“Thailand’s Experience in Clean Energy and Vision for the Future”

Piyasvasti Amranand
Chief Advisor to Energy for Environment Foundation
former Thai Minister of Energy

Asia Clean Energy Forum

ADB-USAID

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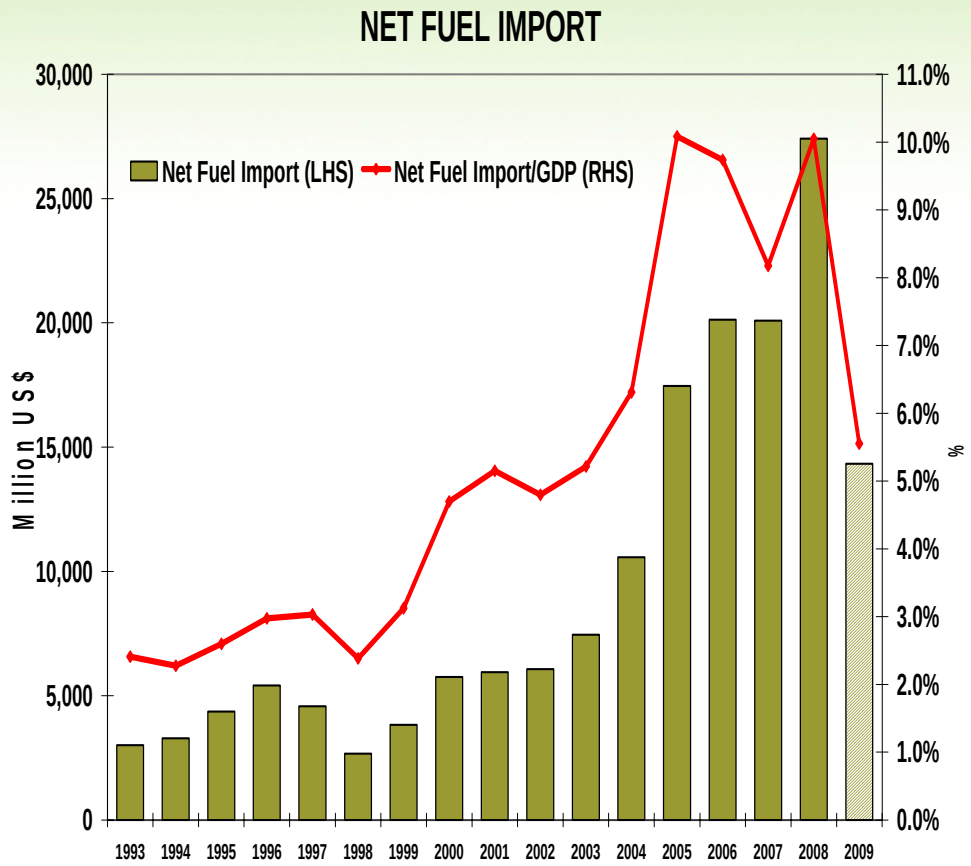
Energy security is the main reason for EE and RE promotion



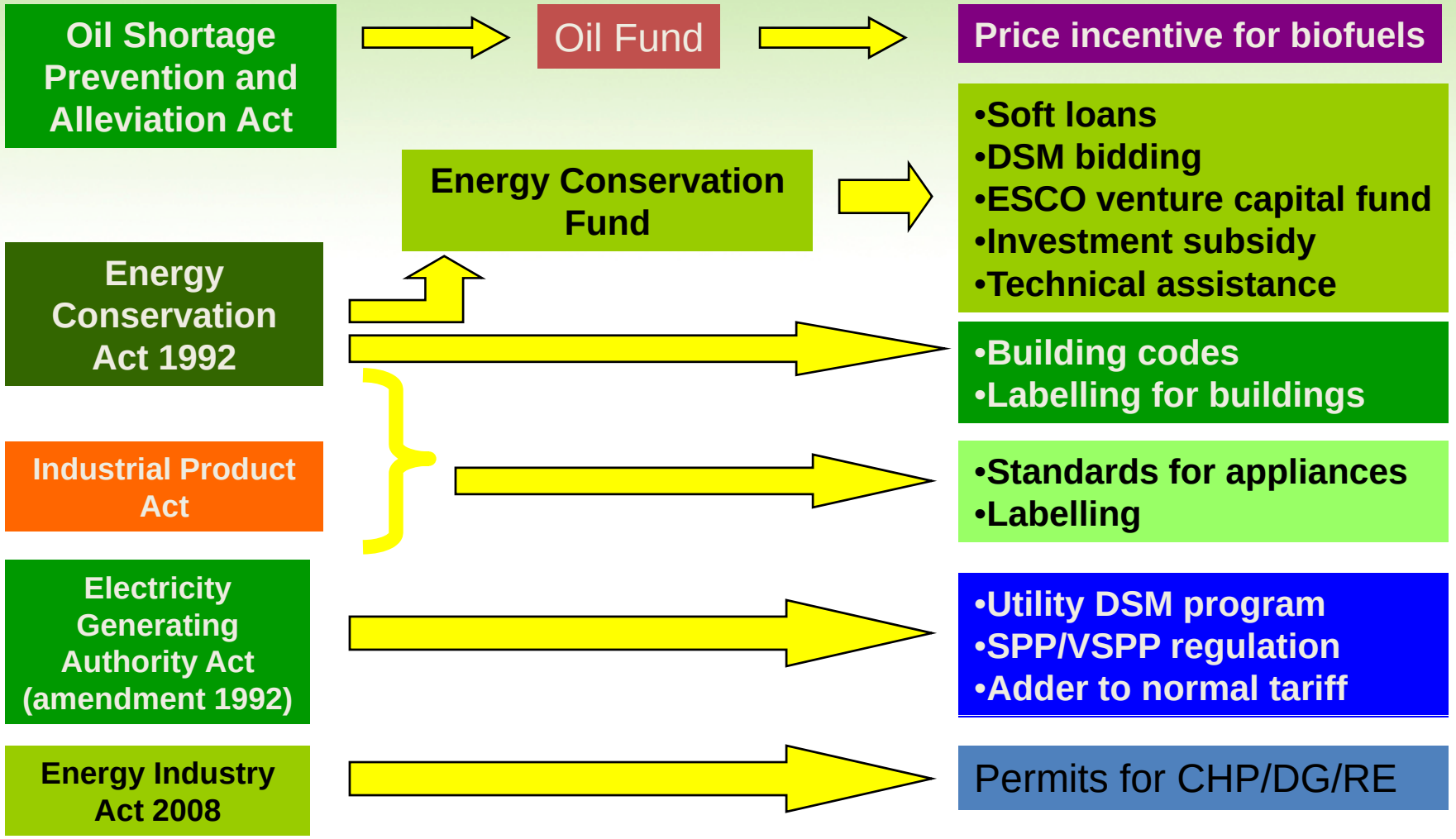
Thailand has no national policy on climate change

