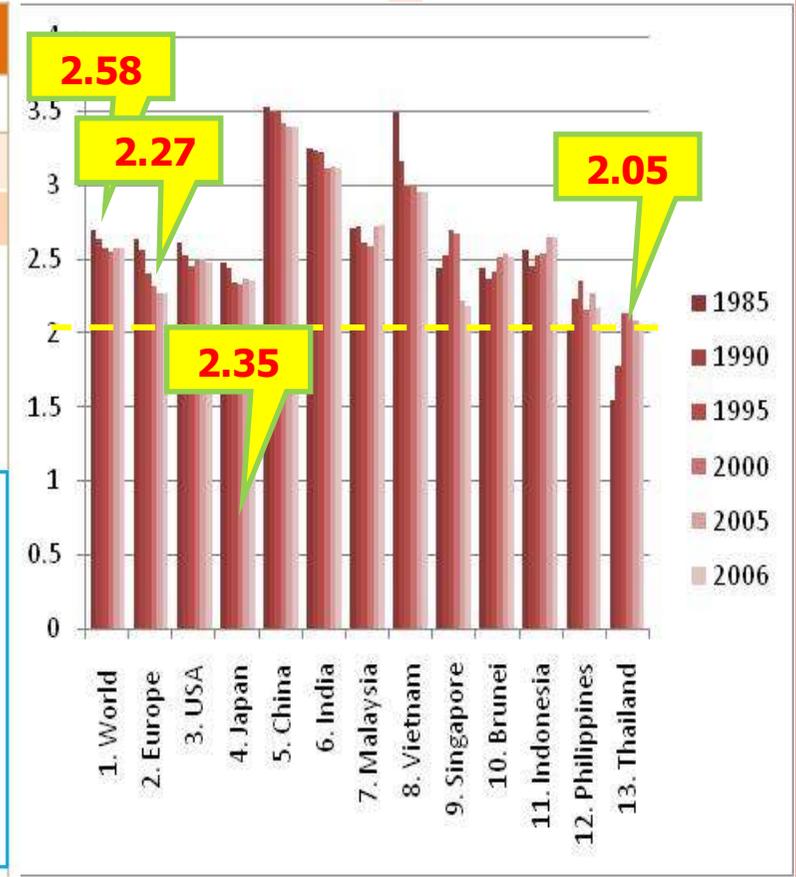
ที่มา : ระบบฐานข้อมูล EPPD-EMS

Unit : Tons/Million Bath

Year	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
CO ₂	34.84	33.23	36.20	36.04	37.67	41.02	42.03	42.48	44.27	45.63	46.81	49.93
Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
CO ₂	52.42	52.86	52.15	50.10	49.93	50.50	49.58	50.79	49.89	47.61	47.09	46.88

