

Sustainable Low Carbon Society Scenario and Roadmap for India

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India NCCAP (June, 2008) - PMO



National Climate Change Action Plan - 8 National Missions

1. Solar Energy: Targets by 2022

- 20 GW Grid Power + 2 GW Off-Grid Power
- 20 million Solar lighting system to replace 1 billion Liters of of Kerosene/yr (2.5 MT CO₂/yr)

2. Enhanced energy efficiency

- Avoided capacity of 19000 MW by 2014-15

3. Sustainable habitat

- Green and Energy Efficient
- Comprehensive approach to manage water, wastewater and solid waste

4. Water Sector

- 20% water use efficiency improvement

5. Sustaining the Himalayan eco-system

6. A “Green India”

- 20 Mil. Ha afforestation by 2020; Forest cover from 23 to 33% in long-run

7. Sustainable agriculture

- Promotion of Micro Irrigation in 40 Mil. ha

8. Strategic knowledge for climate change



Copenhagen & Cancun: Commitments & Actions



- 20 to 25% Emissions Intensity Reduction from 2005 to 2020 (1.5 to 1.9% decoupling)
- Per Capita Emissions Below OECD Average (for ever)
- MRV/ICA of Domestic Actions (India's Proposal at Cancun)

Domestic Actions

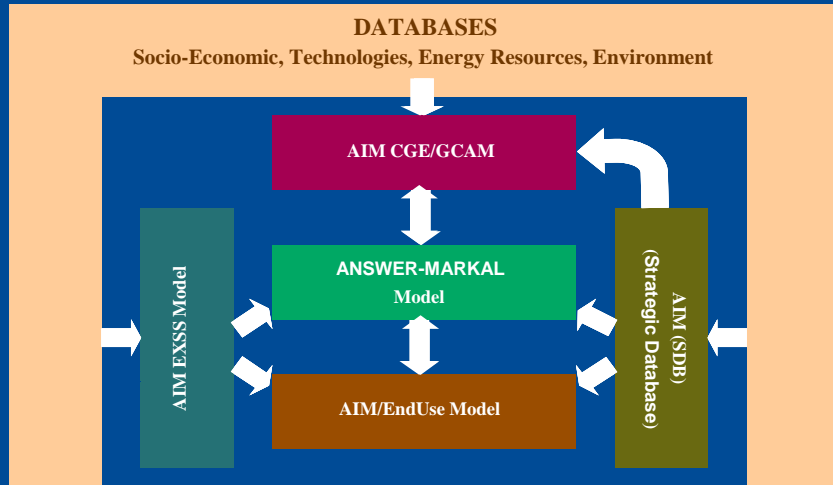
- **Carbon tax on coal to fund clean energy**
 - US \$1/ton on domestic & imported coal; fund to be used for Clean Energy
- **Enhanced Energy Efficiency measures**
 - Mandate to reduce specific energy consumption;
 - Energy savings certificates & trading
 - Energy efficiency ratings mandatory for 4 key appliances from Jan 2010
 - Reduction of 6 GW of electricity demand through mass distribution of CFLs
- **Renewable Energy Push**
 - Capital Subsidies and/or Preferential Feed-in Tariff
 - Renewable Energy Certificates Market
- **Mission on sustainable habitat**
 - Energy efficiency in residential, commercial and urban transportation
 - Managing water, wastewater and solid waste with recycling, reuse and energy creation