EMISSION OF CARBON DIOXIDE FROM FOSSIL FUELS IN 2005 & PRIMARY ENERGY CONSUMPTION (PEC) IN 2007

	CO2 Emissions		PEC
	Total (M.Tons)	Per capita (Tons/person)	Per Capita (Tons/person)
Australia	407	20.24	6.05
USA	5,957	20.14	7.98
Netherlands	270	16.44	5.59
Russia	1,696	11.88	4.85
S.Korea	450	10.27	5.34
Germany	844	10.24	3.77
Japan	1,230	9.65	4.06
UK	577	9.55	3.57
France	415	6.59	4.05
Malaysia	156	6.49	2.39
China	5,327	4.07	1.42
Thailand	234	3.65	1.33
India	1,166	1.07	0.37
World	28,193	4.37	1.72

Source: US DoE and BP

Most vital instruments: Energy Conservation Act and SPP/VSPP regulation



Building codes and standards

- **Mandatory standards for refrigerartors and airconditioners**
- **Standards for > 20 products in process**
- **New building codes recently issued for large buildings**
- **Incentive program for replacement of incandescent bulbs by CFL**
- **Incentive program for replacement of T8 by T5**
- **Local production of CFL and T5 started in recent years**
- **Use of CFL and T5 will reduce power demand by 2,300 MW (10%)**

Proposed Energy Efficiency Standards in New Very Large Buildings (> 10,000 sq.m.)				
kWh/sq.m./year	Current average	New Standard	Future Standard	%New/Current
Office	146.4	98.7	82.3	-32.6%
Hotel	173.2	117.0	101.7	-32.4%
Hospital	148.8	123.9	112.0	-16.7%
Shopping Centre	556.0	438.6	394.7	-21.1%
Educational Institute	94.0	79.3	67.2	-15.6%
Condominium	118.4	105.3	92.7	-11.1%
Hypermarket	394.7	300.9	248.7	-23.8%
Others	139.7	117.2	100.0	-16.1%

Note: New standard was approved by the Cabinet in December 2007 and is expected to become law soon

Soft loans for EE and RE

Phase	Period	Total Budget from ECF (m.baht)	Number of Projects				Total Investment (m.baht)	Funding approval from ECF (m.baht)	Energy savings	
			Factories	Buildings	ESCO	Total			Energy (ktoe/year)	Cost (m.baht/year)
EE 1	30 Jan. 2003-29 Jan. 2006	2,000	63	13	2	78	3,427	1,908	1,349	1,403
EE 2	17 Mar. 2006-16 Mar. 2009	2,000	80	13	1	94	4,778	1,998	1,380	1,511
EE 3	2 Aug. 2007-1 Aug. 2010	1,943	67	11	2	80	4,026	1,899	909	1,231
RE 1	(data as of 12 June 2009)	1,000								
Total		6,943	210	37	5	252	12,231	5,805	3,638	4,145

- Lending through commercial banks
- Interest rate: < 4% p.a.
- Loan period: < 7 years
- Loan size from ECF: up to 100% of project cost per measure but < 50 m.baht

DSM bidding

Bidding round	Date of submission of proposal	Date of result announcement	Number of proposals	Number of accepted proposals	Energy savings		Request for funding (M.baht)
					Heat (MMBTU/year)	Electricity (kWh/year)	
1	20 Dec. 2007	24 Jan. 2008	10	8	662,751	5,379,969	25.1
2	10 Apr. 2008	21 May 2008	10	8	108,667	26,870,432	32.8
3	21 Jul. 2008		60	51	2,580,077	92,121,266	201.1
4	29 Apr. 2009	17 Jun. 2009	31	30	300,813	29,753,380	38.8
5	24 Jun. 2009	19 Aug. 2009	NA	NA			
6	26 Aug. 2009	21 Oct. 2009	NA	NA			
Total			111	97	3,652,308	154,125,046	297.8

Requirements

- **Buildings and factories: saving from all measures of > 300,000 kWh/year or 400 MMBTU/year**
- **Hotels: saving from all measures of > 100,000 kWh/year for hotel>150 rooms, and saving>50,000 kWh/year for hotel<150 rooms**
- **Maximum support: 1.00 baht/kWh for electricity, 75 baht/MMBTU for heat from liquid fuels, 15 baht/MMBTU for heat from solid fuels**

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ESCO Venture Capital Fund

ESCO Fund Investment Committee (500 M.Baht from ECF)

Fund Managers

1. E for E (250 Million Baht) ↕ **2. ECFT (250 Million Baht)**

ESCO Venture Capital	Equity Investment	Equipment Leasing
Carbon Credit Market	Technical Assistance	Credit Guarantee Facility

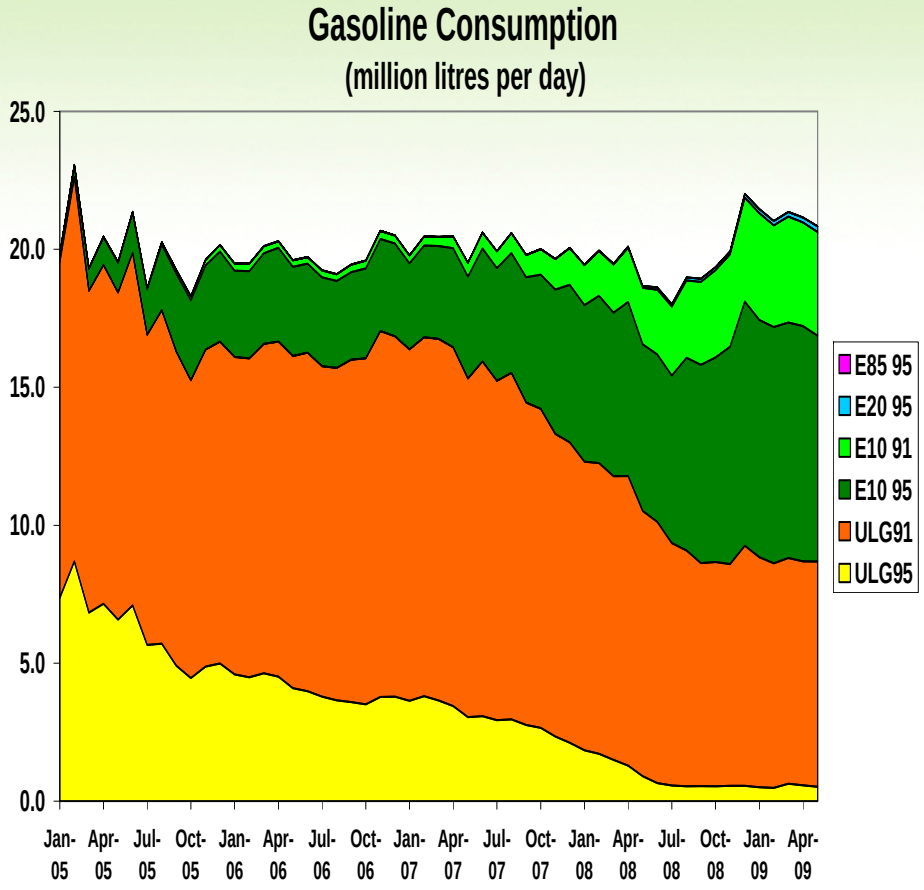
- ***Equity investment:*** **10-50% of investment cost but < 50 m.baht**
- ***Venture with ESCO:*** **10-30% of registered capital but < 50 m.baht**
- ***Duration of investment:*** **prefer period 5- 7 years**
- ***Equipment leasing:*** **100% of cost but<10 m.baht, repayment < 5 years, interest rate 4% pa**