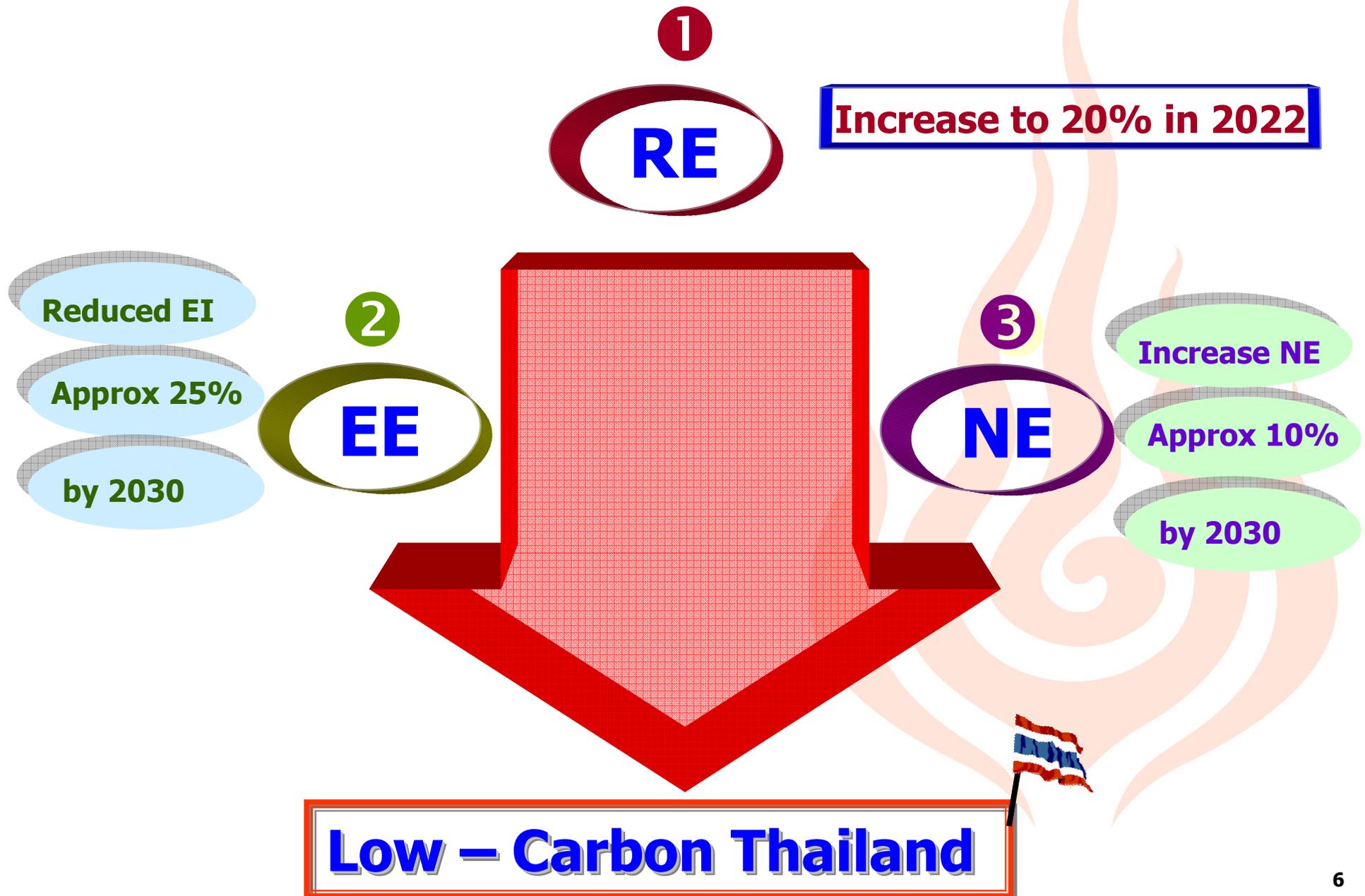
CO₂ Emission in Energy Sector

Country Year	CO ₂ Emission per Primary Energy Consumption (Ton/TOE)					
	1985	1990	1995	2000	2005	2006
1. World	2.70	2.64	2.58	2.55	2.58	2.58
2. Europe	2.64	2.57	2.41	2.32	2.27	2.27
3. USA	2.61	2.53	2.46	2.49	2.50	2.48
4. Japan	2.48	2.44	2.34	2.33	2.37	2.35
5. China	3.53	3.50	3.51	3.42	3.40	3.40
6. India	3.25	3.24	3.23	3.12	3.13	3.12
7. Malaysia	2.71	2.73	2.61	2.59	2.72	2.74
8. Vietnam	3.50	3.16	2.99	3.00	2.96	2.96
9. Singapore	2.44	2.53	2.70	2.68	2.22	2.18
10. Brunei	2.44	2.37	2.42	2.51	2.54	2.52
11. Indonesia	2.57	2.45	2.53	2.54	2.65	2.65
12. Philippines	2.05	2.23	2.35	2.16	2.27	2.17
13. Thailand	1.55	1.78	2.14	2.13	2.08	2.05



