

Towards a low carbon society: Role of carbon tax and mass transport system in Thailand

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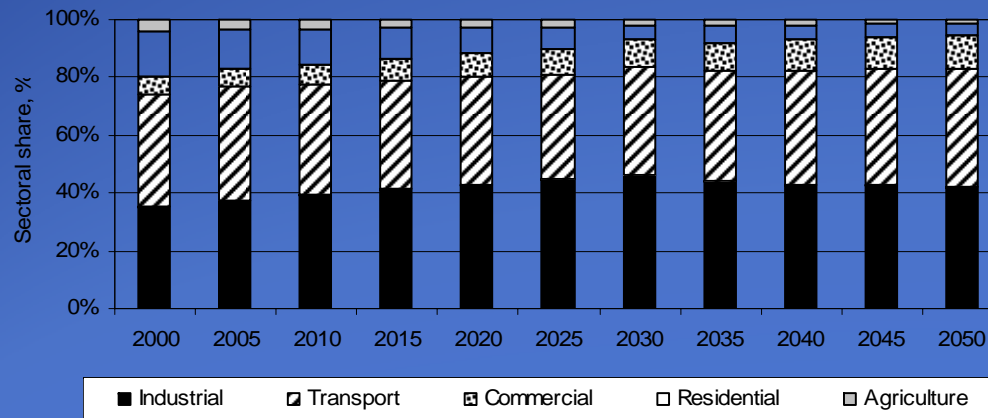
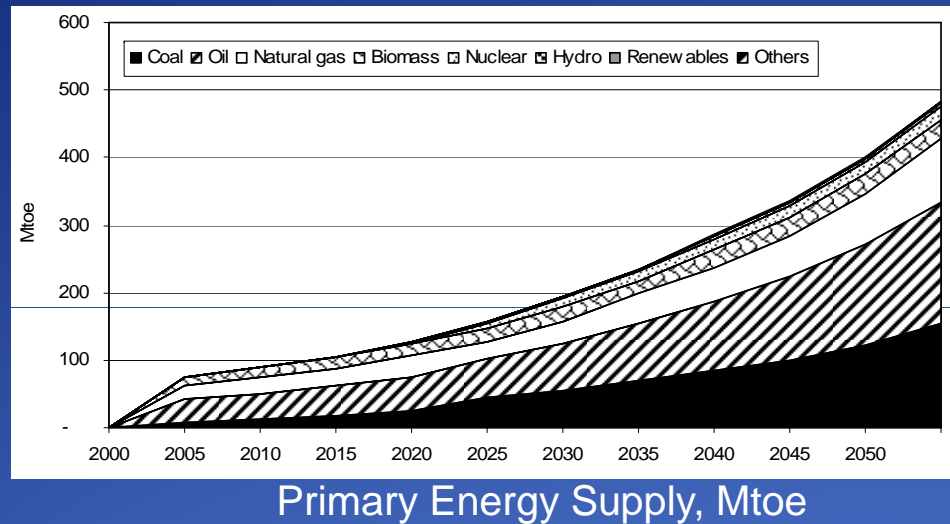
8 December 2007
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Thailand: Brief Background

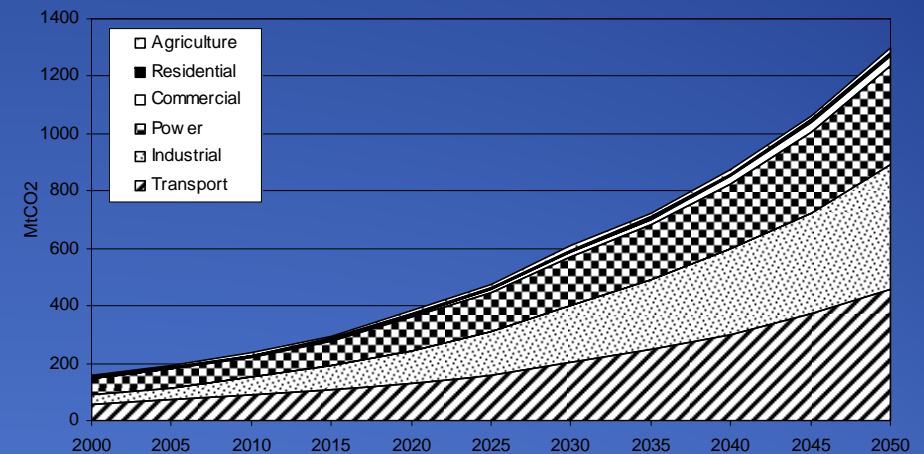
- **Population:** 64.76 million
- **Population Density:** 126 people/km²
- **GDP:** US \$ 176 billion
- **GDP per capita:** US \$ 2727 (year 2005)
- **Economy:** 2nd highest in ASEAN region
- High passenger vehicle ownership rate (Vehicles/thousand people: 324 in Bangkok and 100 (Thailand))
- Electricity generation mainly based on fossil fuels (gas, coal)

Energy mix and CO₂ emission in Base Case

Results based on AIM/Enduse model
(Thailand)