India: Business-as-Usual Projections



Intearted Modelina Framework

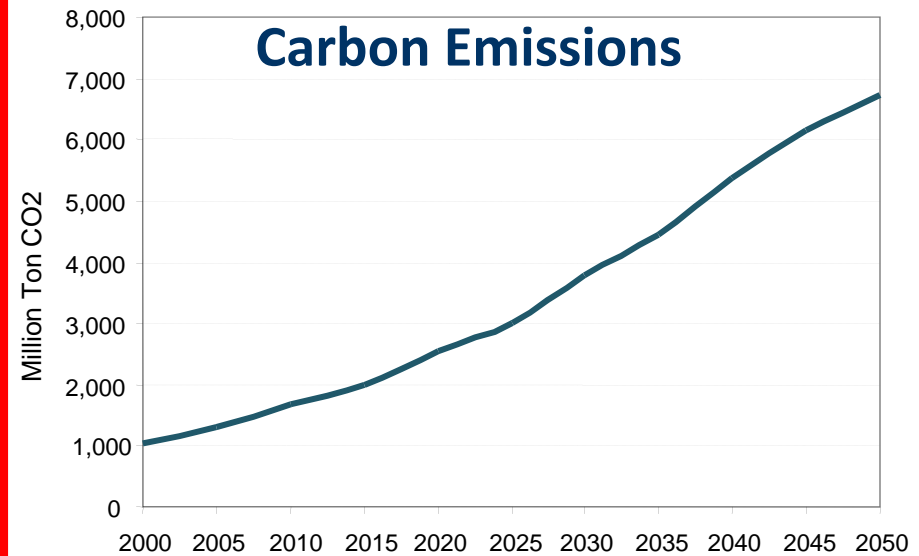
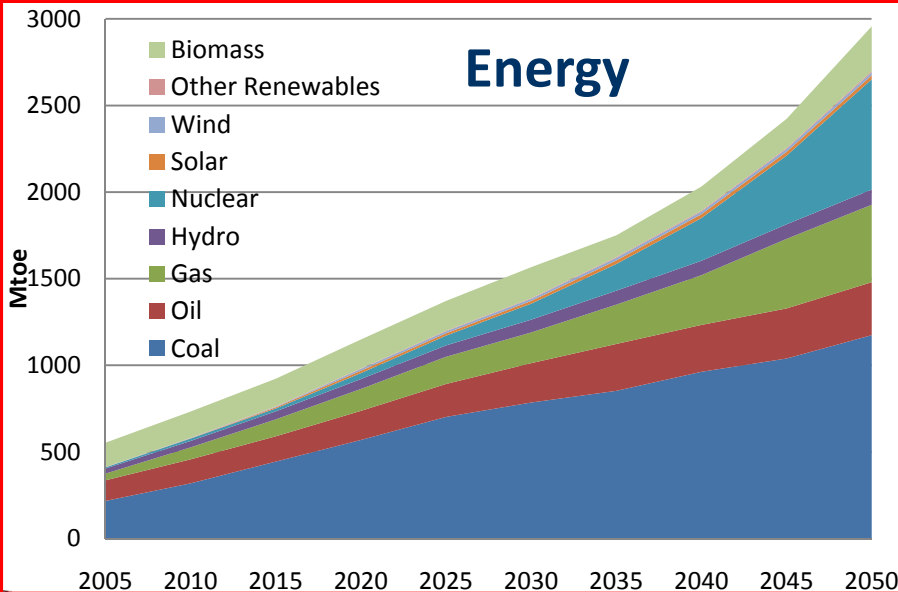


% Annual Intensity Decoupling: BAU

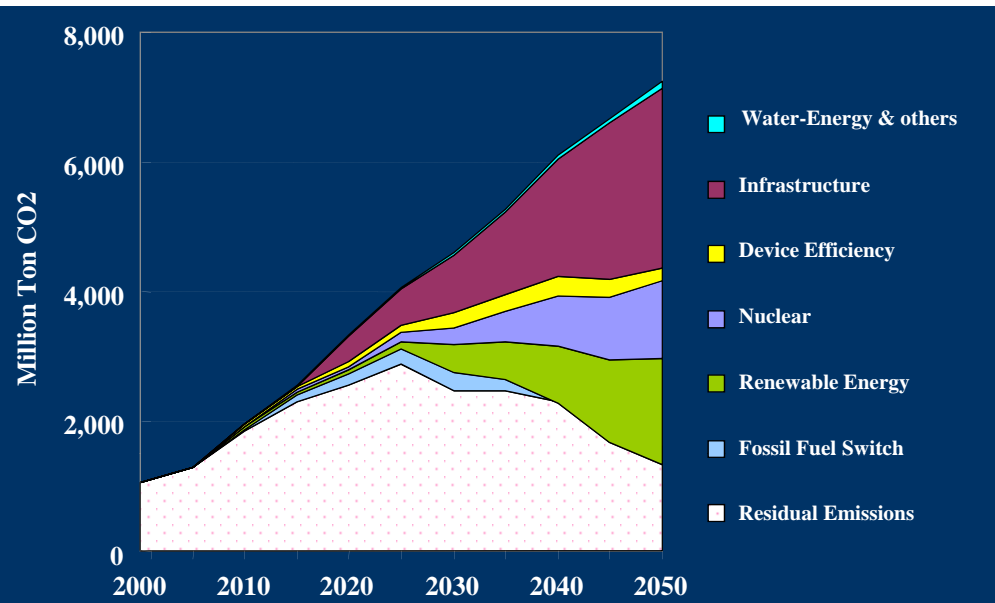
Period	Energy	Emissions
2005-2020	2.7	2.8
2005-2050	3.0	3.6

