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Emission Inventory and Modeling Applications:

Effects of CO₂ Emission Targets in Thailand



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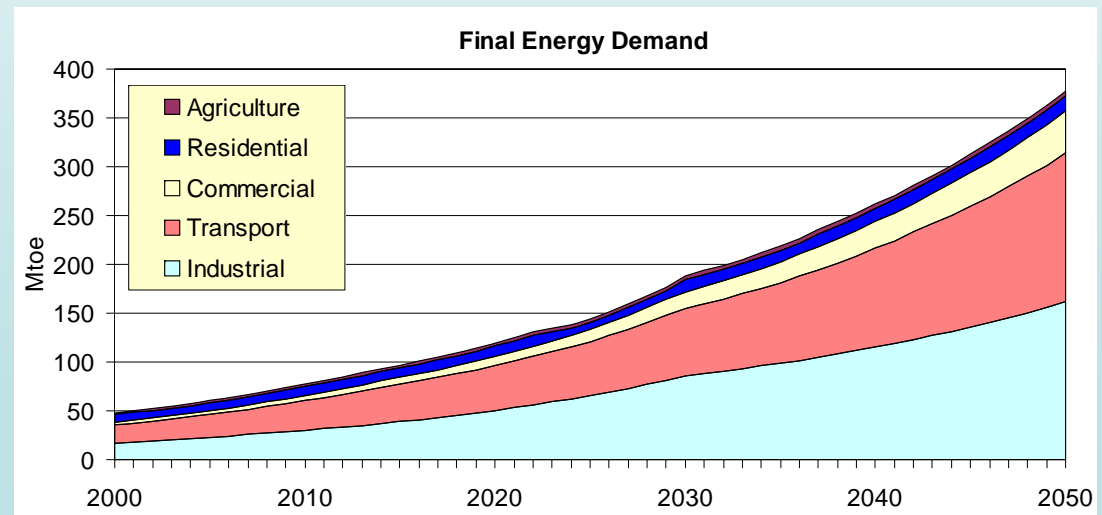
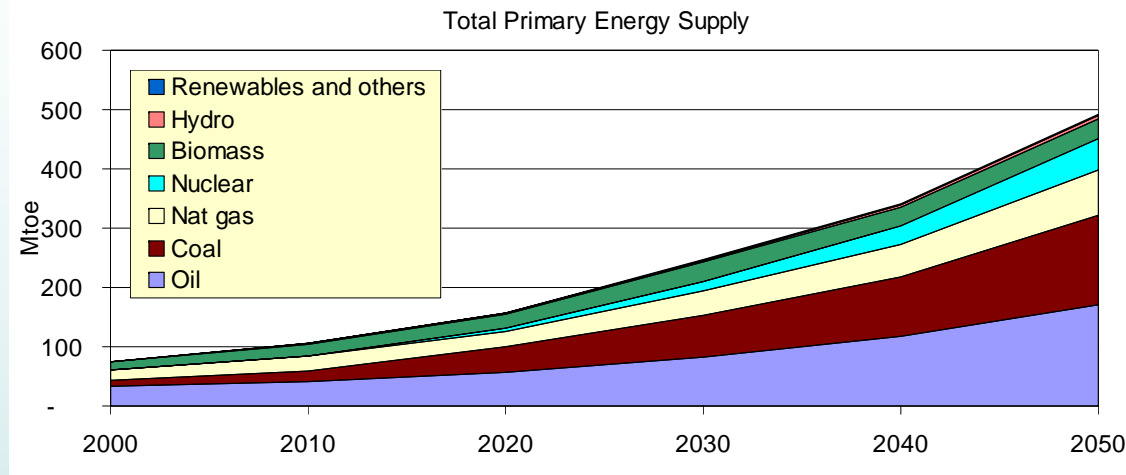
Thailand Model: Base Case



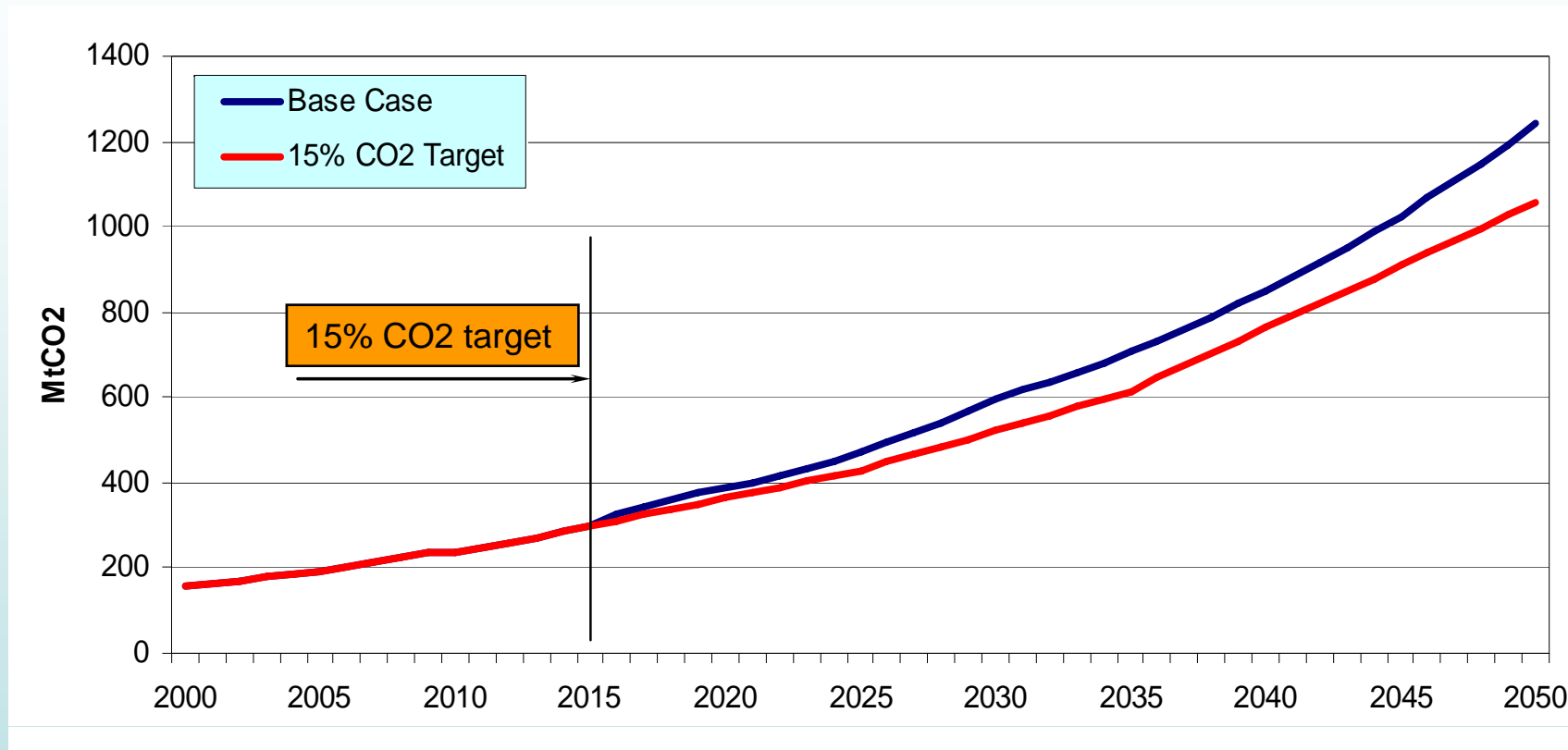
Base Case assumptions:

- Hydro Import:
 - 4000 ktoe (Assumption: 21 GW of hydropower electricity is available as electricity import in the base case by 2050)
- Nuclear will be introduced by 2020:
 - 2500 ktoe (4000 MW)
- Nuclear power generation will be available to the maximum of
 - 20,000 ktoe by 2050
- Biodiesel (B10) will be available up to
 - 40,000 ktoe by by 2050
- Gasohol (E10) will be available up to
 - 20,000 ktoe by 2050.

Energy Supply and Demand during 2000-2050

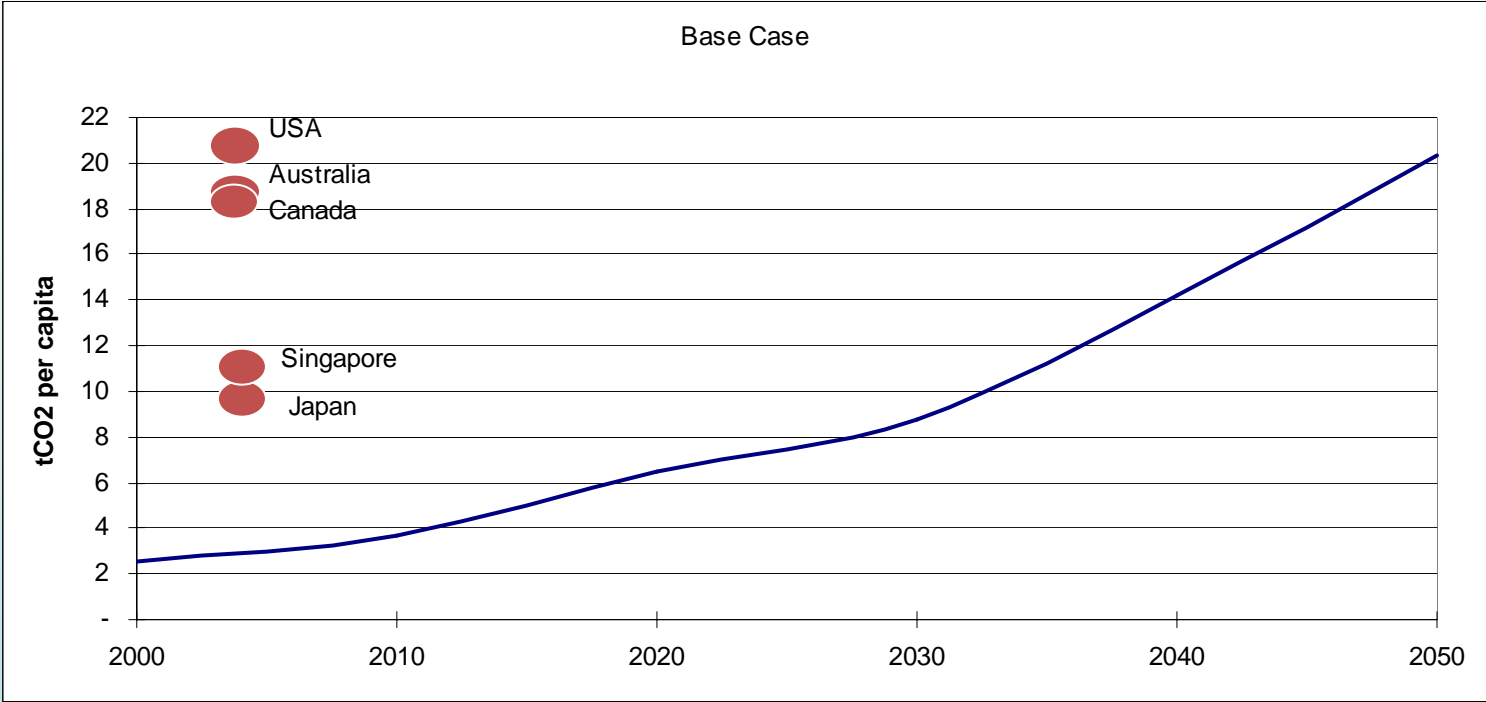


CO₂ emission

