

# Co-benefits of Low Carbon Transition in India: *Aligning Development Perspective and Sector Approach*

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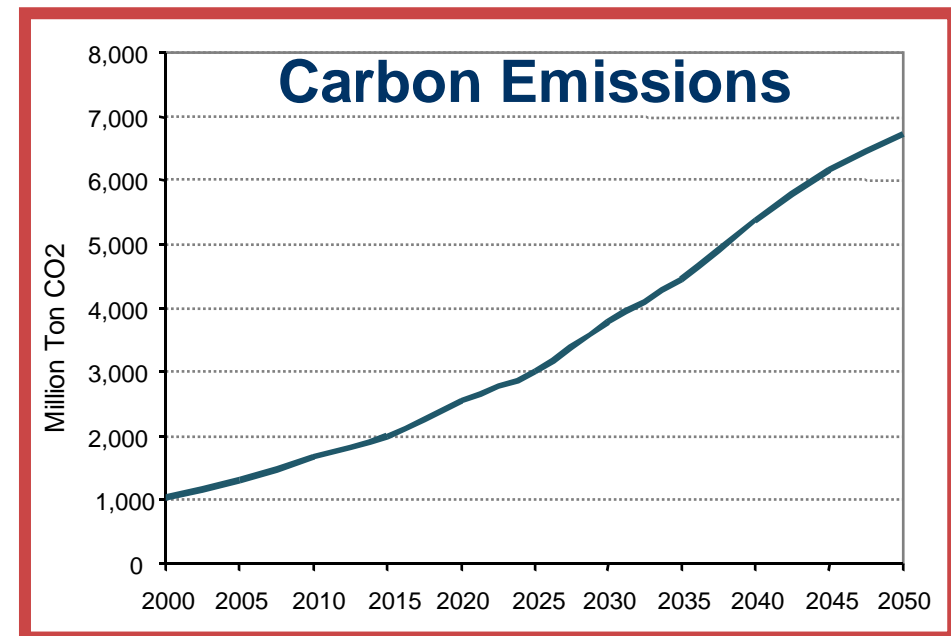
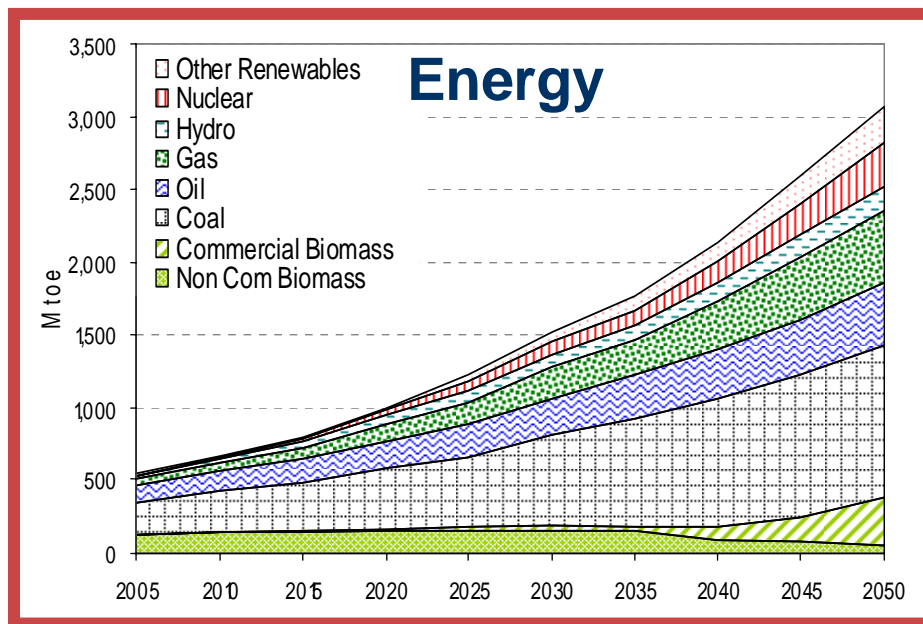
# Energy and Carbon: Base Case



## Assumptions

From 2005-2050:  
Annual Economic Growth: 7.2%  
Annual Population Growth: 0.9%

Increase in 2050 over 2005  
Economy 23 times  
Population 1.56 times



## Results: Energy and Carbon Intensity

Annual Improvement From 2005-2050:

Energy Intensity: 3.14 (%)

Carbon Intensity: 3.07 (%)

Decarbonization of Energy: -0.07 (%)

Direct Investment in Energy Projects:

