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# **CO<sub>2</sub> Reduction and Transport Sector in Thailand: Some Insights**



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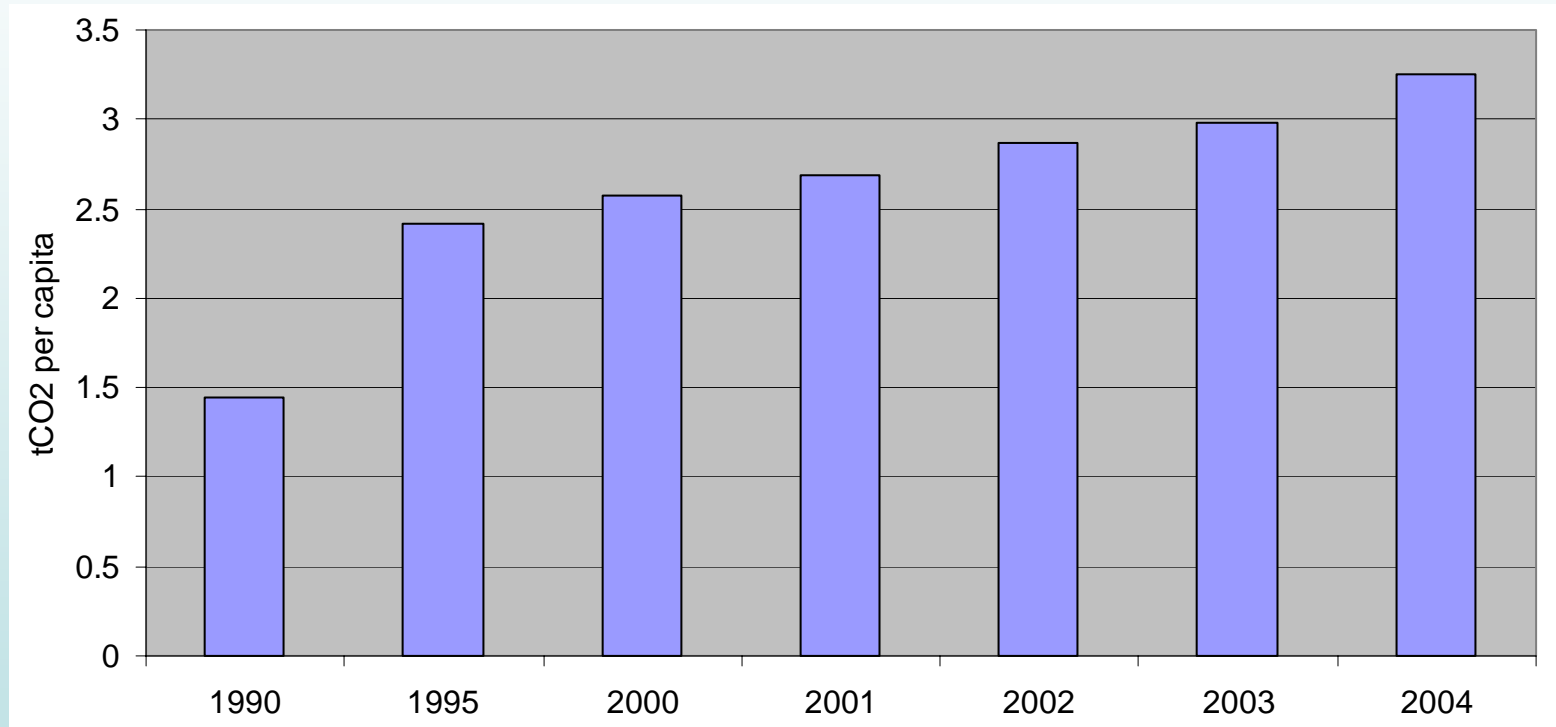