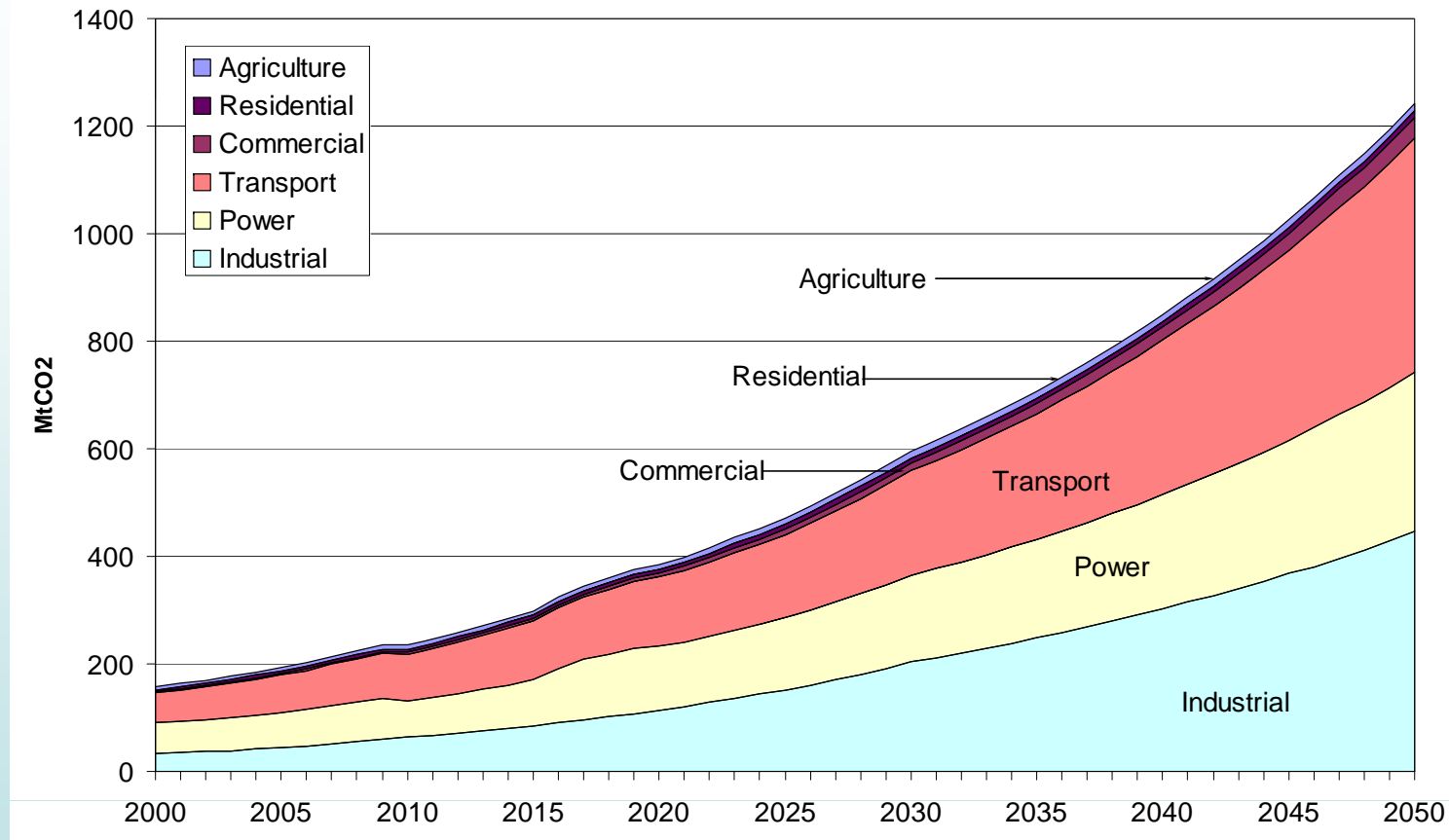


- 15% CO₂ target introduced from 2015
- 2.7 billion tCO₂ would be reduced during 2000-2050 (10%) and 186 billion tCO₂ in year 2050 (15%).

CO2 emission per capita in Base Case during 2000-2050

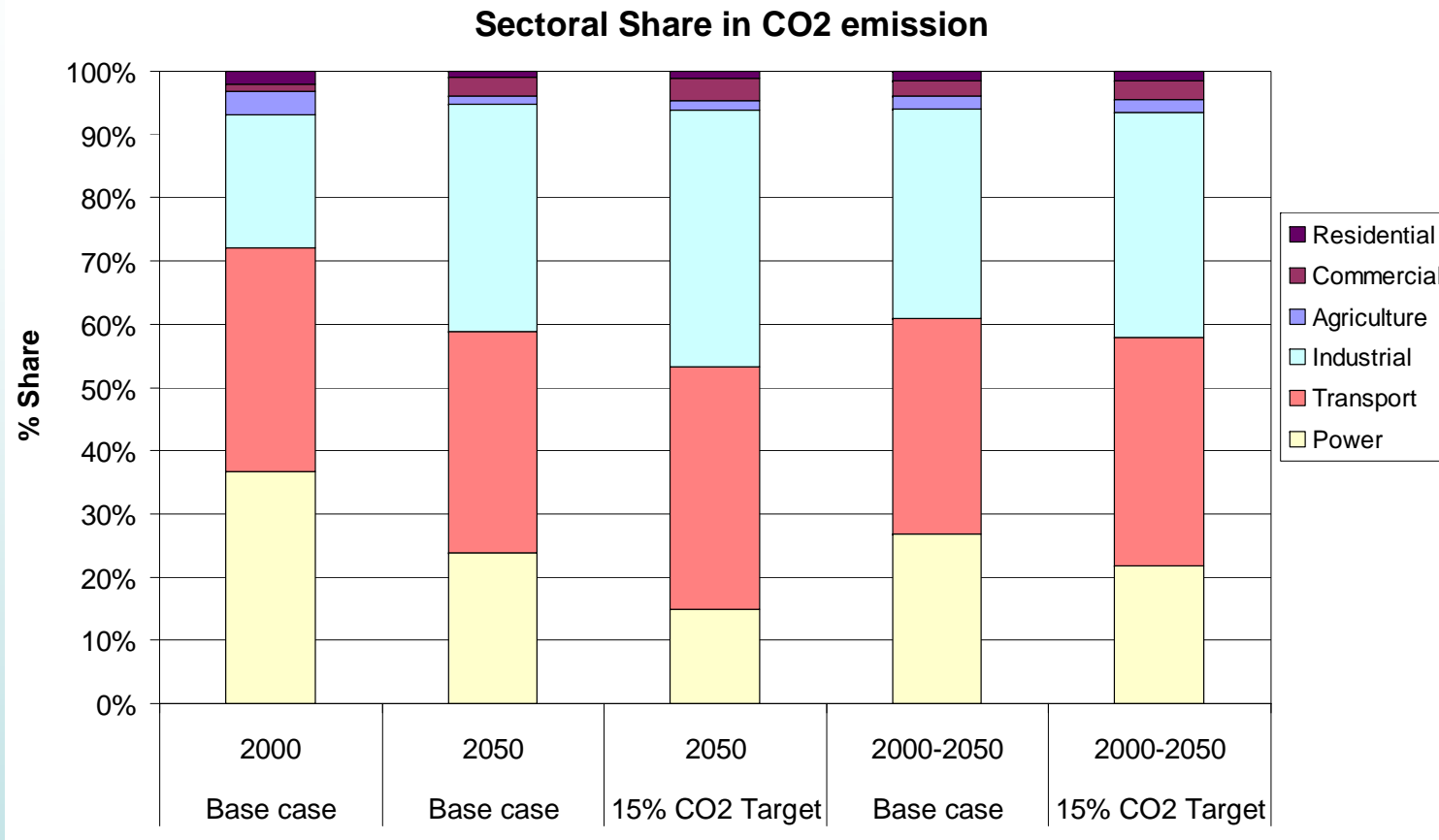


Sectoral CO₂ emission in the Base case



- Industrial, Transport and Power sectors together account for 94% share in CO₂ emission.
- Residential, Commercial and Agriculture sectors together account for 6% share in CO₂ emission