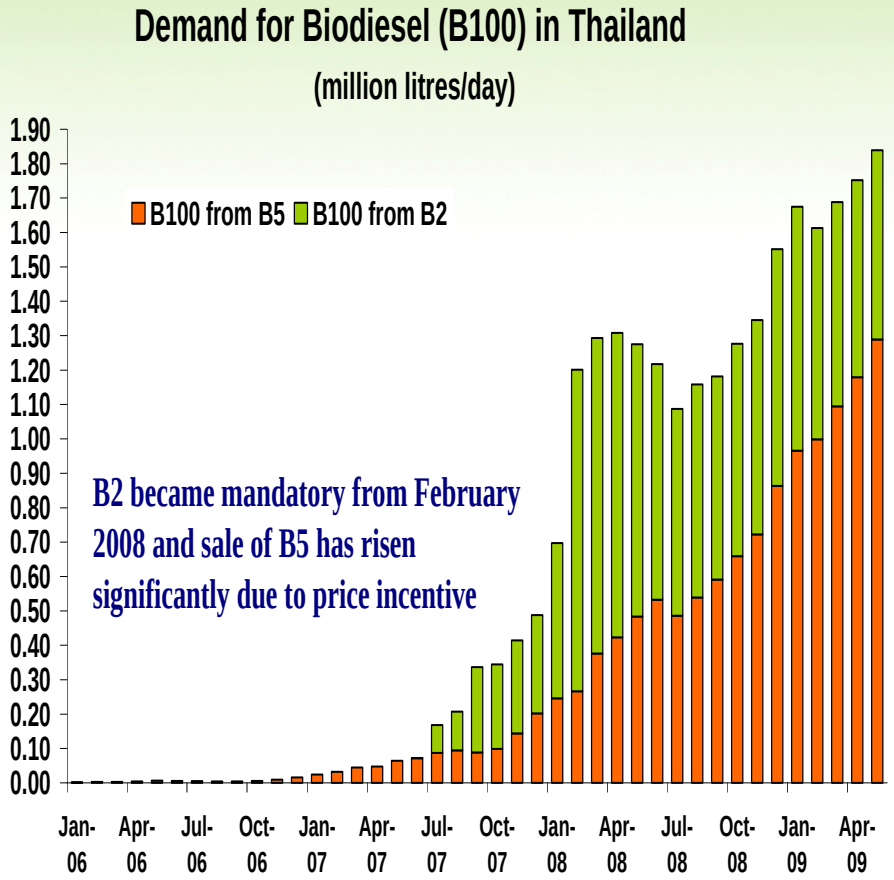
Measures to promote biofuels

•Gasohol: E10 95 RON, E10 91 RON, E20 95 RON, E85 95 RON
•Biodiesel: B2 compulsory, B5 optional

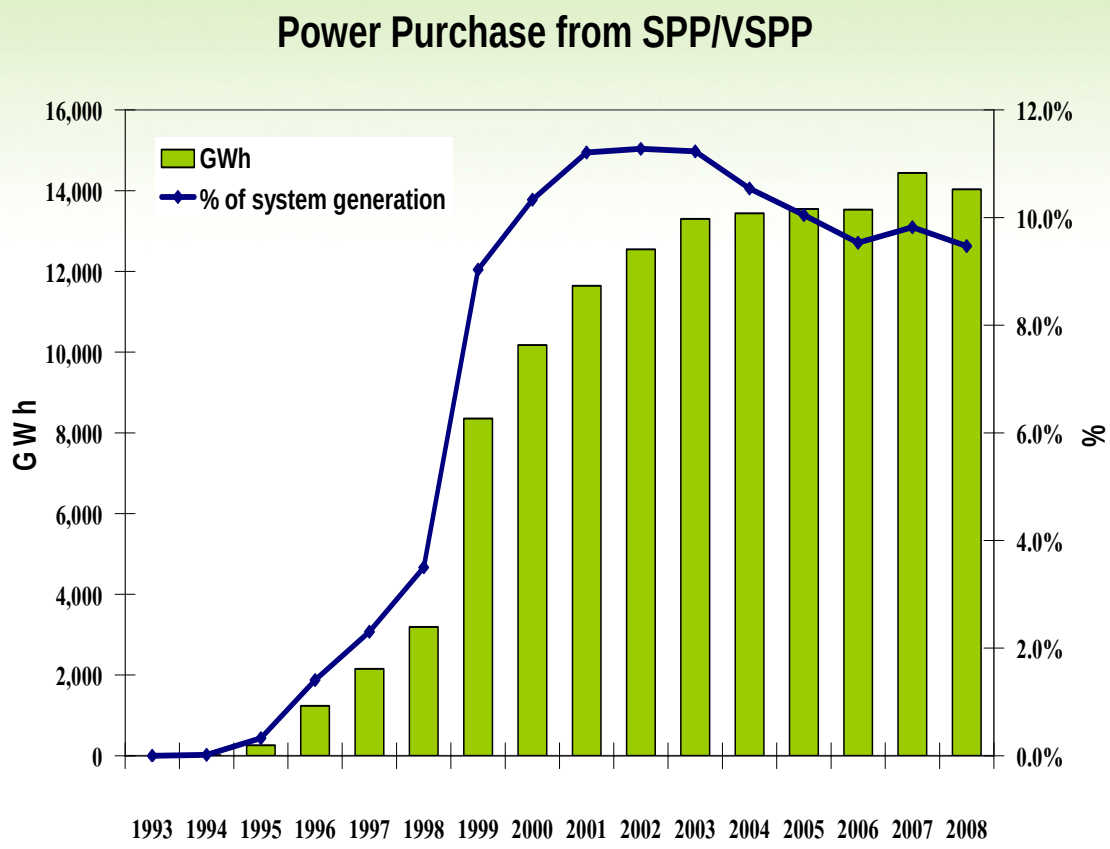
- **Tax incentive to make biofuels cheaper**
- **Strict enforcement of standards**
- **Clear time table for compulsory standards acceptable to oil companies, automobile industry and producers of biofuels**
- **Assurance/guarantees provided by oil companies and automobile manufacturers on quality and impacts on engines**
- **Public information campaign**
- **Financial assistance for oil palm plantation**

Biofuels now account for 3.8% of gasoline & diesel demand





CHP/DG has grown significantly in Thailand over the past 17 years



- **SPP/VSPP: regulations issued in 1993**
- **SPP/VSPP: cogeneration or generation of power from RE**
- **Most SPP/VSPP are CHP/DG**
- **SPP: sale of excess power to grid 10-90 MW**
- **VSPP: sale of excess power to grid < 10 MW**
- **Direct sale without using utility's wires allowed**
- **183 projects in operations with sale to grid of 2,606 MW**
- **10% of national power supply is from SPP. But if direct sale is included, power generation from SPP/VSPP accounts for 16% of total electricity generation**