ที่มา : 1. - 12. The Energy Data and Modeling Center (EDMC), Japan 13. ระบบฐานข้อมูล EPPO-EMS

Low Carbon Energy Pathway



Thailand Renewable Energy Development

1

Committed to the development of low-carbon society

Government Funding On R & D & D Activities

15 years RE-Development Plan

Encouraging Private-Led Investment

Target 20.3 % of RE in Total Energy Consumption By 2022

Solar + Wind
 1,300 MW

Small + Mini Hydro
 320 MW

Bio Energy		
Biomass	Biogas	MSW
4,000 MW	160 MW	120 MW

Biofuels

- Ethanol
- Biodiesel

20% Oil substitution

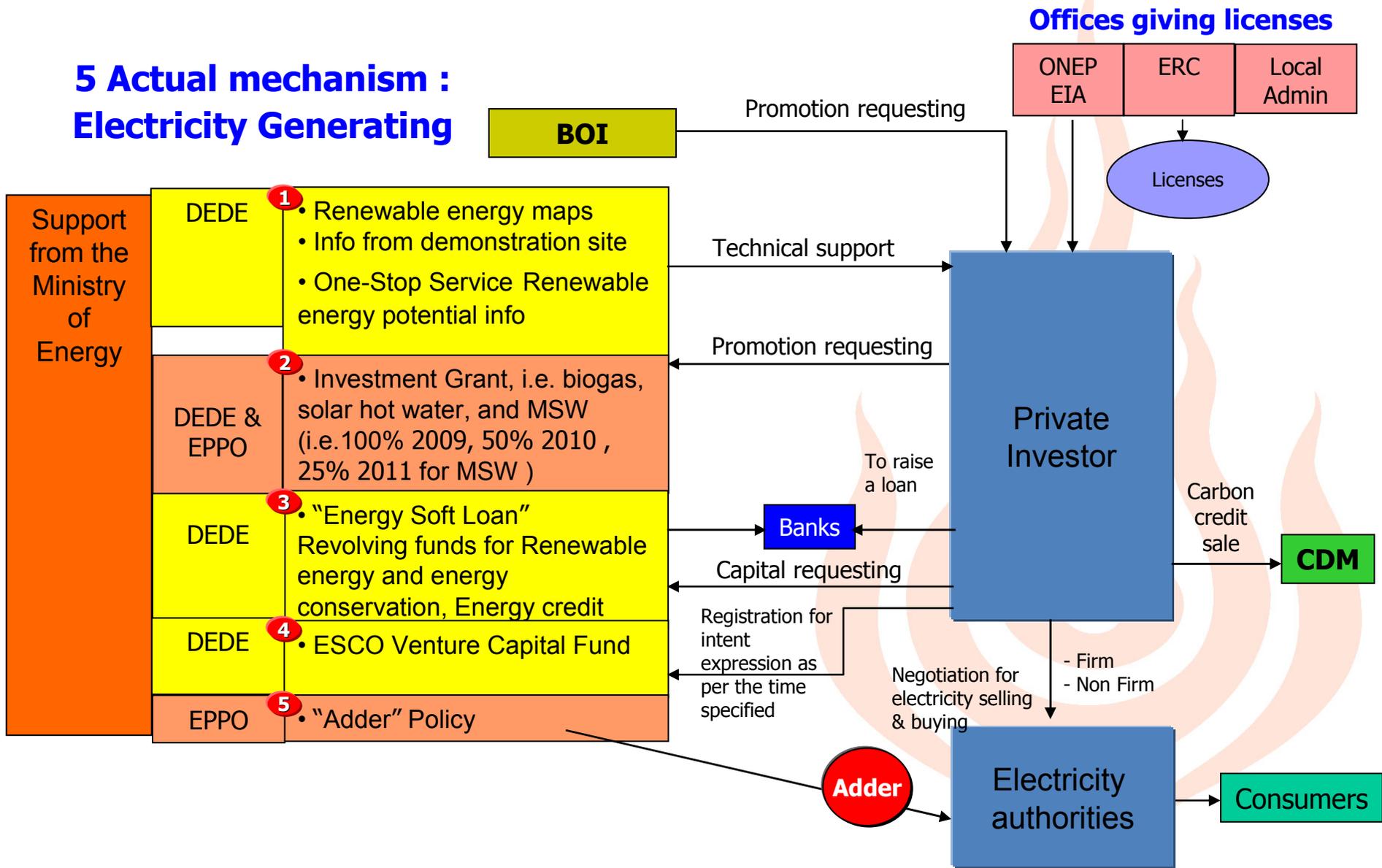
Supporting Schemes

- Feed-in Premium (“Adder”) on top of regular tariff
- BOI Tax incentives scheme (8 yr. Tax holiday)
- Some direct subsidy (10-30%) on Biogas,MSW,Solar-hotwater projects
- Soft Loans for RE+EE investments
- Government Co-investing scheme (“ESCO Fund”)

- Abundant Supply
- Market driven
- Pricing Strategy to promote high-RE-Fuels (E10,E20,E85 and B5)