2010-30: US\$ 1.2 Trillion

2030-50: US\$ 2.3 Trillion



# Alternate Development Visions



## Assumptions

### 1. Global Stabilization Target Assumption:

- 550 ppmv CO<sub>2</sub>e Concentration (OR)
- 3.4 W/m<sup>2</sup> (OR)
- @ 3° centigrade temperature increase

### 2. Two Development Pathways for India:

(with same total CO<sub>2</sub> emissions from 2005 to 2050)

1. Vision 1: **Conventional Development path**
2. Vision 2: **'Sustainability' scenario**

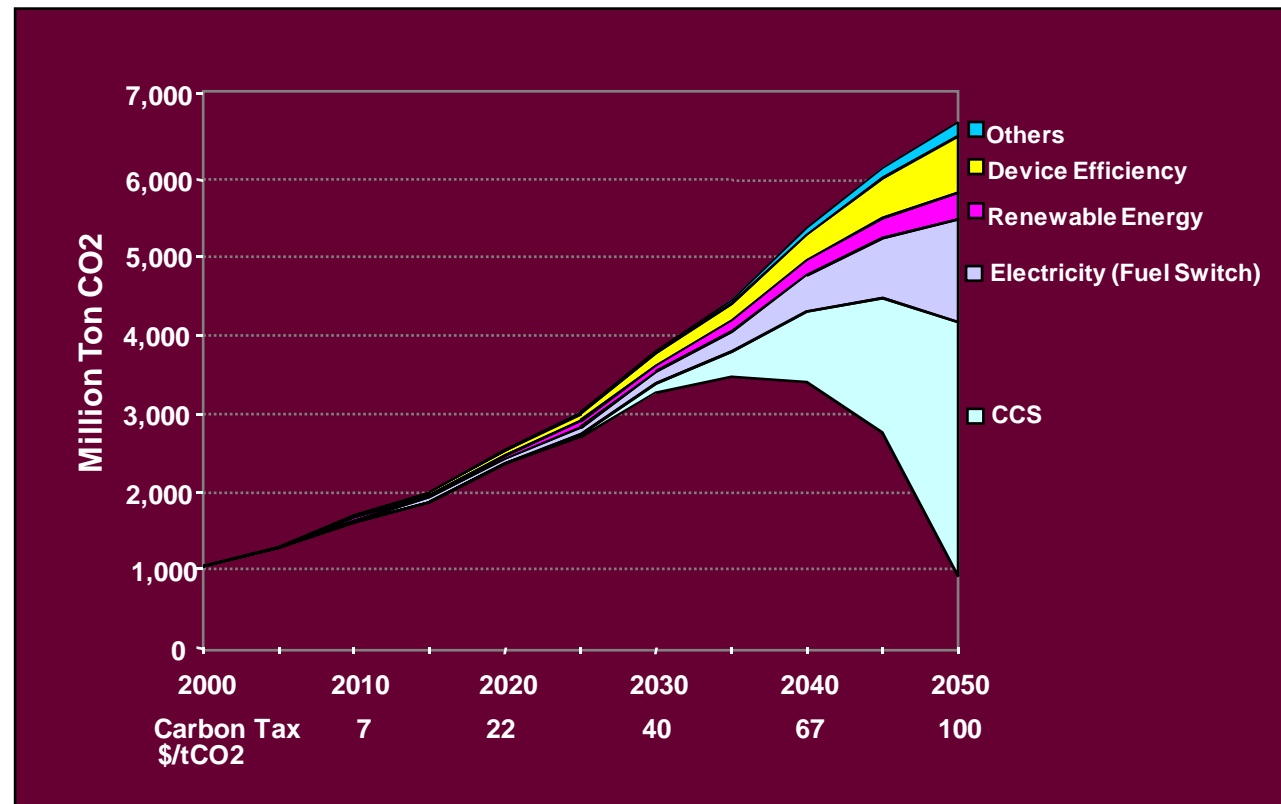
**What path shall best deliver national development goals while fulfilling Climate Commitments?**