% Annual Energy intensity decoupling for Copenhagen Commitment:

- 1.5 to 1.9 Percent



2°C Stabilization: Mitigation Alternatives



Conventional Approach: transition with conventional path and carbon price

- High Carbon Price
- Climate Focused Technology Push
- Top-down/Supply-side actions

Technology Co-operation Areas

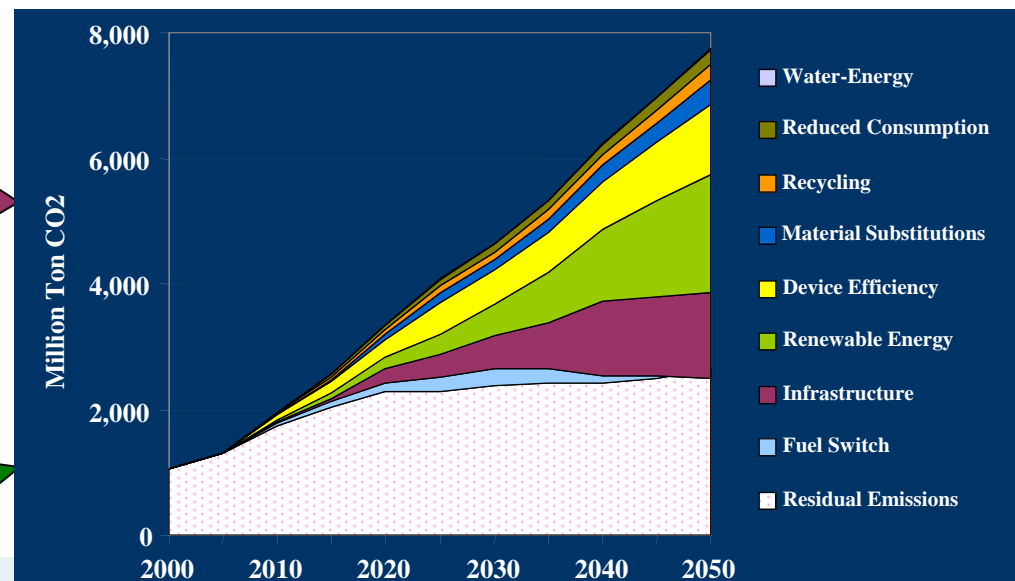
- Energy Efficiency
- Wind/Solar/Biomass/Small Hydro
- Nuclear/Low Carbon Infrastructure