Measures for RE Promotion

5 Actual mechanism : Electricity Generating



"Adder" : Feed-in Premiums

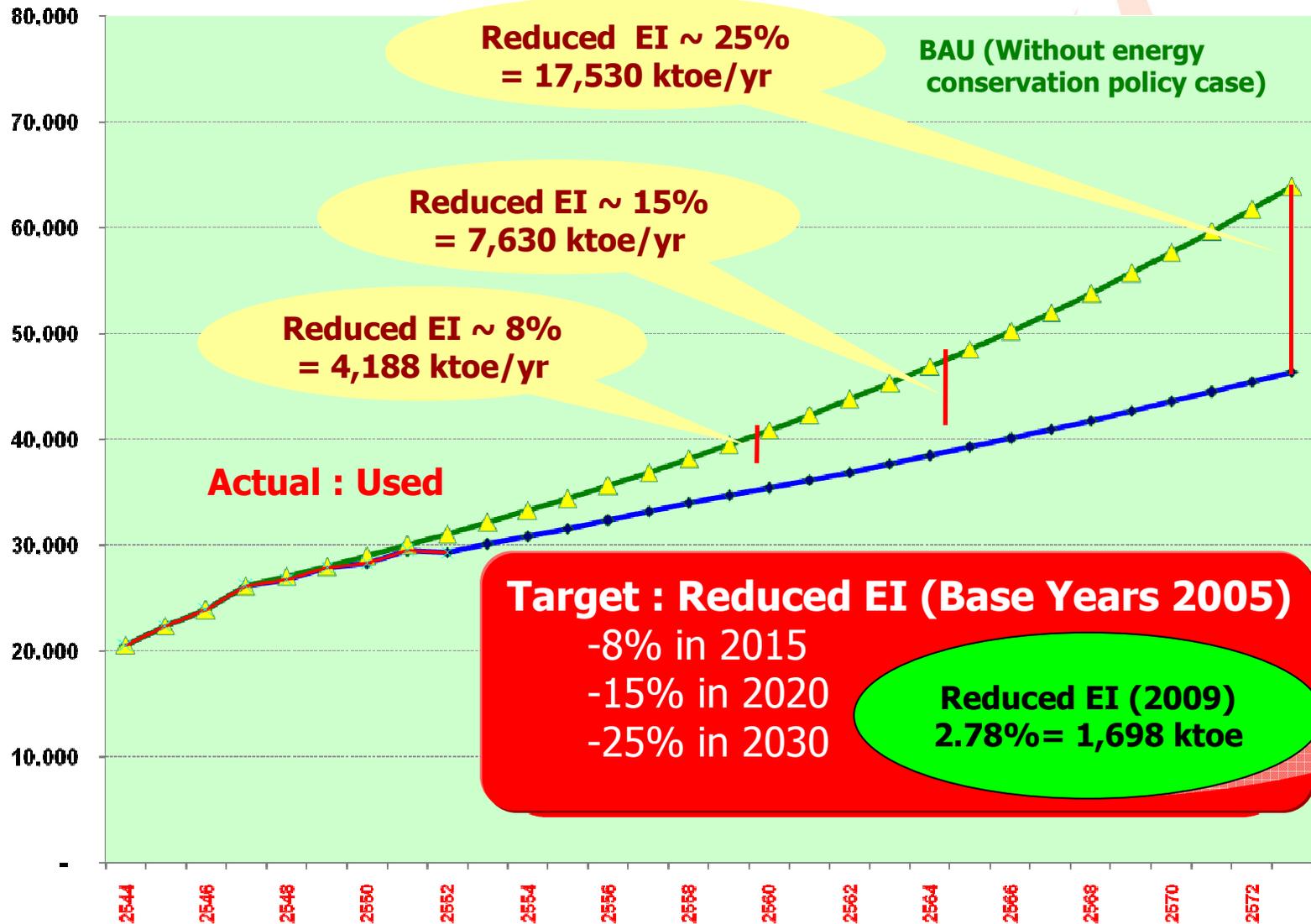
Fuel	Adder (B/kwh)	Special adder * (B/kwh)	Special adder in 3 southern provinces (B/kwh)	Supporting period (B/kwh)
<input type="checkbox"/> Biomass - Installed capacity \leq 1 MW - Installed capacity $>$ 1 MW	0.50 0.30	1.00 1.00	1.00 1.00	7 7
<input type="checkbox"/> Biogas (all categories of production sources) - Installed capacity \leq 1 MW - Installed capacity $>$ 1 MW	0.50 0.30	1.00 1.00	1.00 1.00	7 7
<input type="checkbox"/> Waste (community waste, not hazardous industrial waste, and inorganic waste) - Fermentation system or land fill - Thermal Process	2.50 3.50	1.00 1.00	1.00 1.00	7 7
<input type="checkbox"/> Wind power - Installed capacity \leq 50 kw - Installed capacity $>$ 50 kw	4.50 3.50	1.50 1.50	1.50 1.50	10 10
<input type="checkbox"/> Mini and micro hydropower - Installed capacity 50 kw - $<$ 200 kw - Installed capacity $<$ 50 kw	0.80 1.50	1.00 1.00	1.00 1.00	7 7
<input type="checkbox"/> Solar power	8.00	1.50	1.50	10