# Vision I: *Managing Climate via Conventional Path*



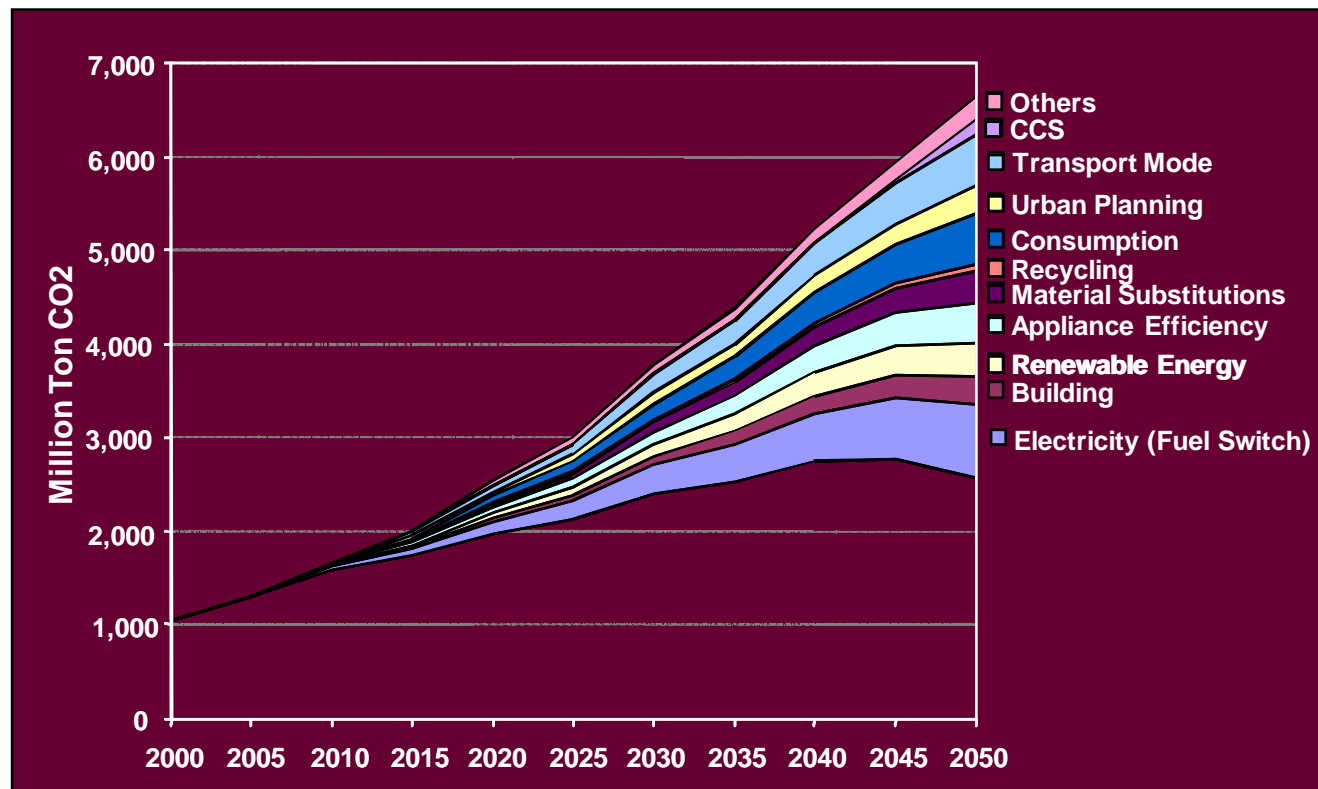
1. Top-down/Supply-side actions
2. High Carbon Price as main instrument
3. Climate Focused Technology Push