# Thailand: Brief Background

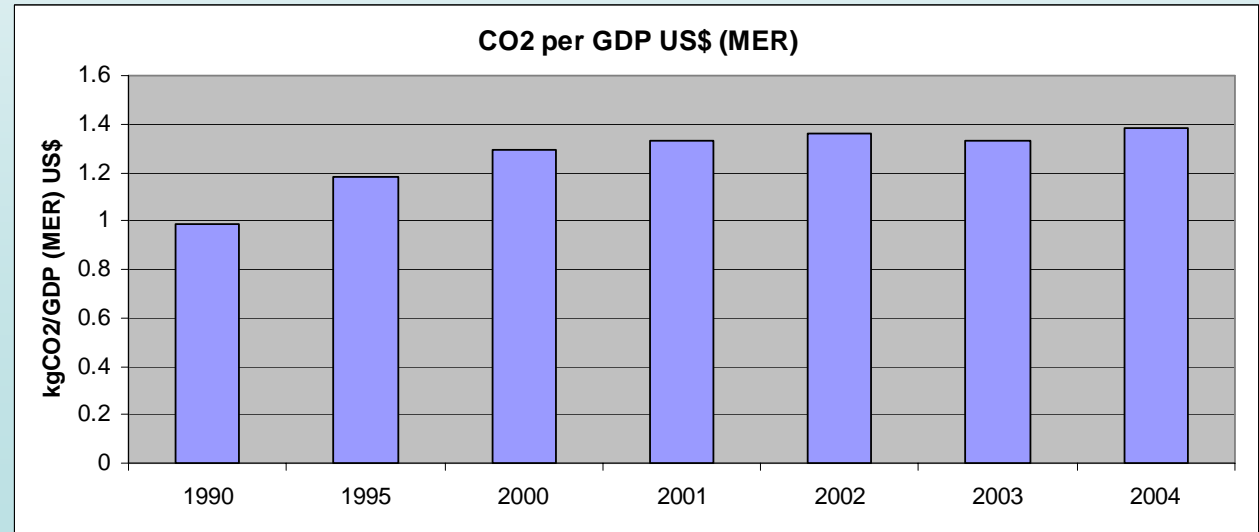
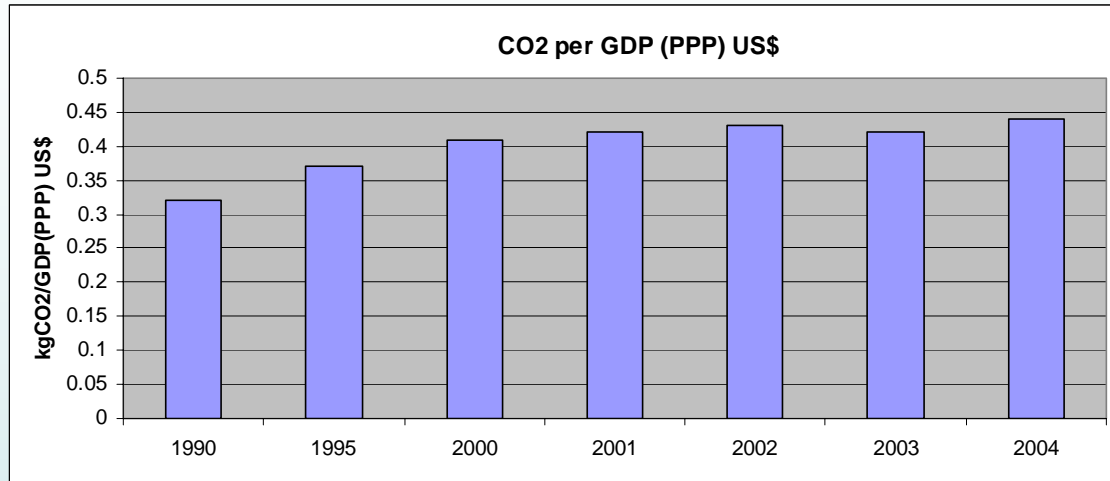
- **Population:** 64.76 million
- **Population Density:** 126 people/km<sup>2</sup>
- **GDP:** US \$ 176 billion
- **GDP per capita:** US \$ 2727 (year 2005)
- **Economy:** 2<sup>nd</sup> largest in ASEAN region
- CO<sub>2</sub> emission: 179.9 MtCO<sub>2</sub> (2004) – 2<sup>nd</sup> largest emitter in ASEAN
- High passenger vehicle ownership rate (Vehicles/thousand people: 324 in Bangkok and 100 (Thailand))
- Electricity generation mainly based on fossil fuels (gas, coal)