Sectoral shares in CO₂ emission

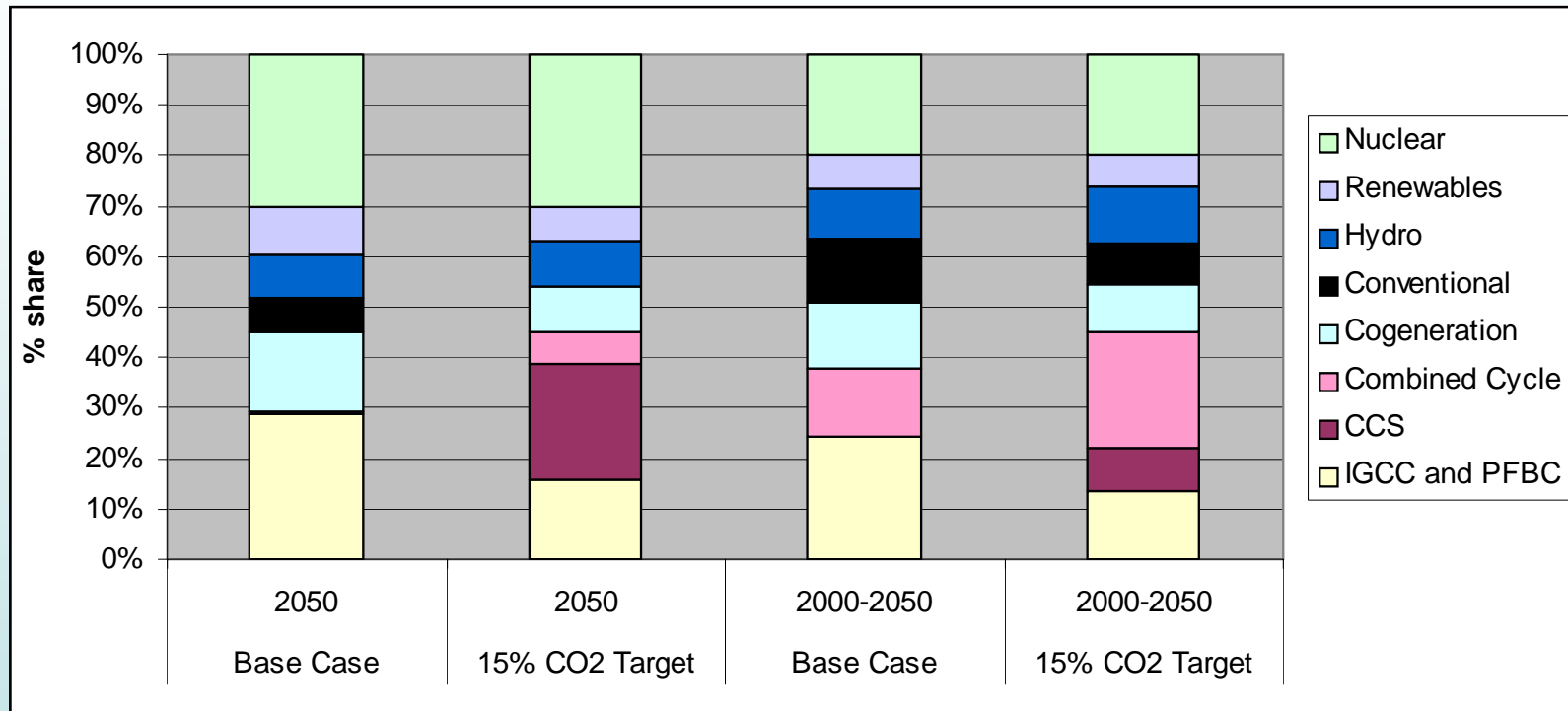


- The power sector would achieve the largest CO₂ emission reduction (73%) followed by Transport sector (15%) and Industrial sector (12%).

Technology-mix in Power Generation



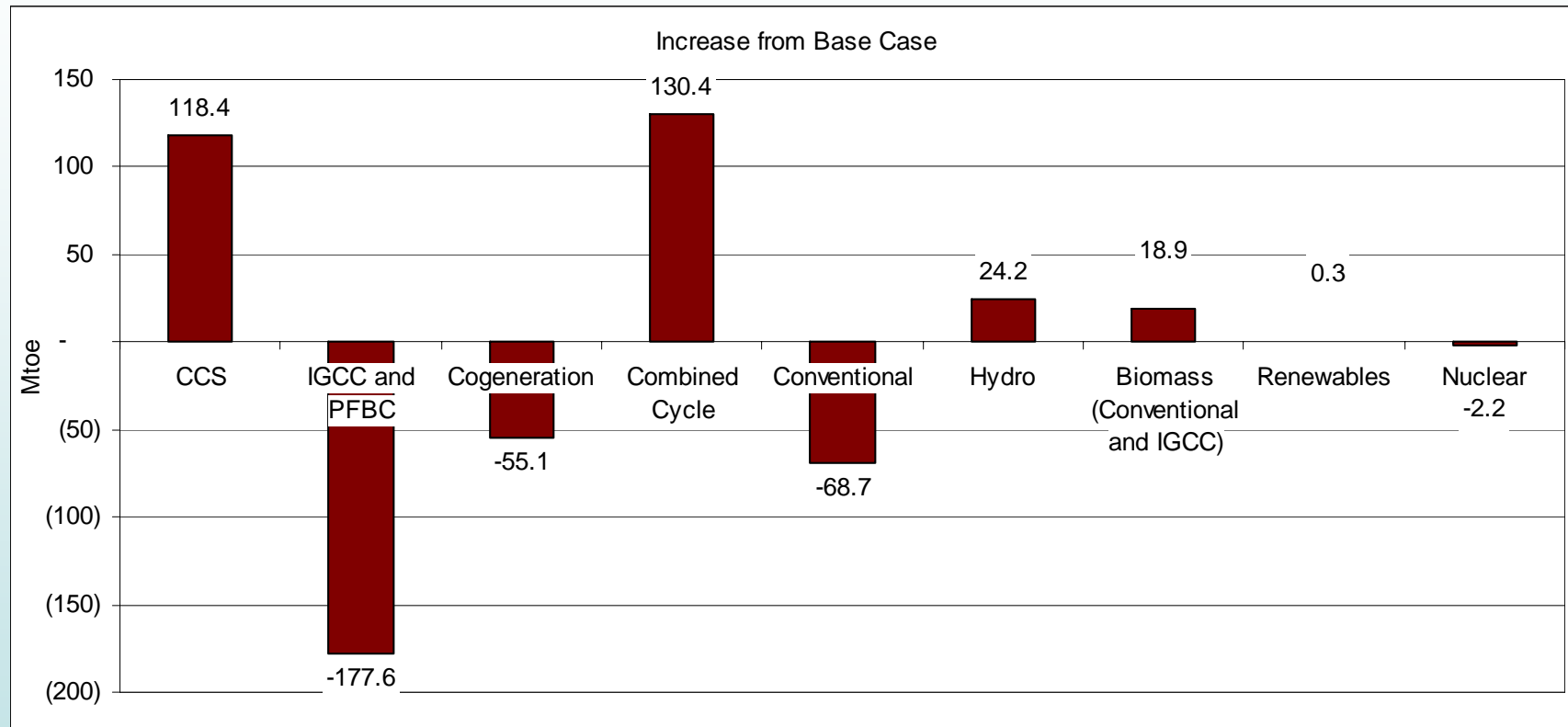
Shares of different technologies in Power Generation



CO₂ target would (during 2000-2050)

- introduce CCS based coal fired power generation (188 Mtoe).
- reduce the shares of IGCC, PFBC and Cogeneration (150 Mtoe).
- increase the levels of combined cycle power generation (130 Mtoe)
- decrease the levels of conventional coal and oil based power generation (69 Mtoe).
- increase Hydro based power generation (24 Mtoe).