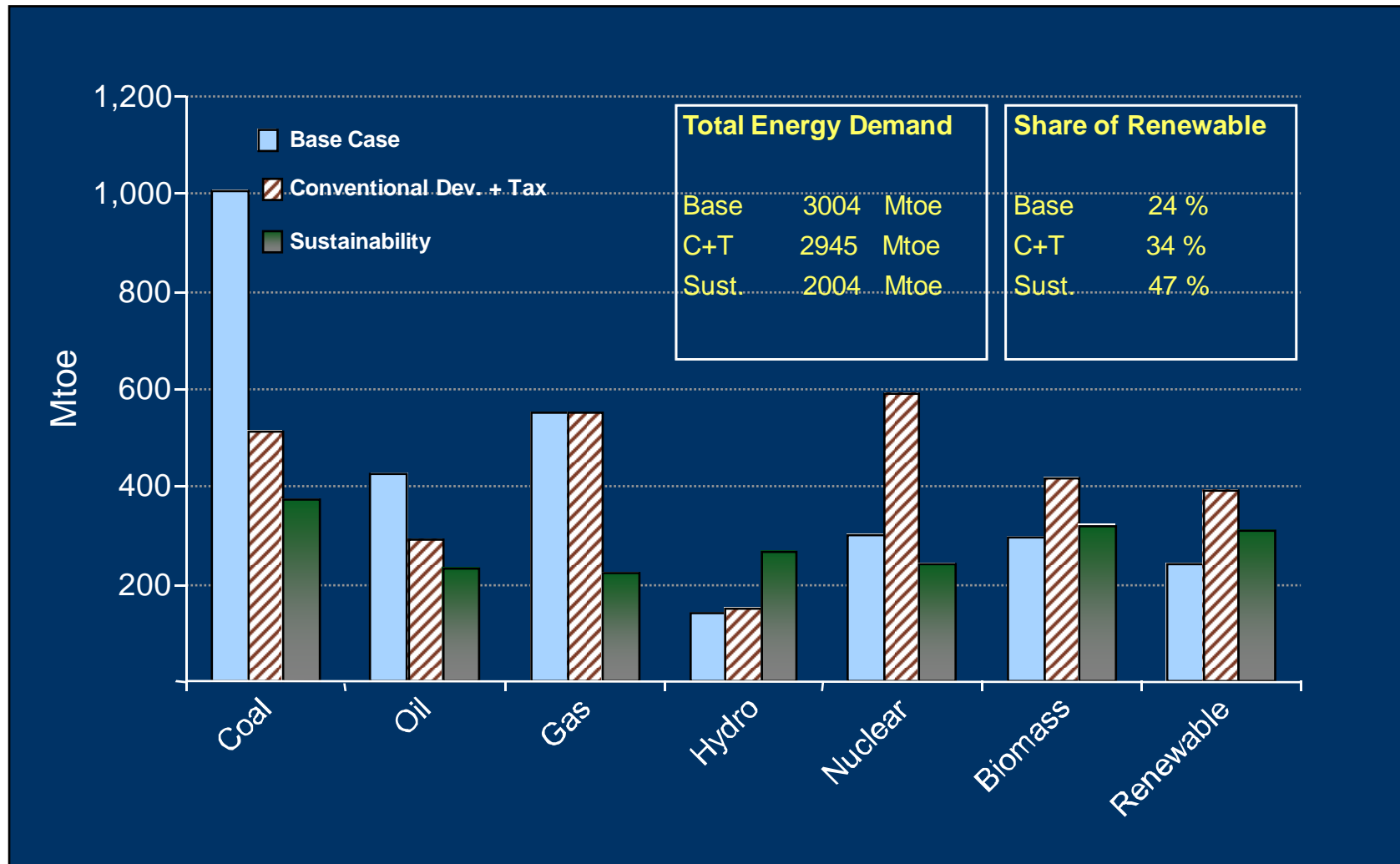
# Vision II: *Managing Climate via Sustainable Path*



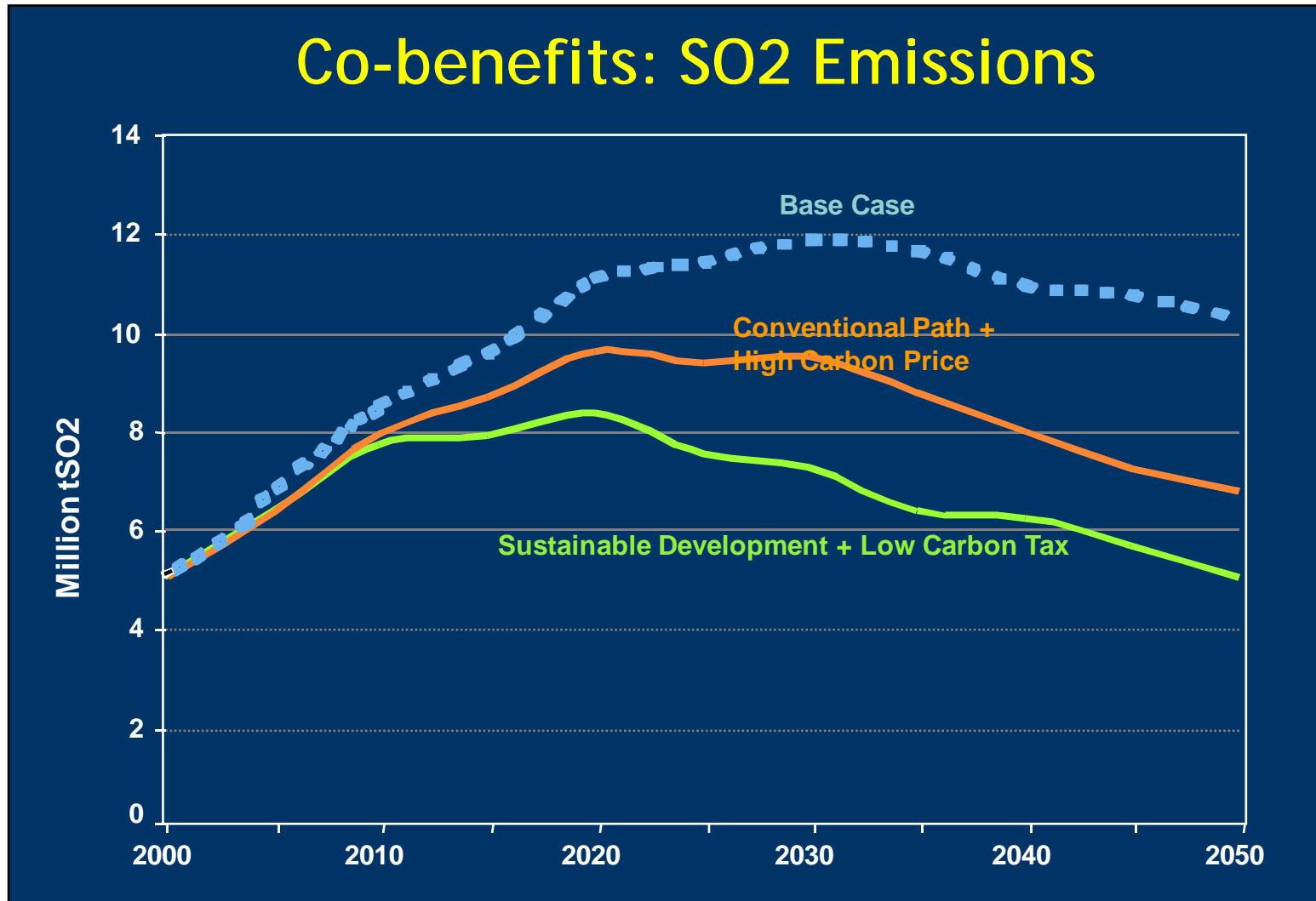
1. Low Carbon Price
2. Bottom-up/Demand-side Actions
3. Behavioural Change
4. Diverse Technology Portfolio