EE Plans and Targets

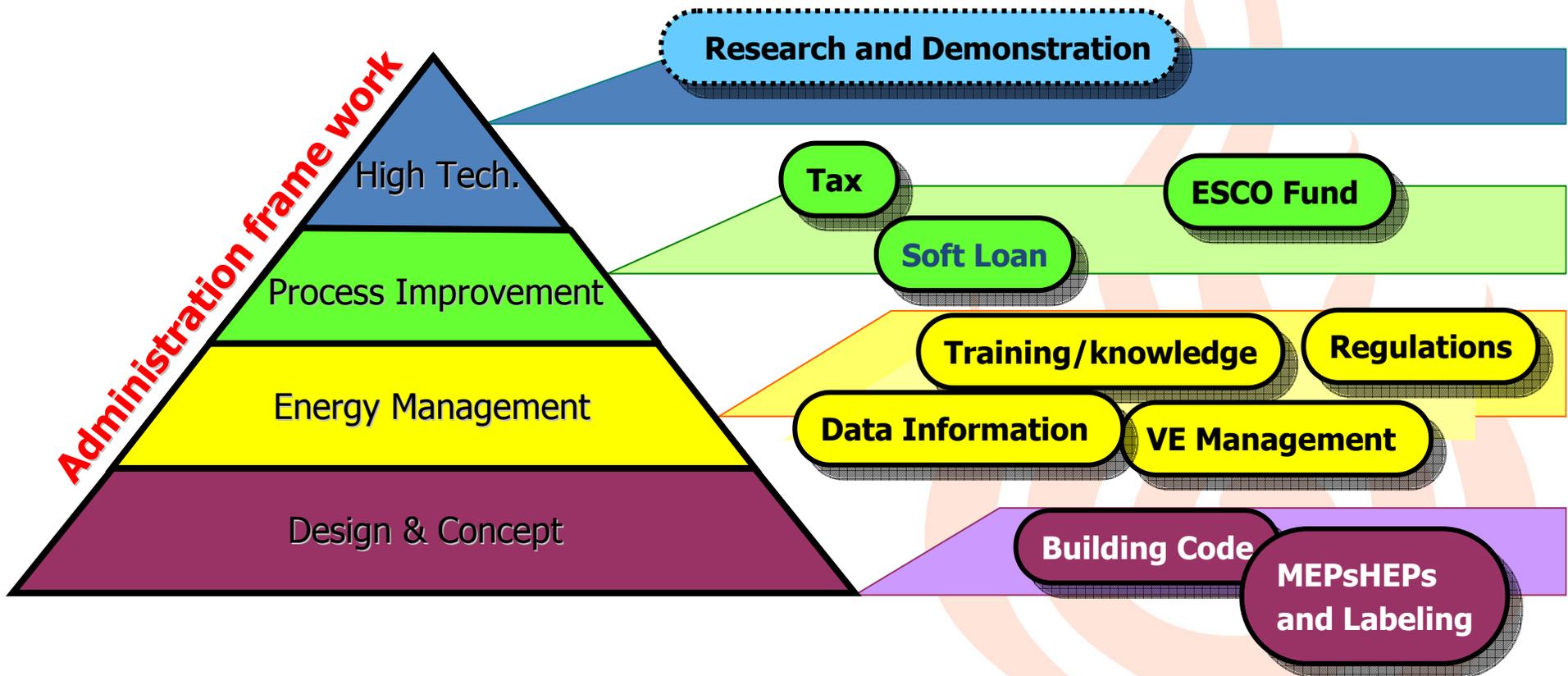
Industrial and Commercial Sectors

2

Energy Consumption (KTOE/yr)



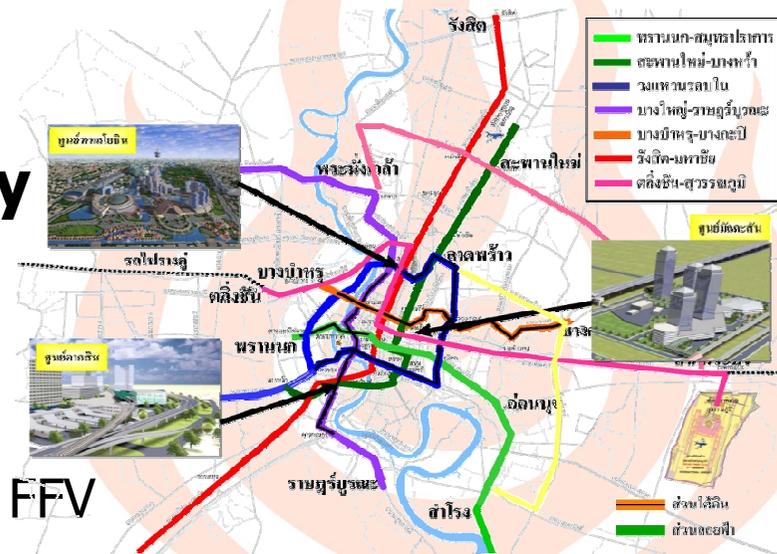
EE Measures



- **Regulatory Measures**
 - Energy Management in Large Factories and Buildings
 - Building Energy Codes
- **Financial Measures**
 - Revolving Fund Program (Soft Loan)
 - ESCO Fund (co-investment)
 - Tax Incentives
- **Capacity Building**
 - Basic and Advanced Training
 - software Simulation to Practical and On-the-job Training
 - formal EE curriculum in vocational schools and universities
- **Awareness and Information Campaign**
 - Thailand Energy Awards
 - Thailand Energy Fair
- **Public Private Partnership**