# CO<sub>2</sub> per capita in Thailand



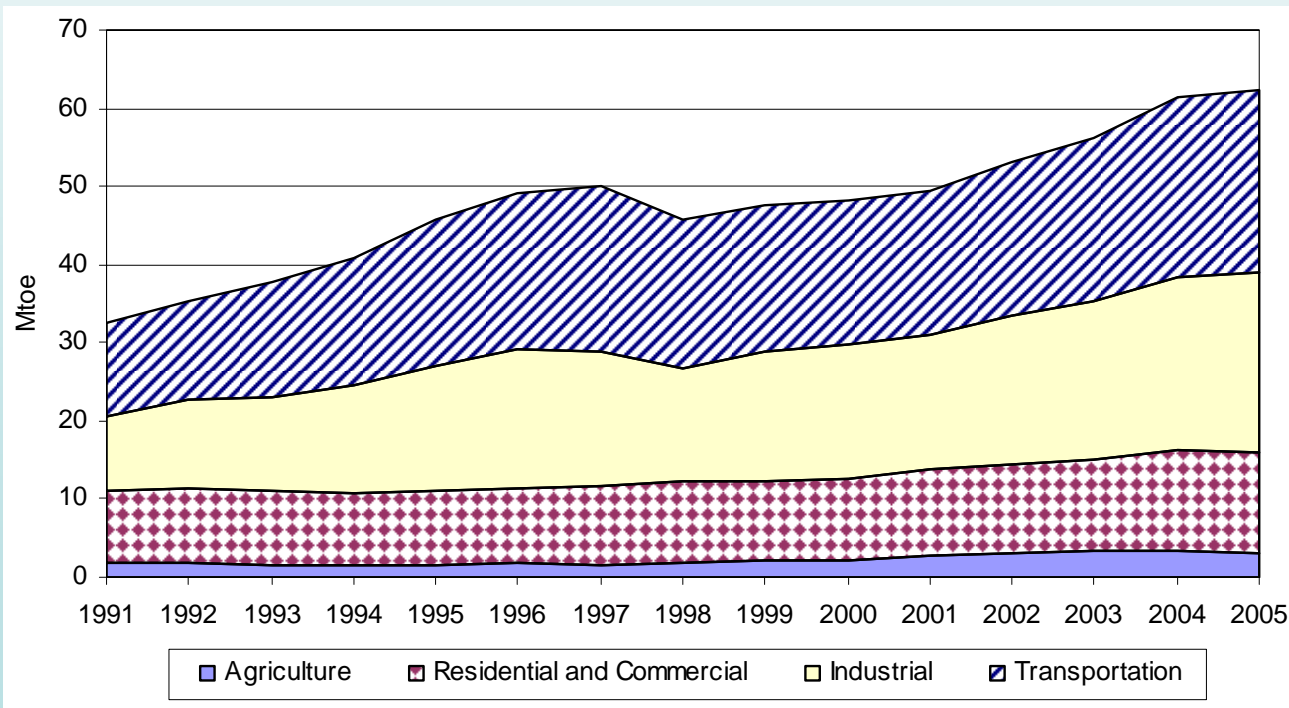
# CO2 indicator of Thailand





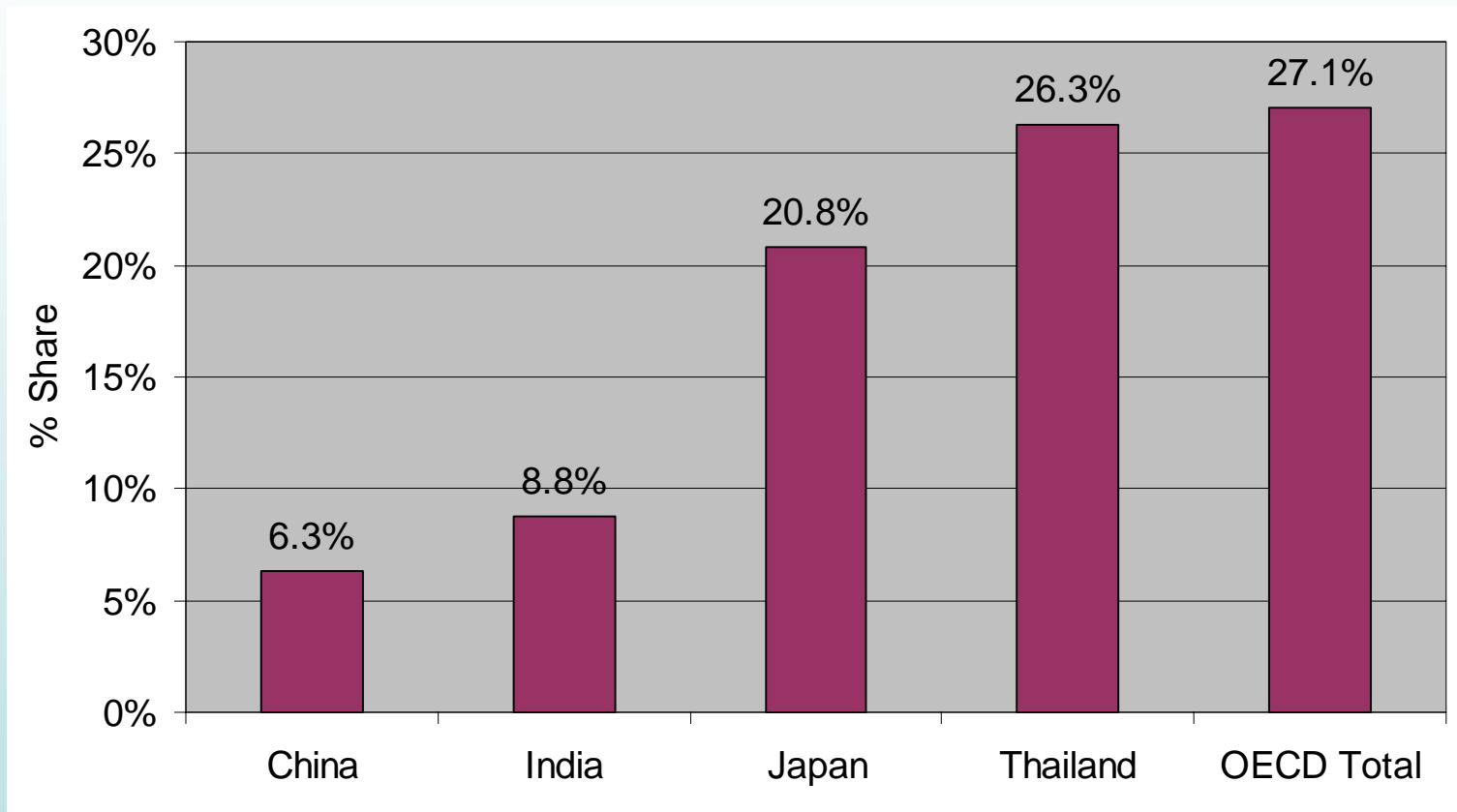
# Predominance of road in transport sector

- Length of Highway: 64,000 km
- Length of Railways: 4070 km (1 m gauge railway line)
  - 294.63 km double track
  - 106.01 km triple track.