Changes in Power Supply Technology under 15% CO₂ Target

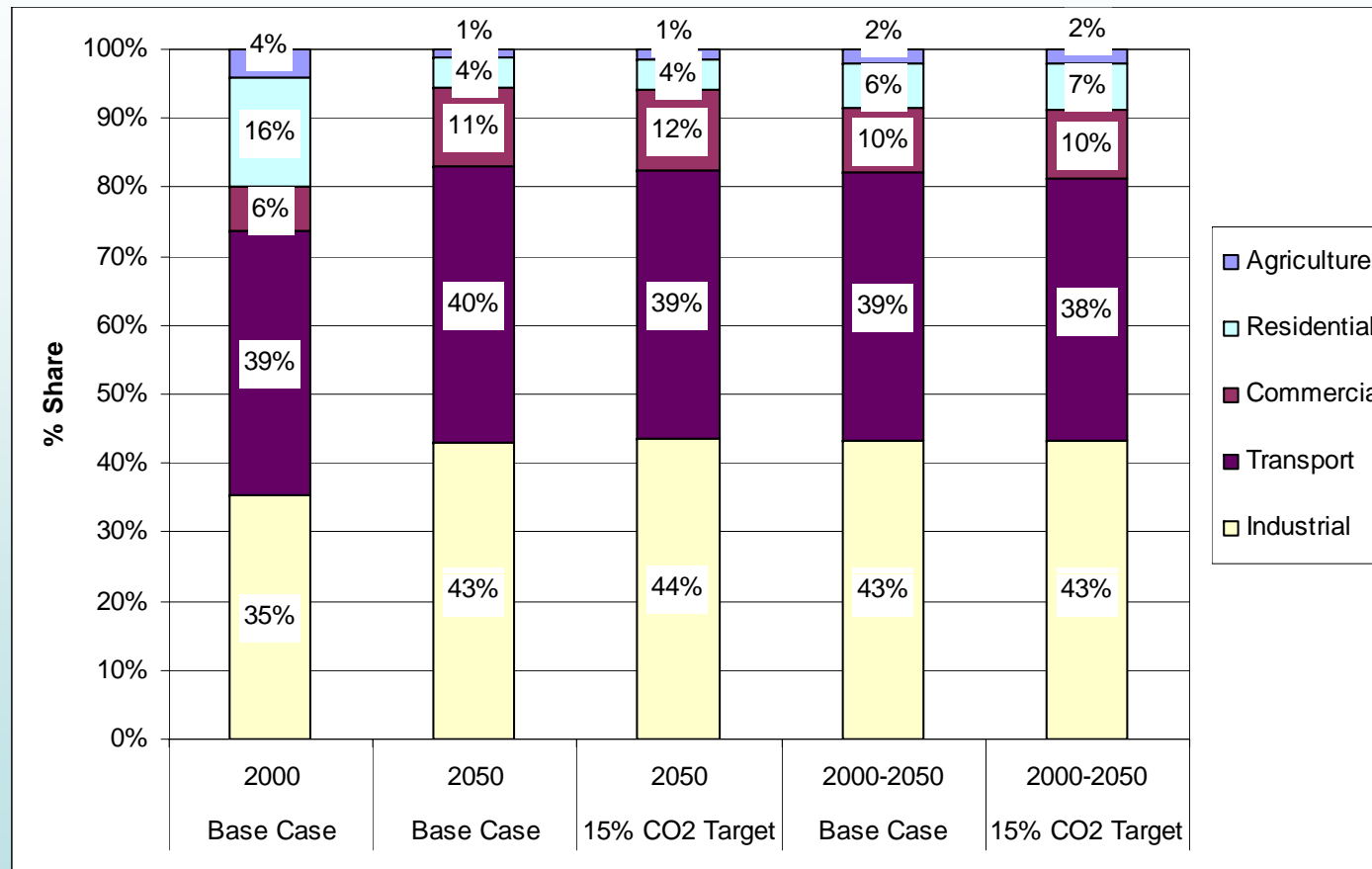


15% CO₂ target would require (during 2000-2050)

- CCS based coal fired power generation (188 Mtoe).
- Combined cycle power generation (130 Mtoe)
- Hydro based power generation (24 Mtoe).
- Biomass (18.9 Mtoe)