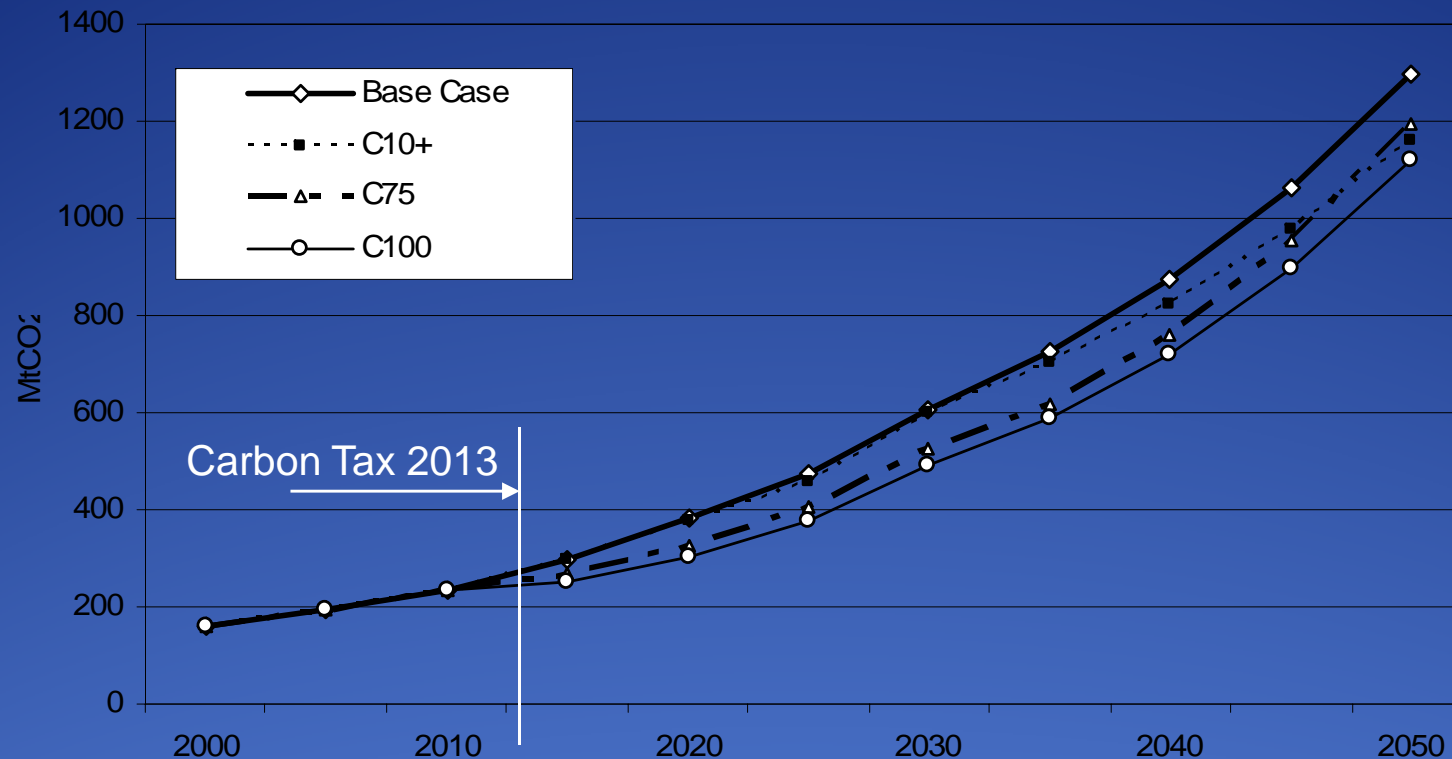


Sectoral Share of Energy Consumption in Base case, %



CO₂ Emission in base case, MtCO₂e
7 fold increase in CO₂ emission
in the base case in the planning
horizon (from 158 million
tCO₂e in 2000 to 1299 million
tCO₂e in 2050).

Effect of Carbon Tax on CO₂ emission in Thailand during 2013-2050



Cumulative CO₂ emission reduction during 2013-2050 (without MRT option):
 C100 : 16.4%
 C75 : 11.5%
 C10+ : 5.5%

Energy type	Percentage share in total energy used in the power sector			
	Base case	C10+	C75	C100
Coal	54	47	39	31
Natural gas	16	20	28	36
Biomass	8	8	8	8
Oil	0	0	0	0
Nuclear	8	12	12	12
Hydro	11	12	12	12
Other renewables	3	2	2	2

Sectoral CO₂ emission reduction with Carbon Tax

Sectors	Base Case Cumulative CO ₂ emission, MtCO ₂	Cumulative emission reduction from the base case emission level under carbon tax scenarios, MtCO ₂		
		C10+	C75	C100
Agriculture	549	0	0	0
Commercial	712	0	0	0
Industrial	9,106	69	337	470
Residential	424	24	27	27
Transport	9,869	283	285	579
Power	8,117	1,204	2,671	3,632
Total	28,779	1,582	3,321	4,710

- Power sector accounts for the largest CO₂ emission reduction (more than 75% in total emission reduction) in Thailand if no MRT/railway option is considered.
- CO₂ reduction from transport sector not very significant (without MRT/rail option).

Role of RE and emerging technologies

With carbon tax:

- Emerging technologies like CCS in coal fired power plants (IGCC and PFBC) in Power Generation will play significant role.
- Role of renewable Energy Technology i.e., PV (with the present price and technology characteristics) role in CO₂ emission reduction is relatively small.
- However, if learning-by-doing effect is considered, solar PV becomes cost effective and , as a result, can reduce CO₂ emission significantly.

Effect of MRT and carbon tax

A shift of of passenger travel demand served by low occupancy vehicles (cars, vans and pickups) to MRTS and railway services (by 10% in 2015 to 30% in 2050) could reduce CO₂ emission by

- 10.1% under C10+ (5.5% without MRT option)
- 16.5% under C75 (11.5% without MRT option) and
- 19.2% under C100 (16.4% without MRT option)

Concluding Remarks

- Effectiveness of economic instruments (?)
- Role of public/mass transport development in CO₂ emission reduction;
- Integrated development of power and transport sectors needed
- Emerging technologies and RE to play important role for LCS.