"Adder" from normal tariff (~ 2.0-2.5 baht/kWh)

Unit: baht/kWh	Original Adder	New Adder (9/3/09)	Special Adder for 3 Southern provinces or remote areas	Duration (years)
Biomass <=1MW	0.30	0.50	1.00	7
Biomass > 1MW	0.30	0.30	1.00	7
Biogas <=1MW	0.30	0.50	1.00	7
Biogas > 1MW	0.30	0.30	1.00	7
Wastes – Landfill/anaerobic digestion	2.50	2.50	1.00	7
Wastes - Thermal Process	2.50	3.50	1.00	7
Wind <=50 kW	3.50	4.50	1.50	10
Wind > 50kW	3.50	3.50	1.50	10
Hydro 50-<200 kW	0.40	0.80	1.00	7
Hydro < 50 kW	0.80	1.50	1.00	7
Solar	8.00	8.00	1.50	10

Price response by renewable energy is remarkable

Status of SPP/ VSPP Mar.2009	Projects Submitted			Projects Approved			Projects in Operation		
	Number	Gen. Capacity (MW)	Power Sale (MW)	Number	Gen. Capacity (MW)	Power Sale (MW)	Number	Gen. Capacity (MW)	Power Sale (MW)
Cogeneration/Fossil fuels	57	5,426	3,417	52	5,401	3,403	29	3,041	1,736
Non-conventional	1,321	10,007	8,318	656	4,126	3,019	150	1,252	637
Biomass	370	4,234	2,788	193	2,487	1,517	69	1,192	601
Wastes	55	249	219	26	139	118	4	6.4	3.5
Biogas	110	220	192	83	134	113	25	27.6	20.6
Solar	656	3,007	2,840	333	1,260	1,173	47	4.8	4.1
Wind	118	2,269	2,258	10	78.4	78.1	1	0.1	0.1
Hydro	9	6.9	6.9	8	6.4	6.4	2	0.1	0.1
Others	3	21.0	13.7	3	21.0	13.7	2	21.0	7.7
SPP- mixed fossil+non-conventional	4	476	233	4	476	233	4	476	233
Total non-conventional	1,325	10,483	8,551	660	4,602	3,252	154	1,728	870
Grand total	1,382	15,908	11,968	712	10,003	6,655	183	4,769	2,606

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Biomas, biogas, MSW projects also have environmental benefits