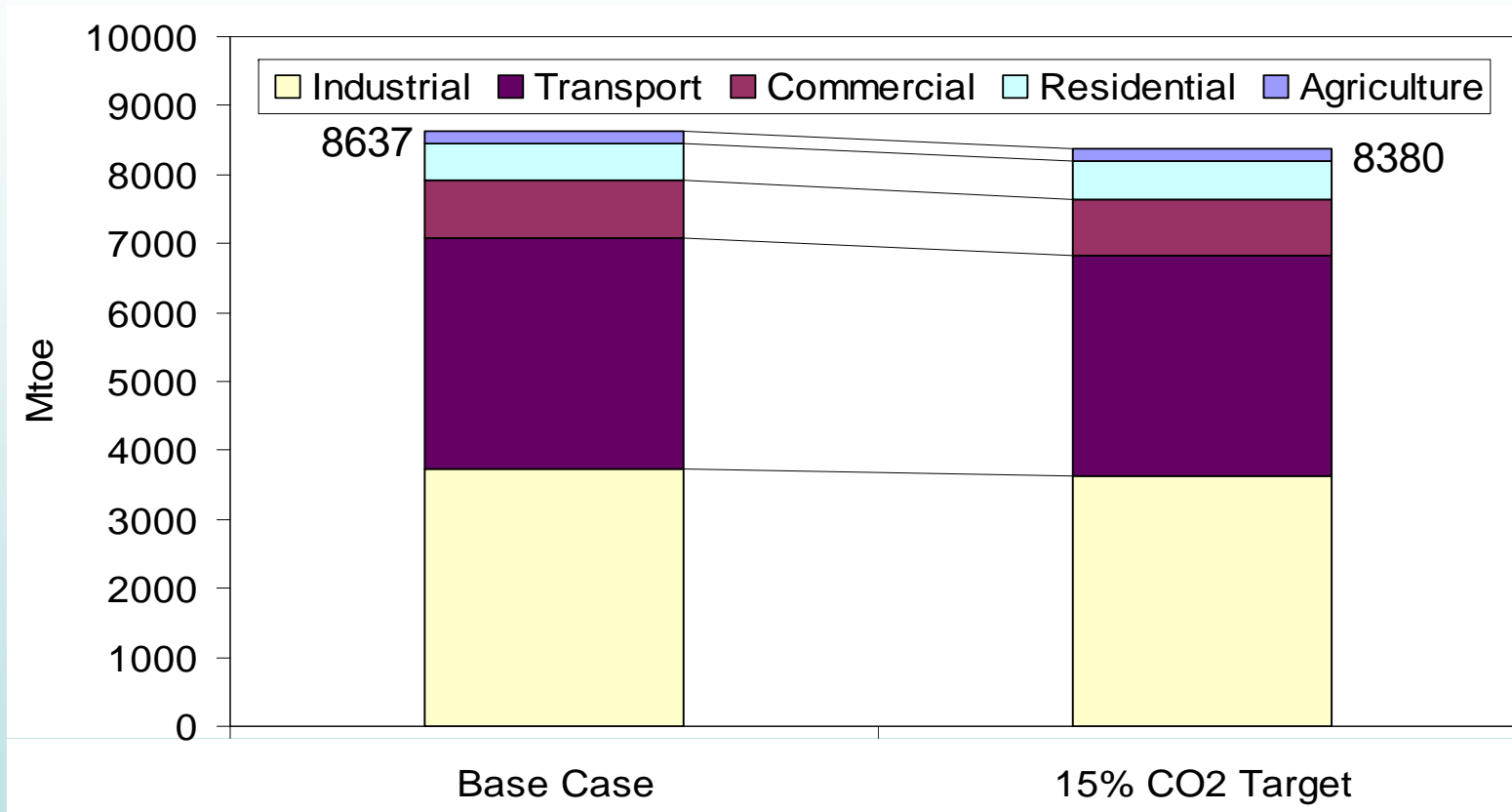


Final Energy Demand under 15% CO₂ Reduction Target



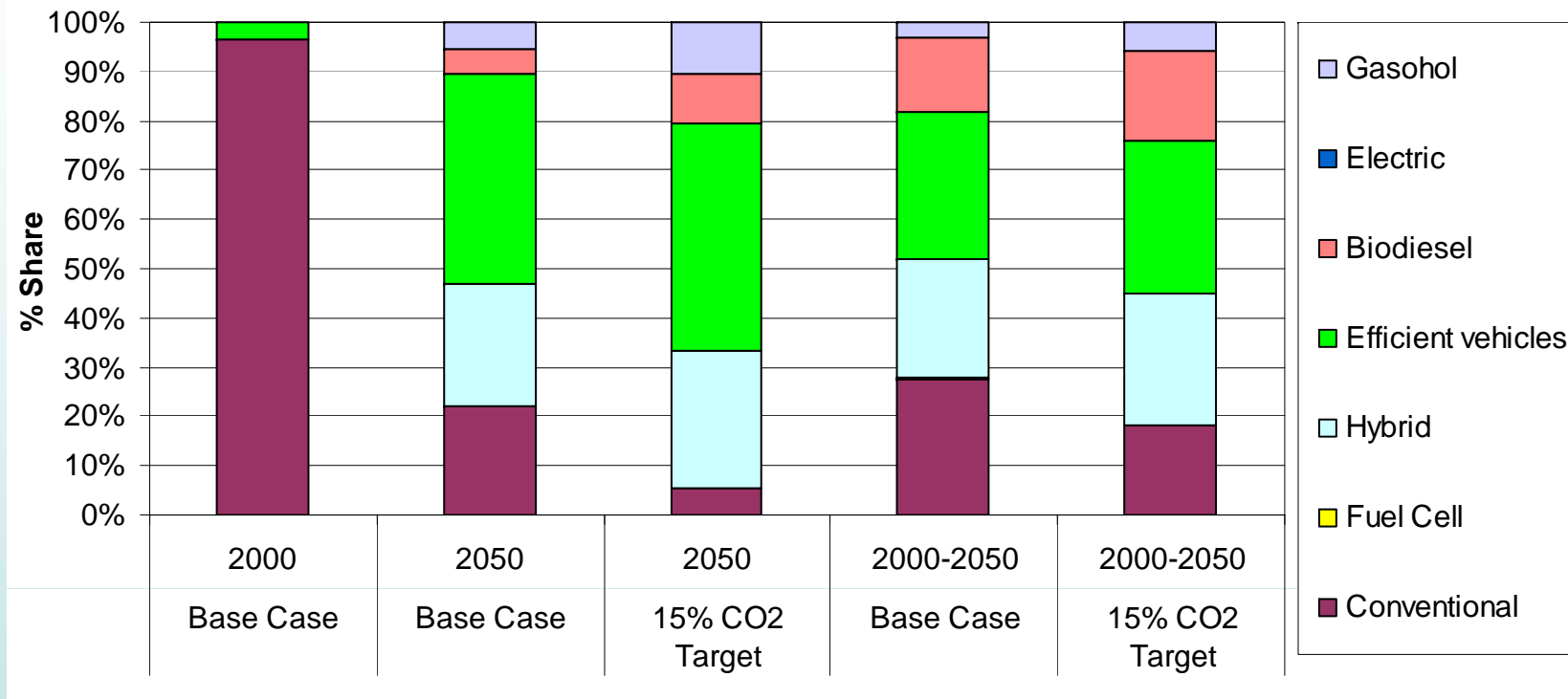
- Not significant changes under 15% CO₂ target
- Industrial and Transport sector would experience a small decrease in energy demand.