Transport sector has the 2<sup>nd</sup> largest share (38.6% in 2005) in Total Energy Consumption.

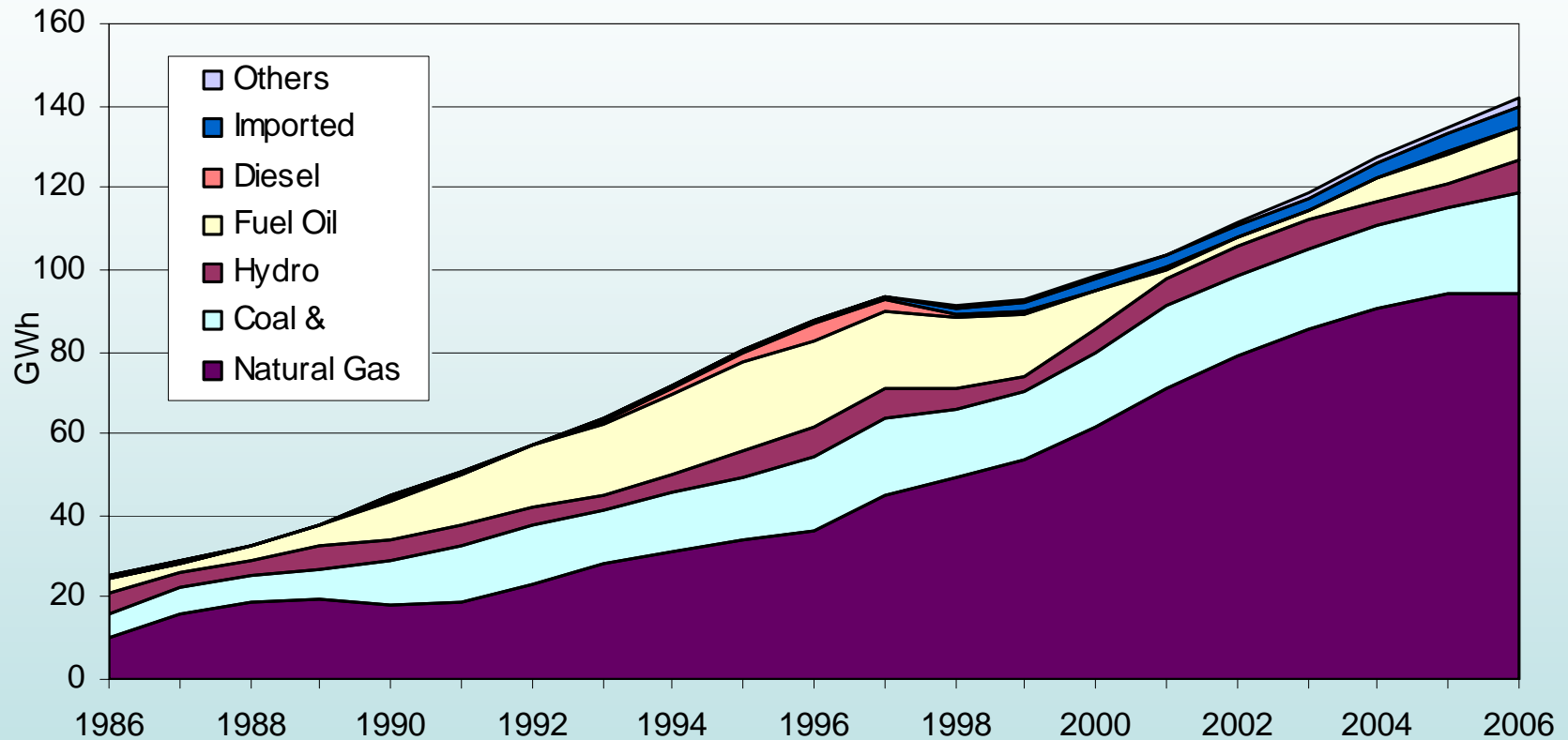
# Transport Sector share in total CO2 emission



In Thailand, transport sector has higher share in total CO2 emission.