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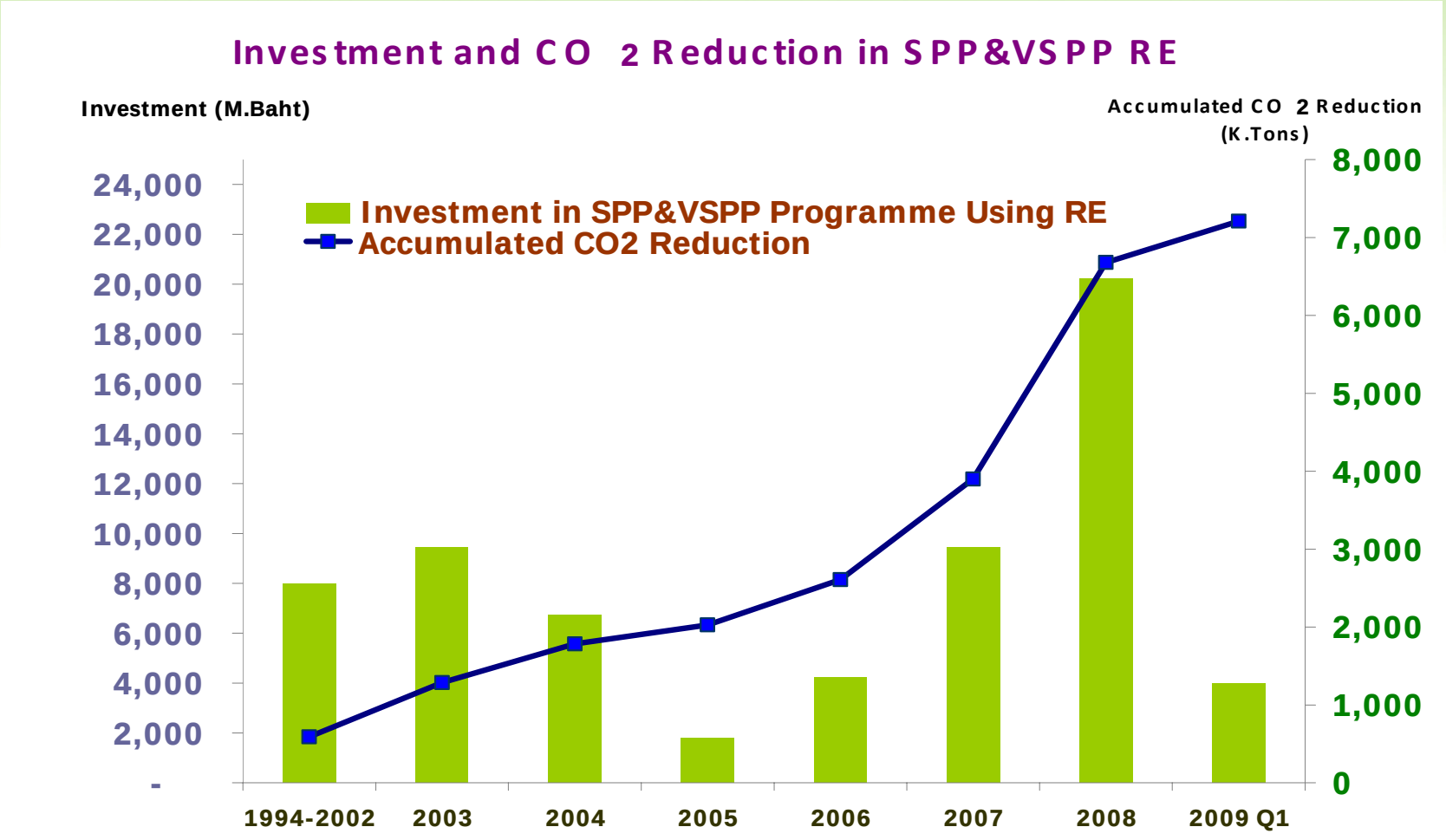
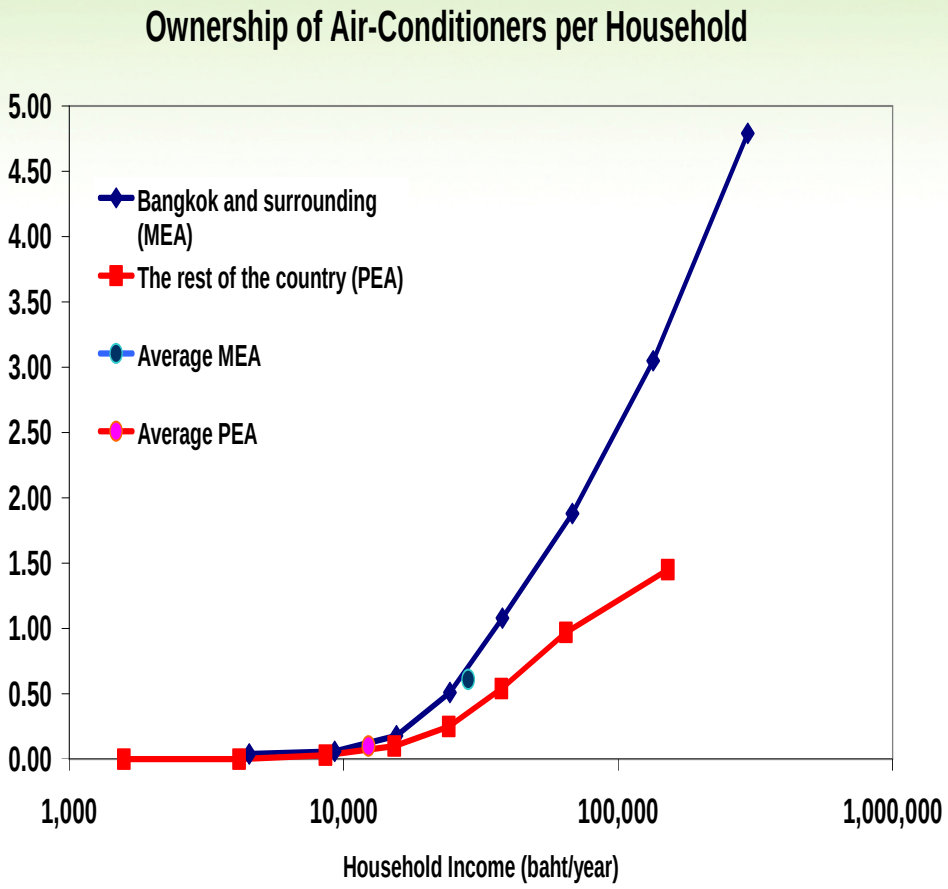
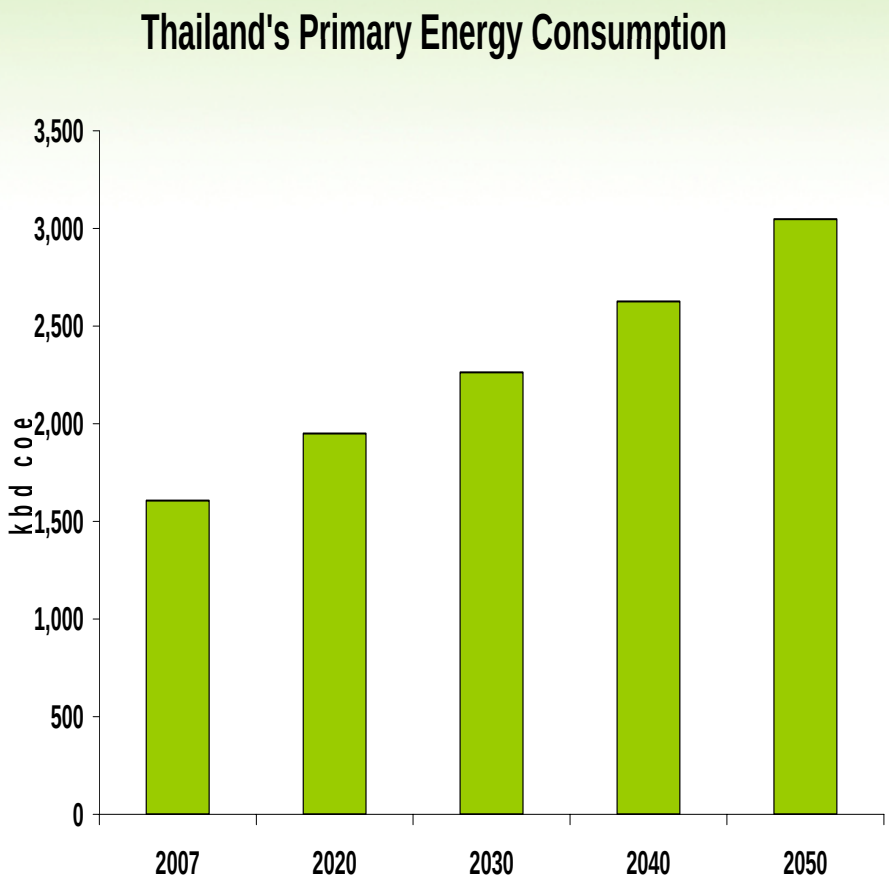
Will all these wind and solar farms materialize?