Final Energy Demand under 15% CO₂ target



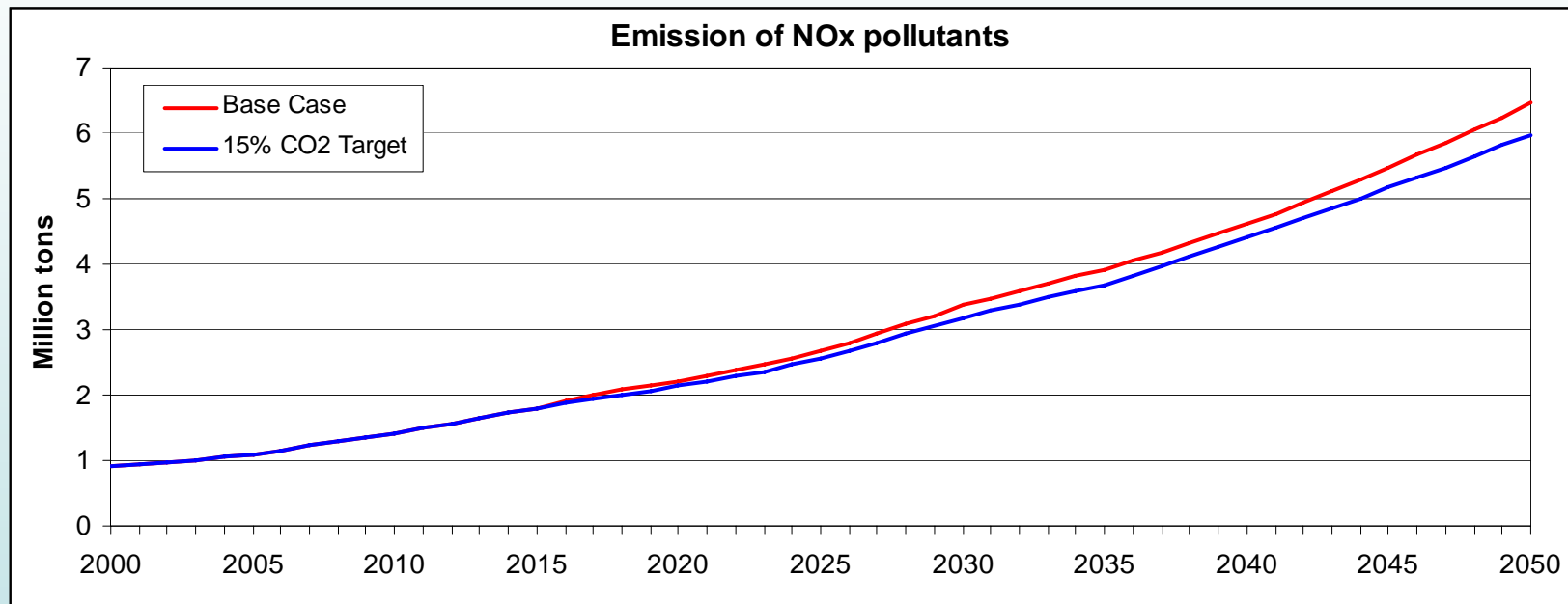
- Industrial (108 Mtoe) and Transport sector (159 Mtoe) final energy demand would slightly decline.

Share of technologies in the transport sector



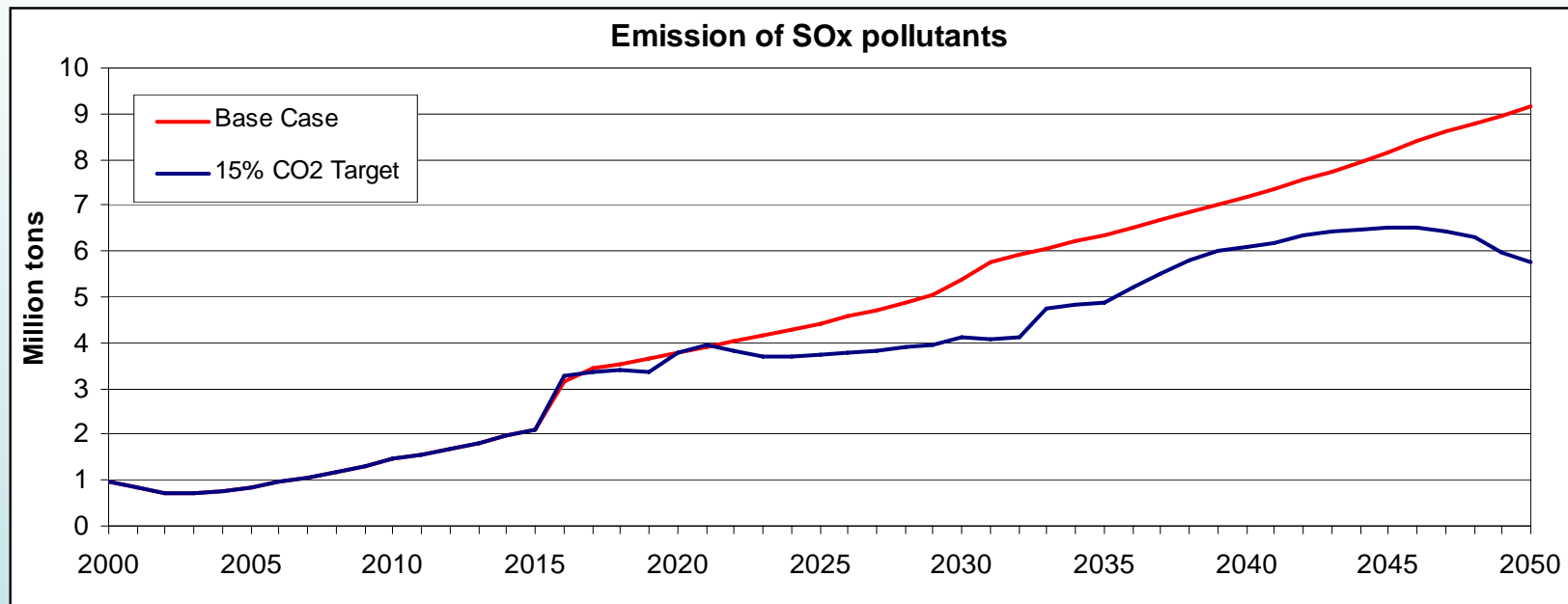
- Efficient gasoline/diesel vehicles (30%), hybrid vehicles (24%) would have a major share in the base case followed by bio-diesel (15%) and Gasohol (3%).
- 15% CO₂ target would increase the share of biodiesel (by 4%), gasohol vehicles (3%) and hybrid vehicles (3%).