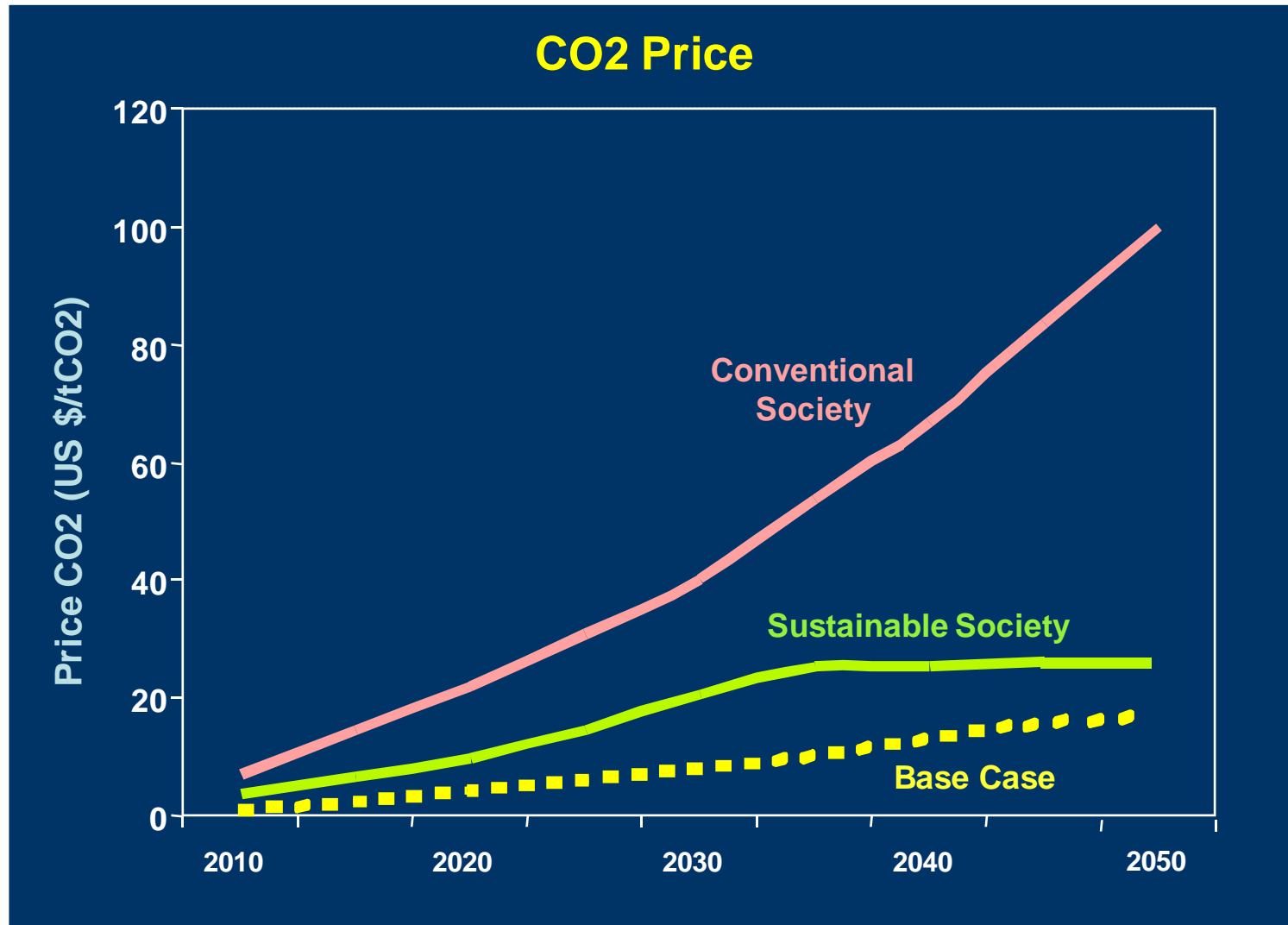
# Energy Technology Mix in 2050



# Co-benefits of Climate Actions



# CO2 Emissions & Price Trajectories





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# Broadening Sector Perspective for Low Carbon Development



# Urban - sector?



## Vertical vs. Horizontal Design



## Mitigation & Adaptation: Sustaining Water and Vegetation



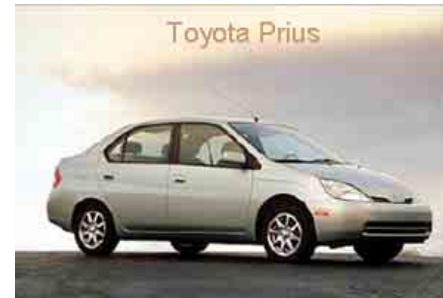
- Land-use Planning
- Building Choices
- Infrastructures
- Service Networks