# Power Sector Fuel Consumption



Source: EGAT, 2007

- Natural gas has been occupying the largest share in the power generation



# **Environmental Friendly Policies and Programs in Transport and Power Sectors in Thailand**





# Environment Friendly policies

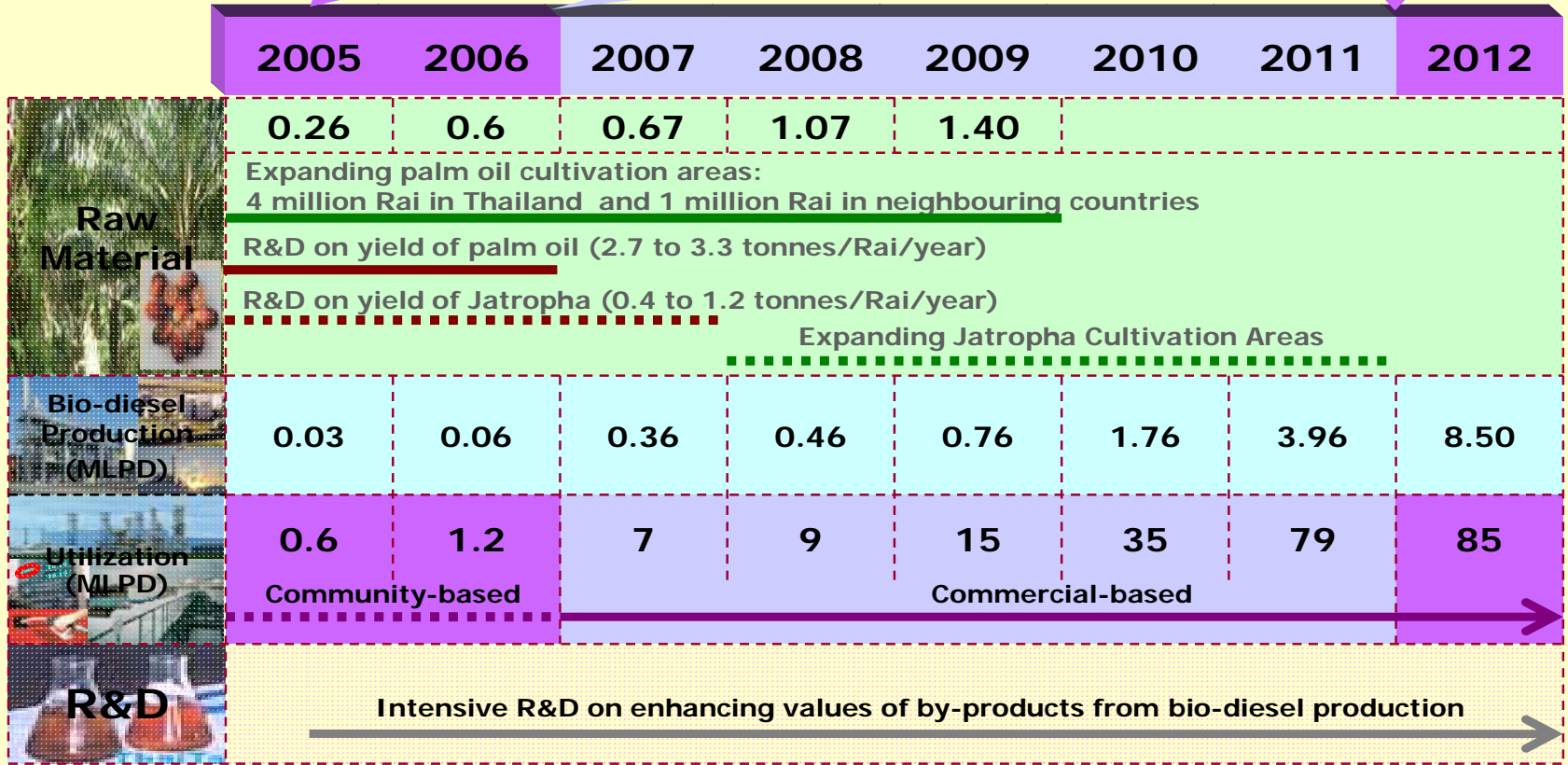
- Power Sector
  - PDP 2007 has a plan for nuclear and coal plants as future power generation
  - Nuclear power plants will be introduced by 2020 with a capacity of 2000 MW.
  - Additional nuclear power plants of 2000 MW capacity will be connected by 2021.
  - Power sharing deal/agreements with neighbouring countries:
    - Purchase of 5000 MW hydro from Union of Myanmar by 2015.
    - Purchase of 3000 MW power from China by 2017.
    - 6371 MW hydropower from Lao PDR by 2021.
- Transport Sector
  - To replace current diesel run train with electric locomotives with medium speed train (120-140 km/hr average)
  - To develop mass transit to replace private vehicles (813 km long double track trains)
  - To develop intercity electric trains to reduce private vehicles usage within city.

# Action Plan on Bio-diesel Utilization Promotion and Development

Community Scale development and B100 Specification Establishment

Commercial Scale of B100 Production and Utilization of B5 in the South and the Central Part of Thailand