NOx emission under 15% CO2 target



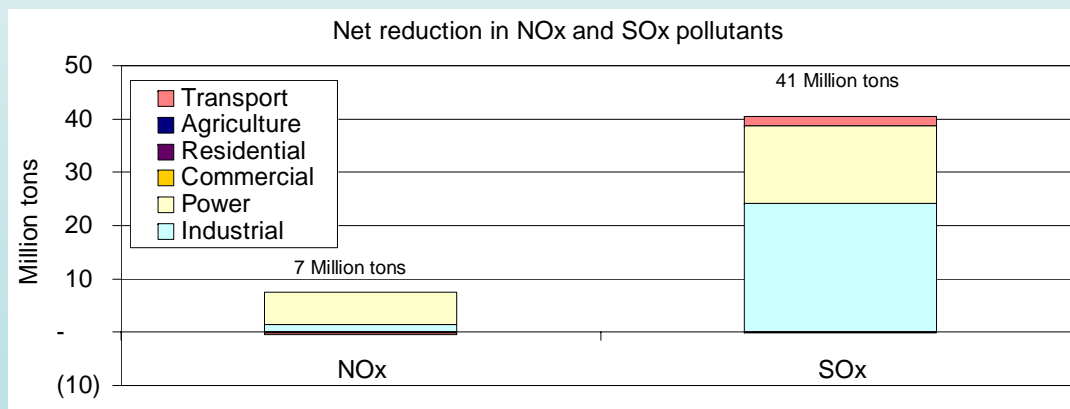
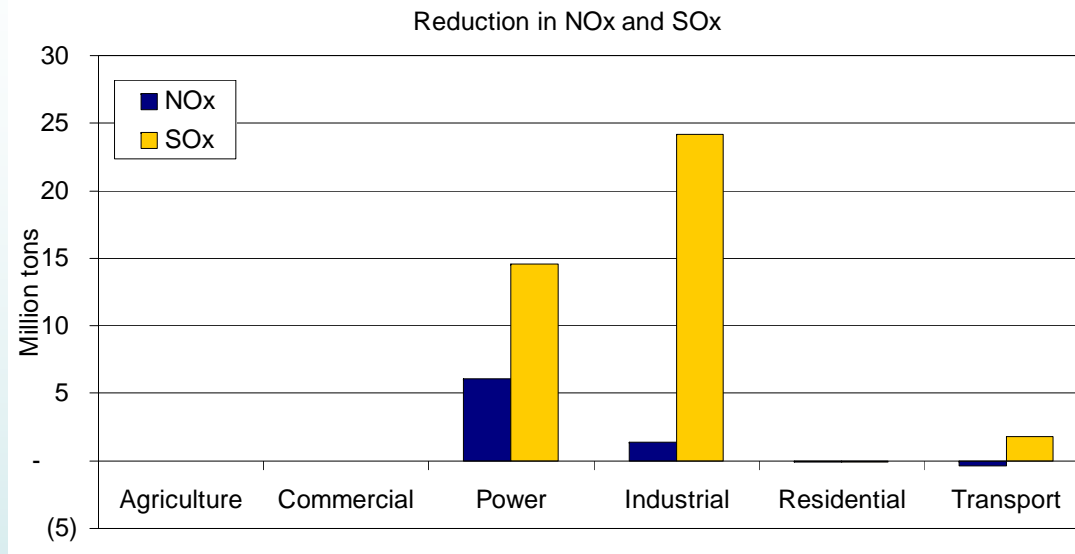
- 7 million ton of NOx is reduced during 2000-2050.

SOx emission under 15% CO2 target



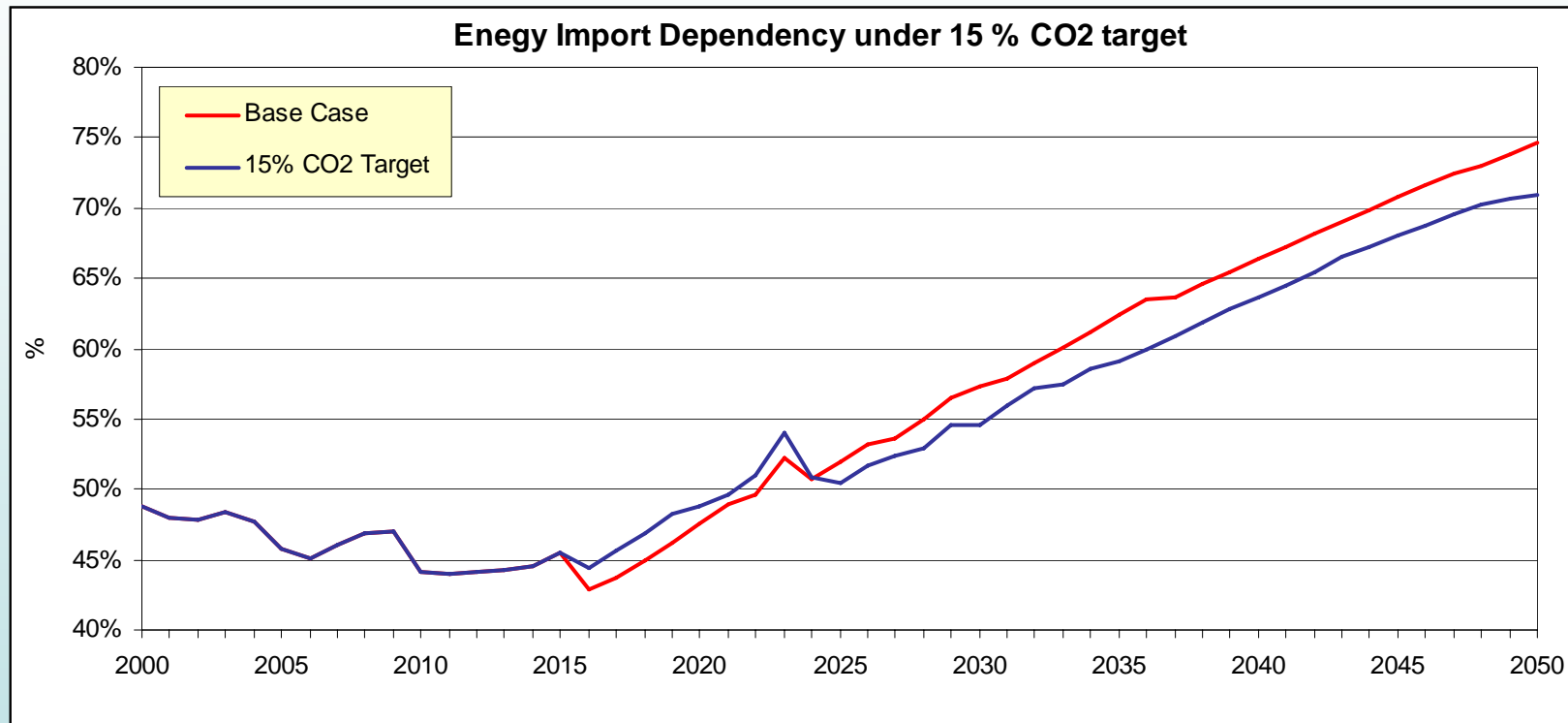
- 40 million ton of SOx is reduced during 2000-2050.

Co-benefits of 15% CO₂ target



- Power sector would achieve the largest NOx emission reduction followed by the industrial sector.
- In transport, 0.4 million ton of NOx would be increased.
- Industrial Sector would achieve the largest SOx emission reduction followed by the power and transport sector.

Energy Import Dependency under 15% CO2 target



- Energy import dependency reduces by 2% during 2000-2050
- The same would reduce by 4% in year 2050.

Concluding Remarks



- To achieve a target of 15% reduction in CO₂ emission,
 - CCS and combined cycle technology in the power sector would play a major role.
 - Renewable energy would not be contributing significantly in CO₂ reduction in the power sector.
 - In transport sector, bio-diesel, gasohol and hybrid vehicles would have significant role in emission reduction.
 - The results would be affected if modal shift to railways and other mass transport systems are considered.

Thank you