# Automobile - sector?



## Rush Hour Traffic in India



## Electric Car: Reva



## CNG Three-Wheeler



## Rising Incomes and Small Cars



Tata Nano: \$2500



QQ: \$4000

## 10% Bio-diesel Engine



## Bio-diesel Bus



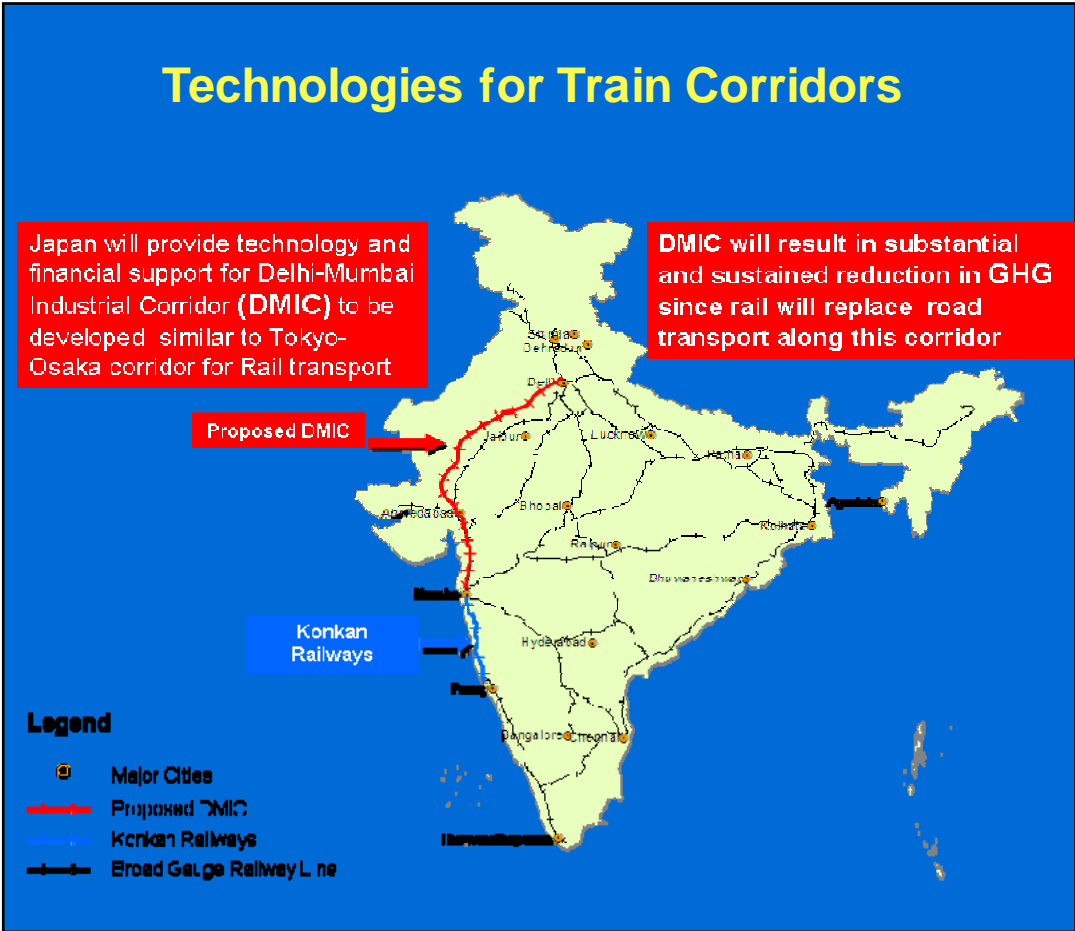


# Transport mode - sector?

## Bus Rapid Transport System

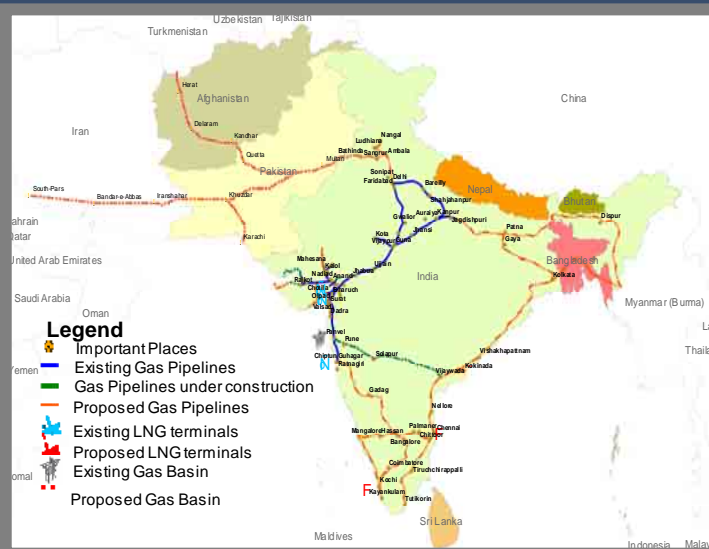
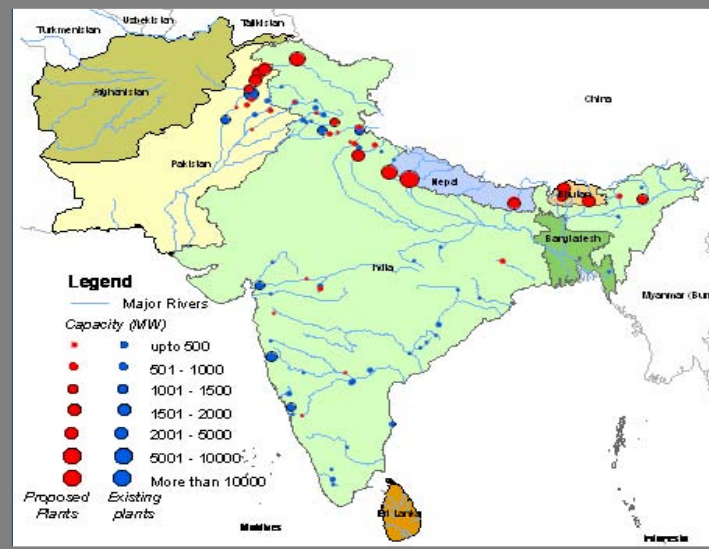