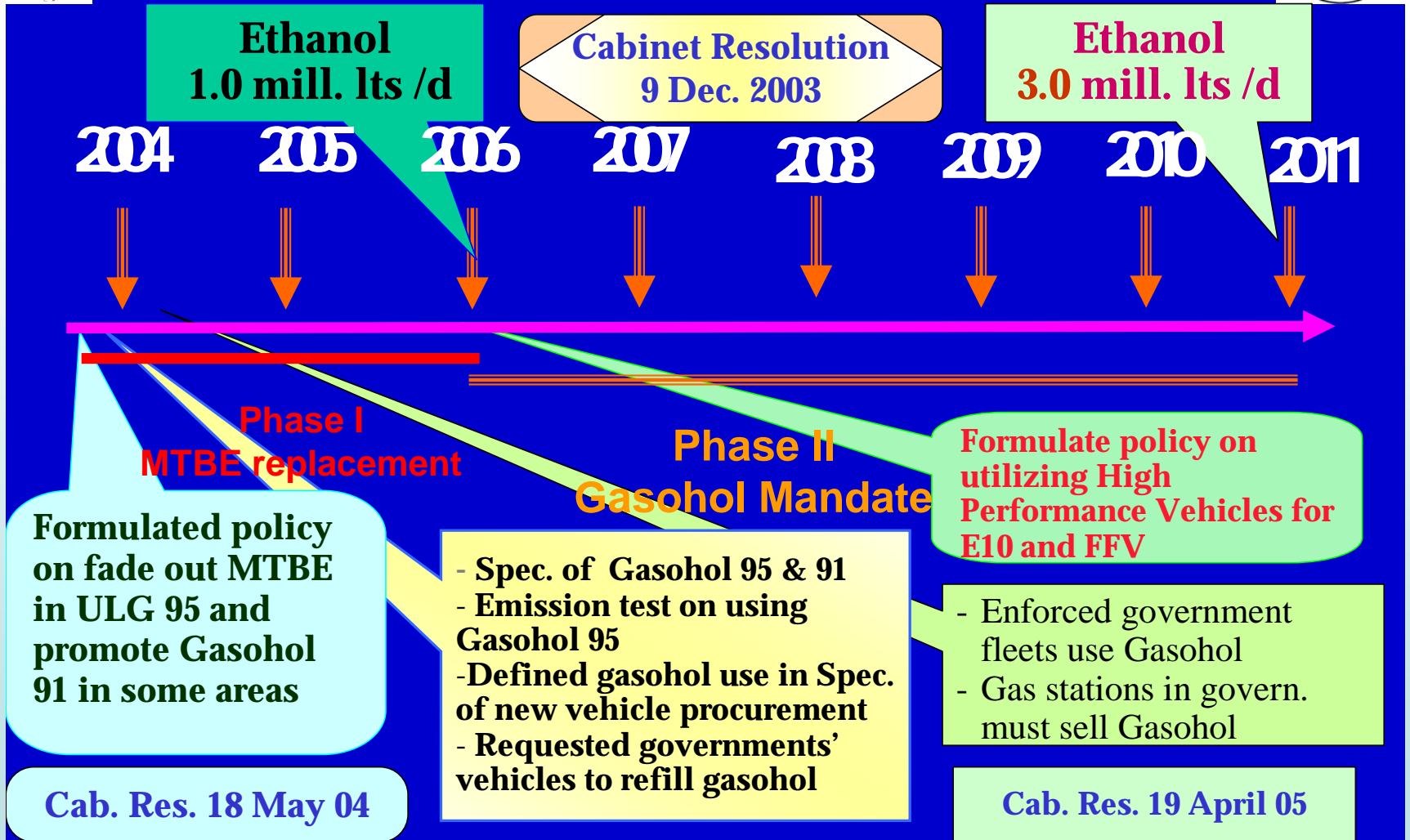
Substitute B100 to 10% Diesel



- Biodiesel target approx. 81 ktOE/day

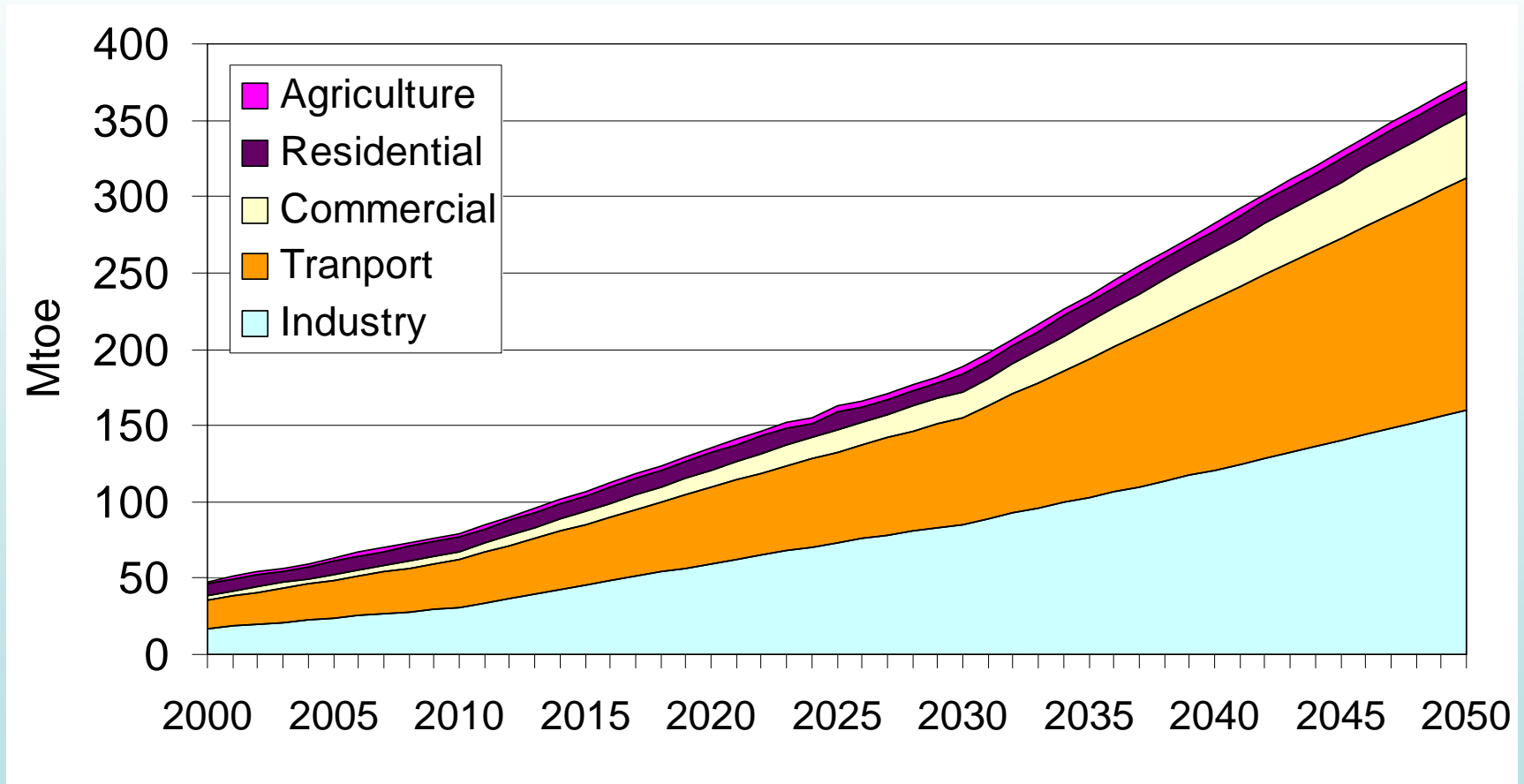


# Gasohol Strategic Plan



E10 target is approx 29 ktoe/day

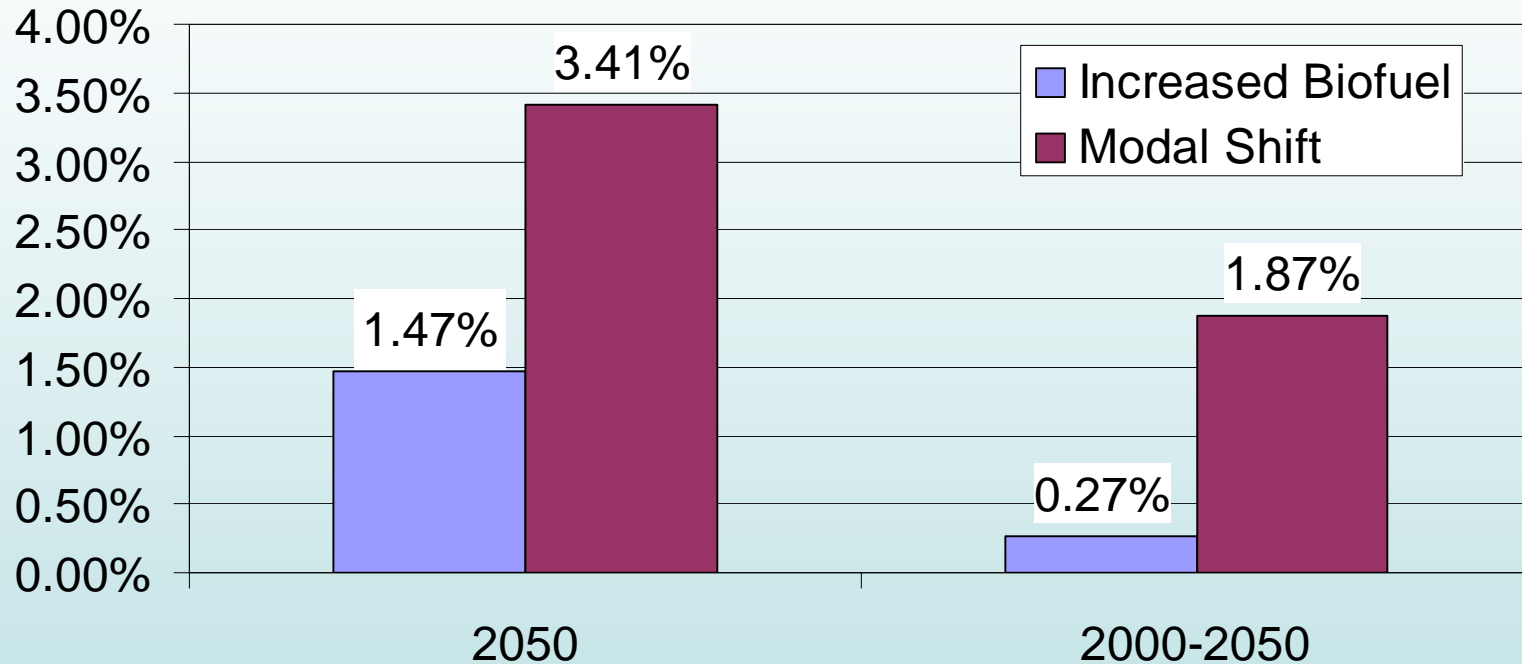
# Sectoral Energy Consumption Shares





# CO2 Emission Reduction in increased biofuel availability and modal shift case

Percentage of CO2 Emission Reduction



In increased biofuel case:

	Base Case	Increased Biofuels Case, ktoe
Biodiesel	40000	76625
Gasohol	20000	24368

In modal shift case:

- 10% of passenger travel demand of car, van and pickup would be substituted by mass rapid transit (electric railways) in 2015.
- 20% by 2030 and 30% by 2050.