Boom in RE investment in the midst of economic recession



Thailand's GHG emission is likely to rise significantly





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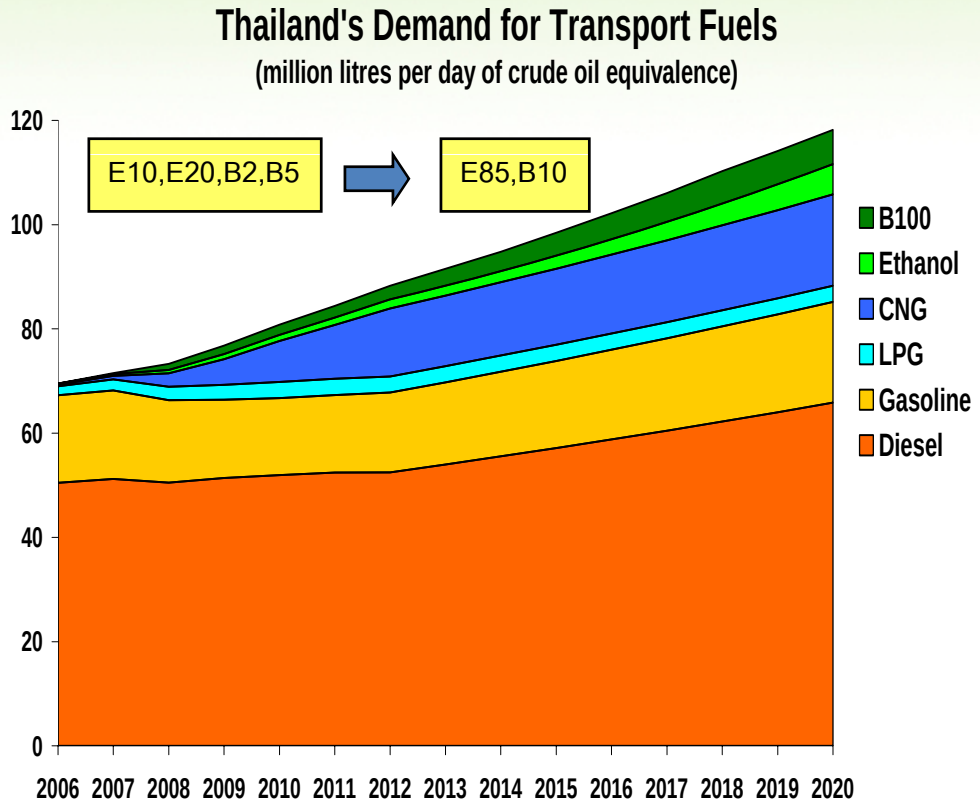
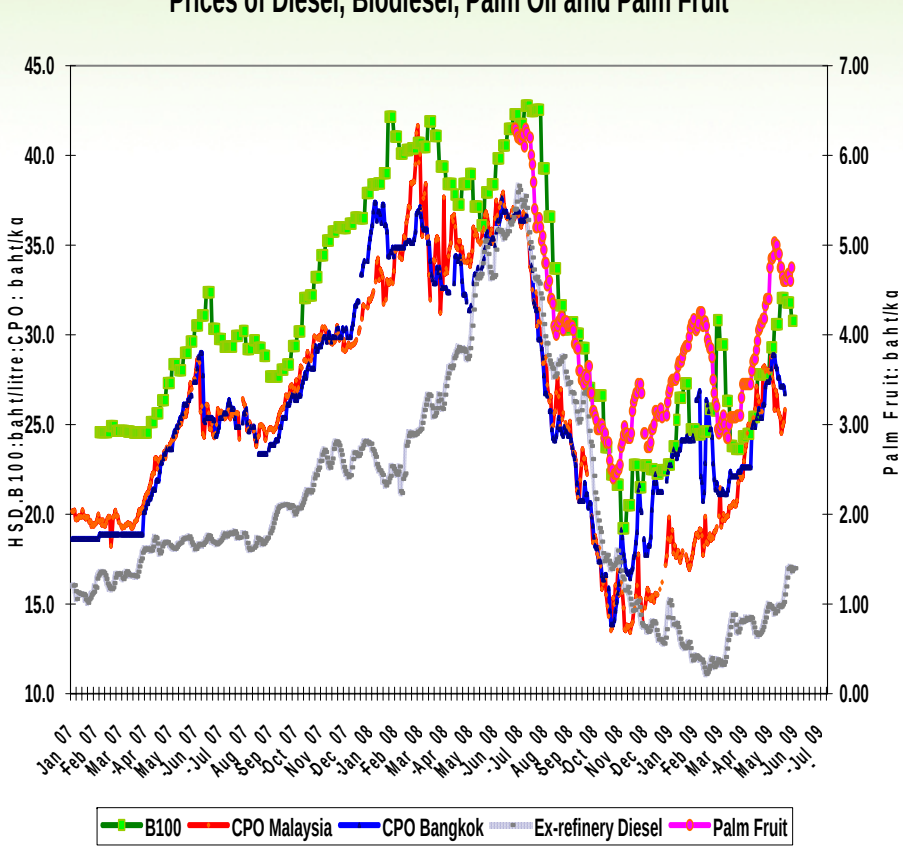
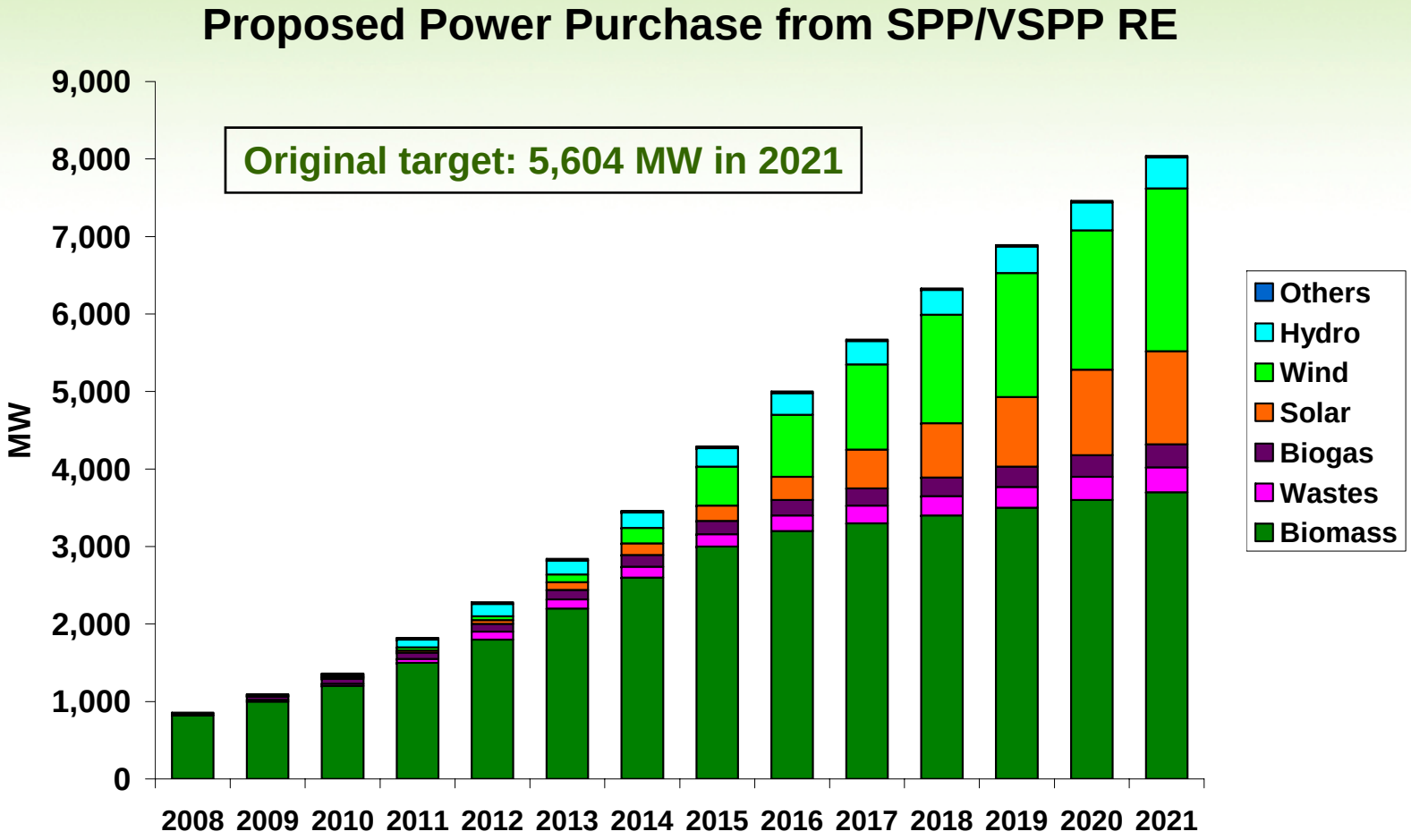
Second generation biofuels essential