## Public Transport: Metro Rail



# Co-benefits of Regional Infrastructure

MDG 1: Eradicate extreme poverty and hunger, MDG 7: Environmental Sustainability



## Co-benefits of South-Asia Integrated Energy-Water Market

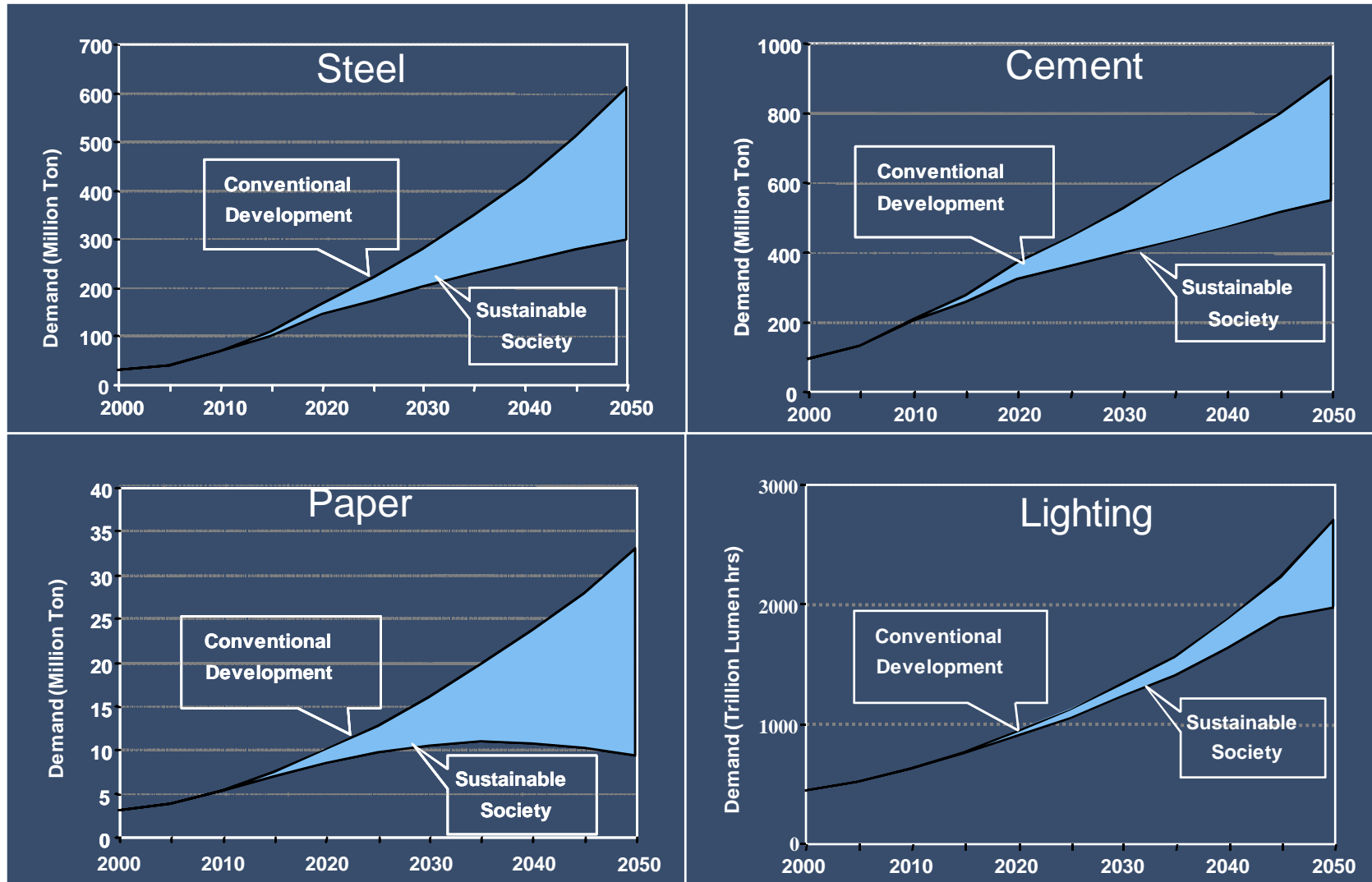
Benefit (Saving)		\$ Billion	% GDP
Cumulative from 2010 to 2030			
Energy	60 Exa Joule	321	0.87
CO <sub>2</sub> Equiv.	5.1 Billion Ton	28	0.08
SO <sub>2</sub>	50 Million Ton	10	0.03
Total		359	0.98

## Spill-over Benefits / Co-Benefits

- More Water for Food Production (MDG1)
- 16 GW additional Hydropower (MDG1&7)
- Flood control (MDG1&7)
- Lower energy prices would enhance competitiveness of regional industries (MDG1)



# Dematerialization - sector?



# Conclusions



- **Developing Countries have opportunities to make choices which can vitally alter future emissions path.**
- **Sector approach for developing countries should be different. The key sectors could be infrastructure, 3R, urban design etc.**
- **Sector mitigation strategies should focus on co-benefits**
- **Sector approach should aim for cooperation rather than competition.**
- **Important to communicate**
  - **why sector approach?**
  - **what sectors?**
  - **how to implement it in a cooperative framework?**

*Thank you*