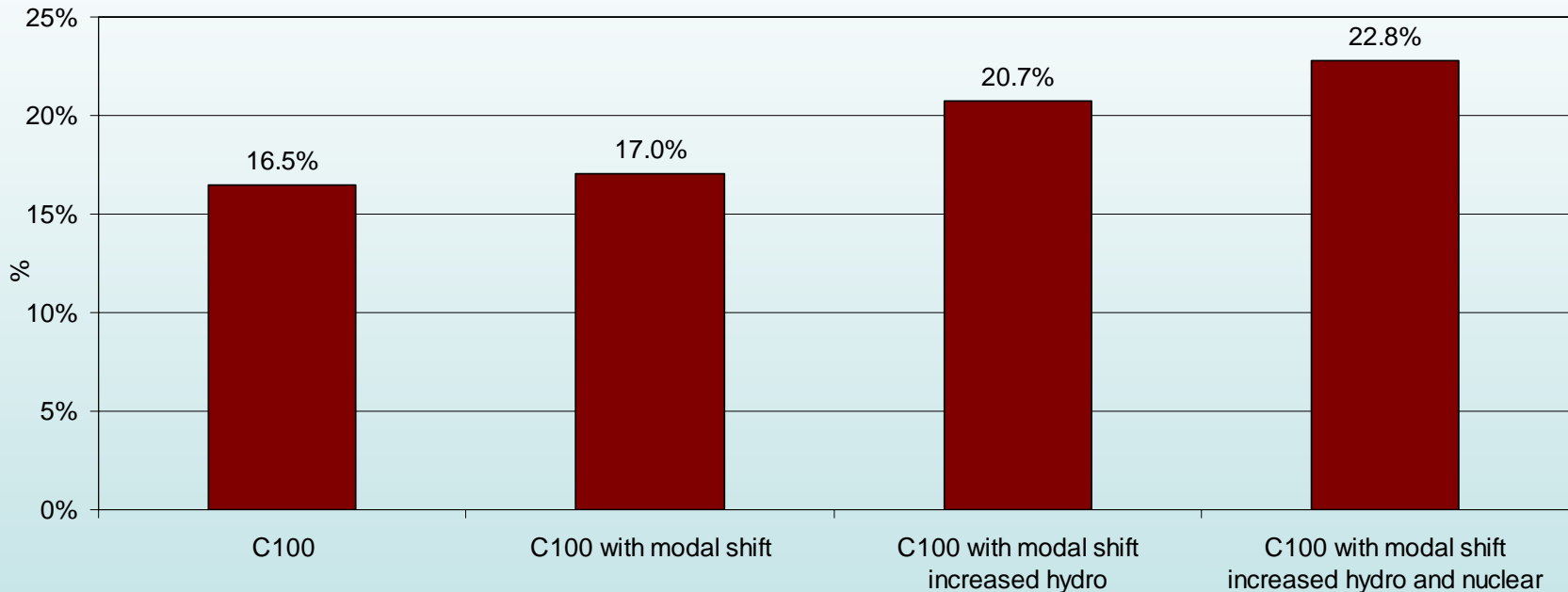


# CO2 emission reduction from different sectors

	CO2 emission reduction from the base case			
	Base case emission, MtCO2	C100	C100 modal shift	C100 modal shift, increased hydro and nuclear
Agriculture	549	0%	0%	0%
Commercial	712	0%	0%	0%
Power	7725	77%	68%	72%
Industrial	9201	13%	11%	3%
Residential	405	0%	0%	0%
Transport	9544	10%	21%	24%
Total (MtCO2)	28137	4633	5225	6403
% of Base Case		16%	19%	23%



# Role of modal shift with carbon tax during 2000-2050



- Additional hydro and nuclear availability would be fully used under C10+ and C100 by 2050
- In addition more CCS based power generation would be required under C10+ and C100 cases to achieve higher CO<sub>2</sub> reduction.



# Concluding Remarks

- Biofuels have a limited role in CO<sub>2</sub> reduction
- Modal shift is a major option for carbon mitigation in developing countries. However, modal shift alone will have a limited CO<sub>2</sub> reduction potential in the absence of climate friendly power generation options.
- Regional hydropower development and nuclear options need to be considered for significant reduction of CO<sub>2</sub> emission.
- Other demand side options need to be adopted for additional carbon emission reduction.



**Thank You!**