Biodiesel is already facing supply constraint



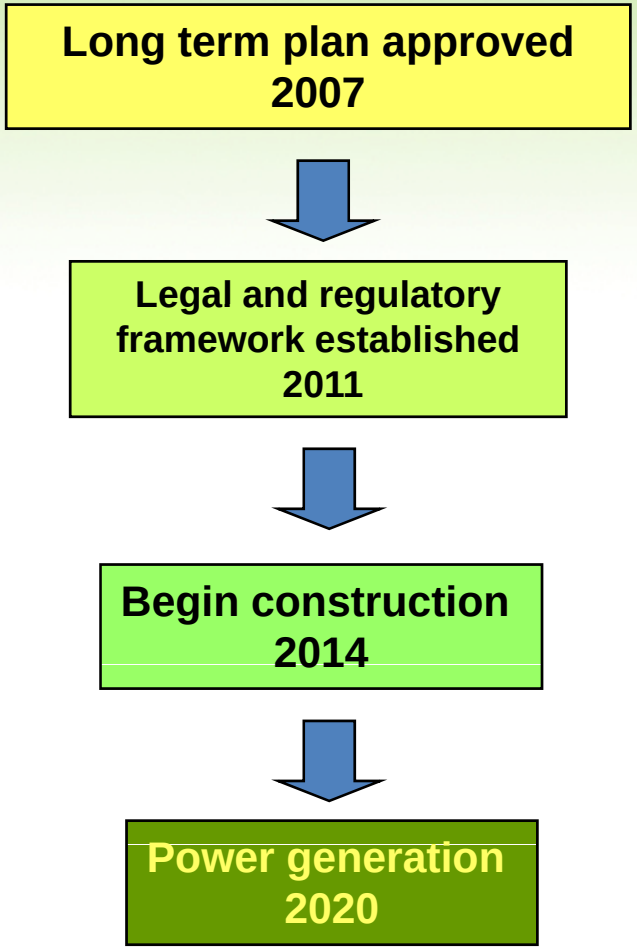


RE Target is far too low: 8,000 MW RE capacity is possible

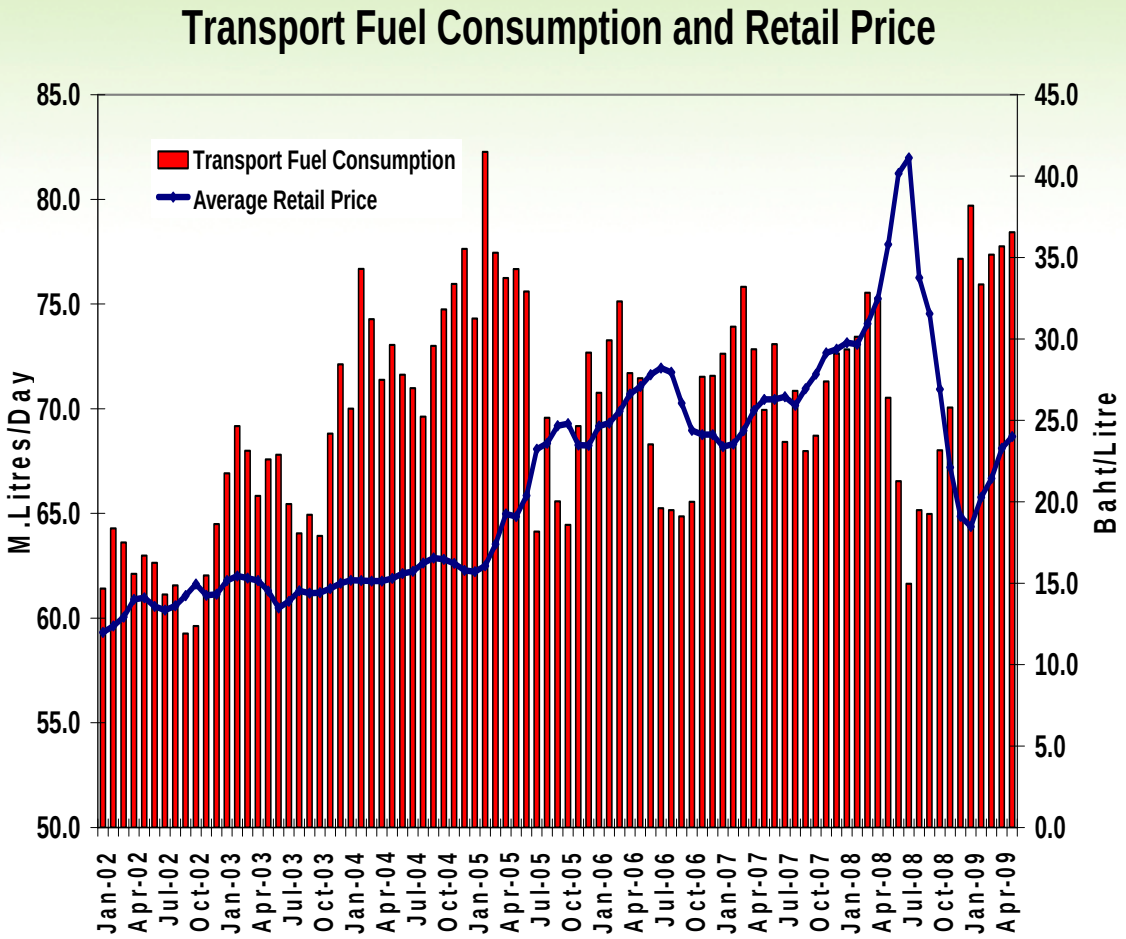


Nuclear energy is inevitable

- Training, manpower
- Feasibility study (wastes disposal, decommissioning, fuel supply etc.)
- Location
- Safety/technical standards
- Establishment of legal and regulatory framework
- International treaties
- Establishment of supporting industries
- Public acceptance