- **Changing Mode of Transportation (long term)**
 - Dual Track system
 - Comprehensive Train System throughout the country
- **Change from Private to Public Transportation**
 - Complete Subway and Sky-train in Bangkok Metro
 - Improve Bus system
 - park-n-ride
- **Change to Alternative Energy**
 - Gasohol – E10. E20. E85
 - Move to B3, B5 and B10
 - NGV / Biodiesel
 - Tax privilege for E85/NGV/Hybrid / FFV
- **Awareness and Information**
 - TV campaign, brochures, web-site
 - Encourage Carpool



- **Youth Programs**

- Green Classroom / School
- Energy Academy Fantasia / Energy Camp



- **Standard and Labeling for household appliances**

- Label 5 for AC, Refrigerator, Rice cooker, Water heater, etc.
- Energy Labels for buildings and houses
- High Efficiency and Minimum Efficiency Performance Standards

- **Promotion of High Energy Efficient Lighting**

- T5 , CFL, Electronic Ballast
- Demonstration at market places, temple, government hospitals and facilities, military facilities

- **Awareness and Information**

- Energy Conservation Demonstration Houses
- TV campaign, brochures, web-site
- Events



- **Under study and preparation**
- **Original Plan = 4x1,000 MW by 2022**
- **Adjusted = 2x1,000 MW by 2022**
- **New Power Development Plan : Limit
NE~10%**

Output and Outcome

(1) Economics aspect

- **Currency saving on energy import 460,000 M฿/year within 2022**
- **Increase investment of private sector 382,240 M฿**
- **Creates 40,000 clean and new jobs.**
- **Opportunity to earn 14,000 M฿/year form Carbon Credit trading.**
- **Delay the construction of new fossil fuel power plant 3,800 MW (equivalent to 100,000 M฿)**
- **Create Country's incomes by exporting biofuels, RE technologies (Gasification, biogas fermentation system).**

(2) Social aspect

- **Migration mitigation due to job creation in rural areas.**
- **Extra income to farmers.**
- **Improve quality of life for Thai people.**

(3) Environmental aspect

- **Low Carbon Society to mitigate the global warming**



Low Carbon Target

Reduce GHG Emission of **146 million** ton CO2 equivalent from EE plan and **42 million** ton from RE development plan by 2020

(EE and RE policies with CDM supports)



GLOBAL Cooling Plan

ASEAN Plan of Action for Energy Cooperation (APAEC): 2010-2015

STRATEGIC GOALS

- To achieve a **collective target of 15% for regional renewable energy in the total power installed capacity by 2015**
- To strengthen **regional cooperation** on the development of renewable energy and alternative energy including hydropower and bio-fuels
- To promote the development of centers of **research and development on** renewable energy in the region;
- To promote **open trade**, facilitation and cooperation in the renewable energy sector and related industries as well as **investment** in the requisite infrastructure for renewable energy development

ASEAN Plan of Action for Energy Cooperation (APAEC): 2010-2015

Six Strategies:

1. Increase the **development and utilization** of RE sources to achieve the 15% target share of RE in ASEAN power generation mix
2. Enhance **awareness and information sharing** and strengthen **networks**
3. Promote intra-ASEAN cooperation on **ASEAN-made products and services**
4. Promote renewable energy **financing scheme**
5. Promote the **commercial** development and utilization of biofuels
6. Develop ASEAN as a **hub for renewable energy**



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...THANK YOU...

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