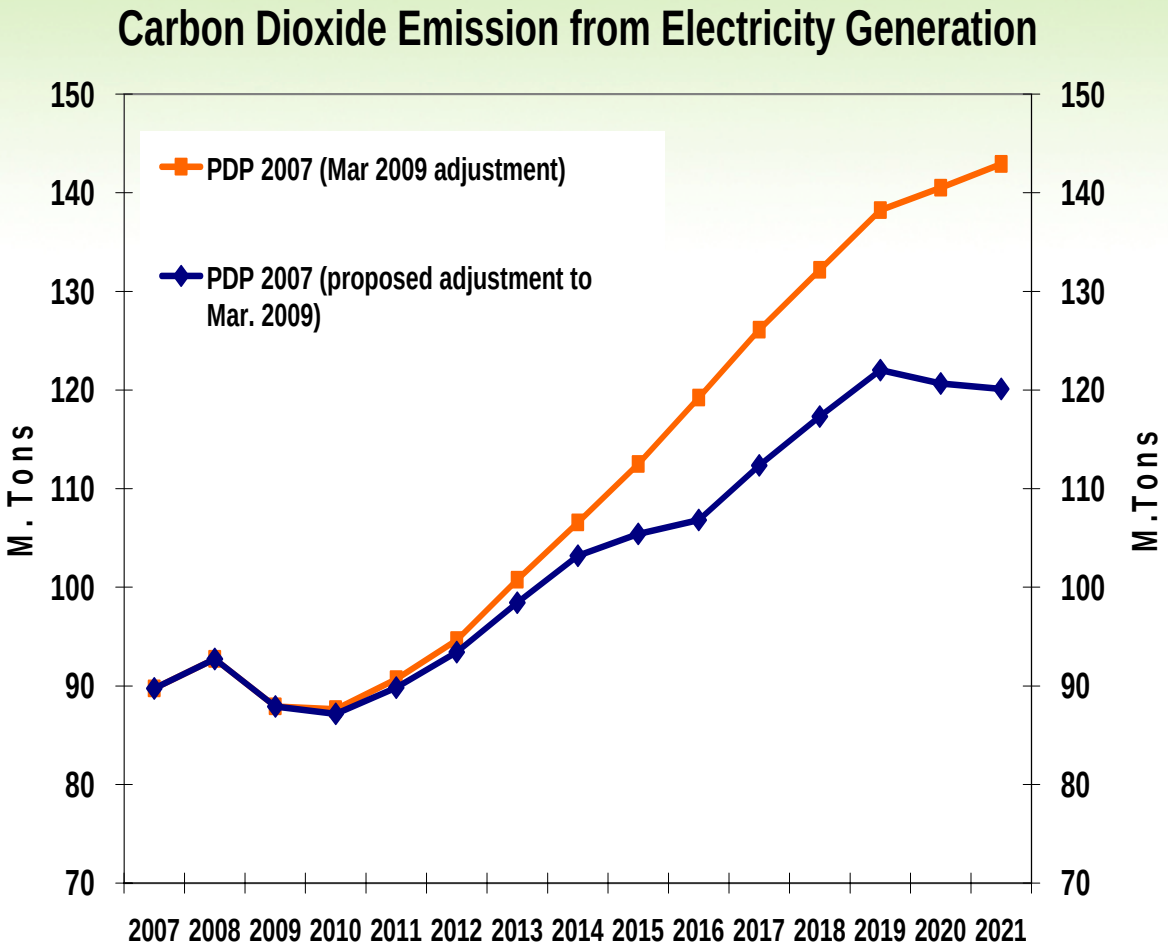
Lessons from Thailand's experience



Essential requirements for successful EE and RE program

- **Cost reflective energy price**
- **Use of market forces and incentive program**
- **Clear rules, regulations, standards, incentives Creation of competition**
- **Human resources and training**

Decline in GHG emission from power sector is possible

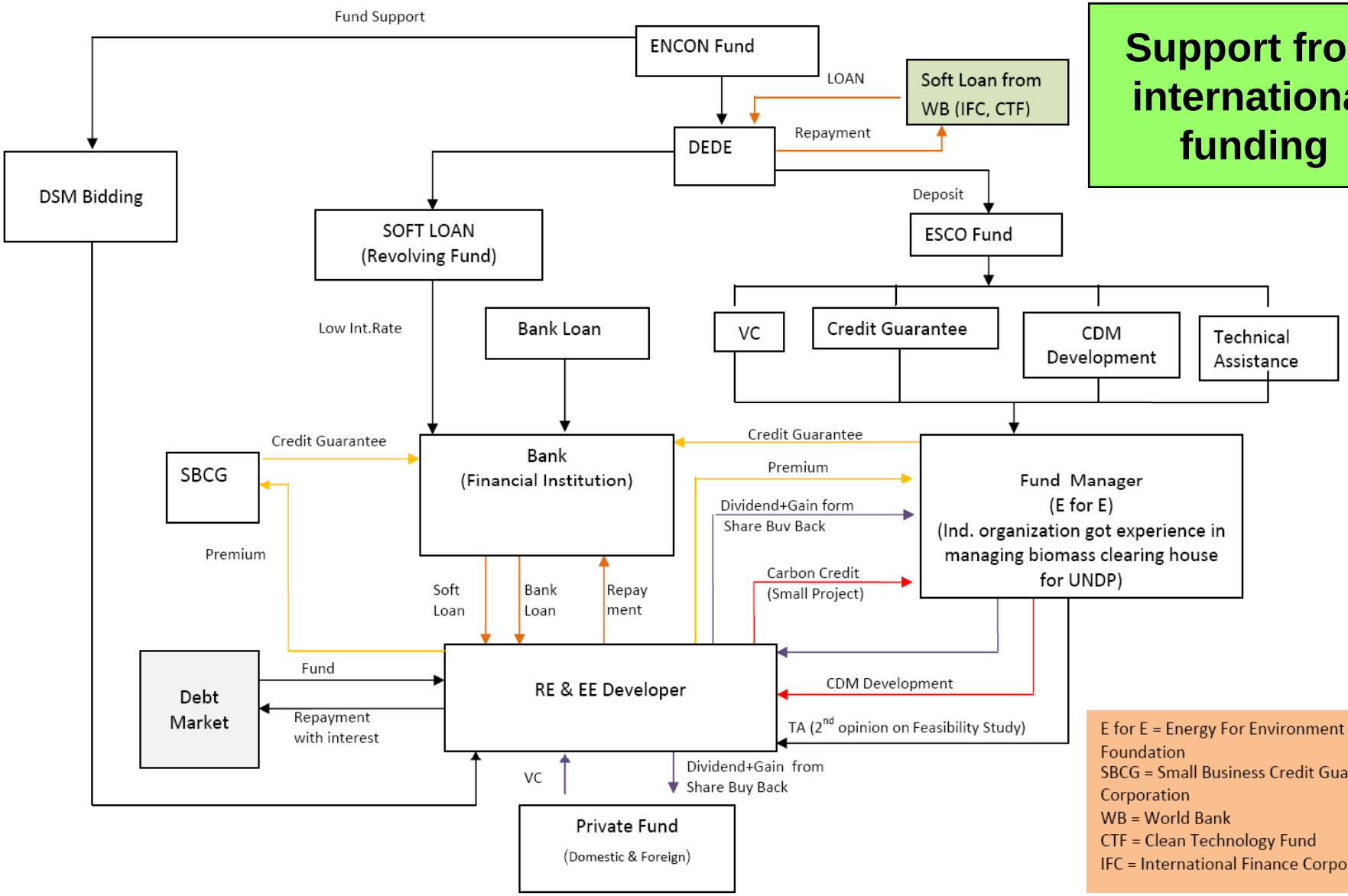


Although under the current power development plan approved on 9 March 2009 GHG emission from power sector will rise substantially. Decline in GHG is possible if

- **Much higher RE and CHP**
- **Speed up of nuclear program**
- **Higher hydropower development in neighbouring countries**

Government must create awareness, consensus and drive changes which will involve unpopular measures

Support from international funding



E for E = Energy For Environment Foundation
SBCG = Small Business Credit Guarantee Corporation
WB = World Bank
CTF = Clean Technology Fund
IFC = International Finance Corporatation

Energy for Environment Foundation (E for E)

14th Fl., Si Ayutthaya Bldg., 487/1 Si Ayutthaya Rd.,

Ratchathewi, Bangkok 10400

Tel. 0 2642 6424-5

Fax 0 2642 6426

http://www.efe.or.th

E-mail: efe@efe.or.th