Sustainability Approach: aligning climate and sustainable development actions

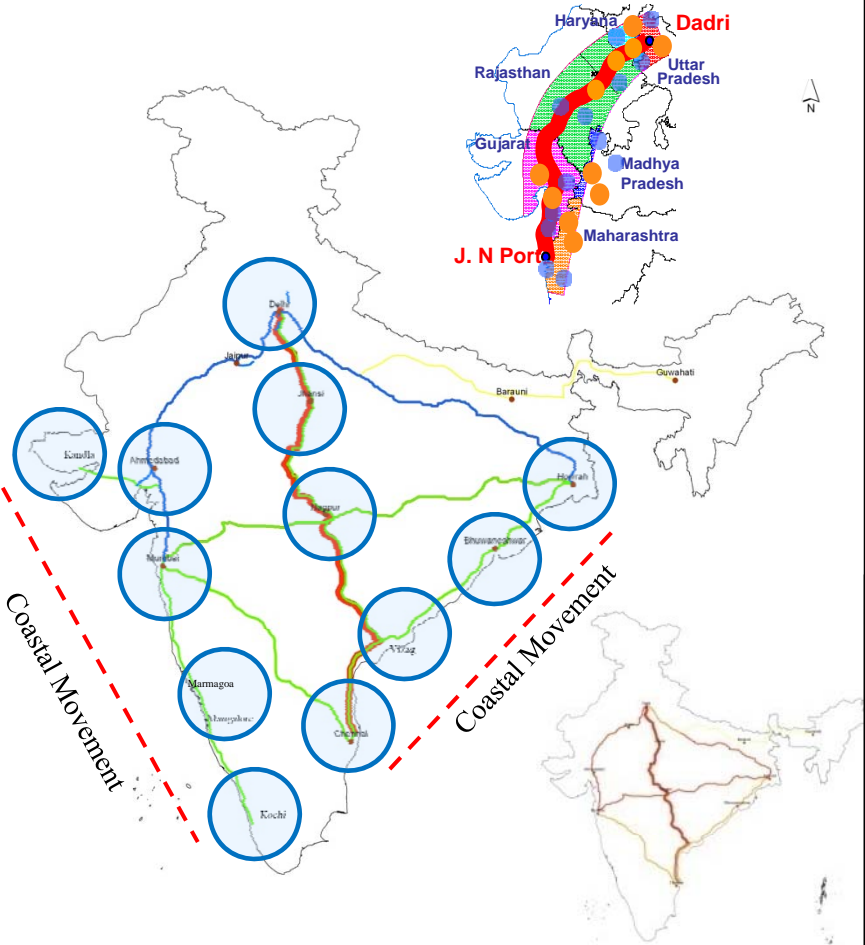
- Low Carbon Price
- Bottom-up/Demand-side actions
- Behavioural change
- Diverse Technology portfolio

Technology Co-operation Areas

- Transport Infrastructure Technologies
- 3R, Material Substitutes, Renewable Energy
- Process Technologies
- Urban Planning, Behavioral Changes

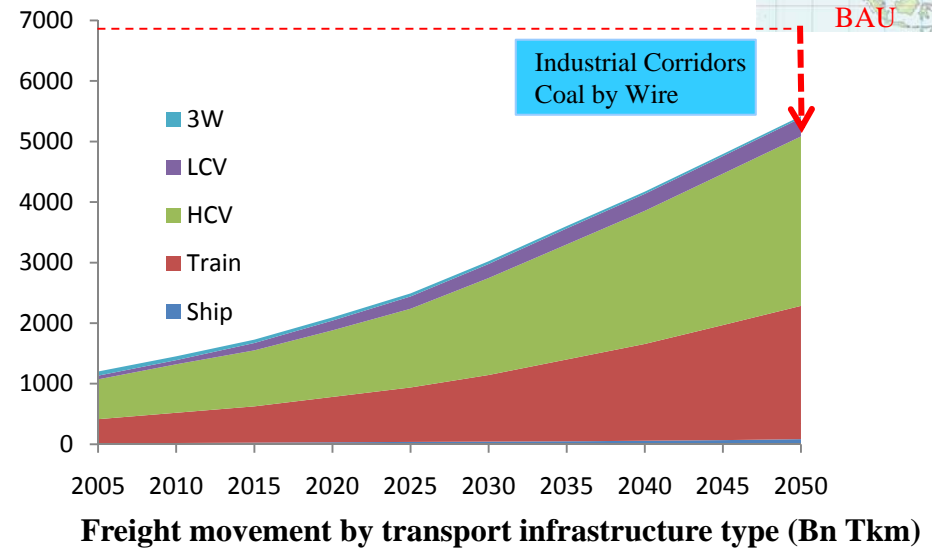


Freight Transport Infrastructure

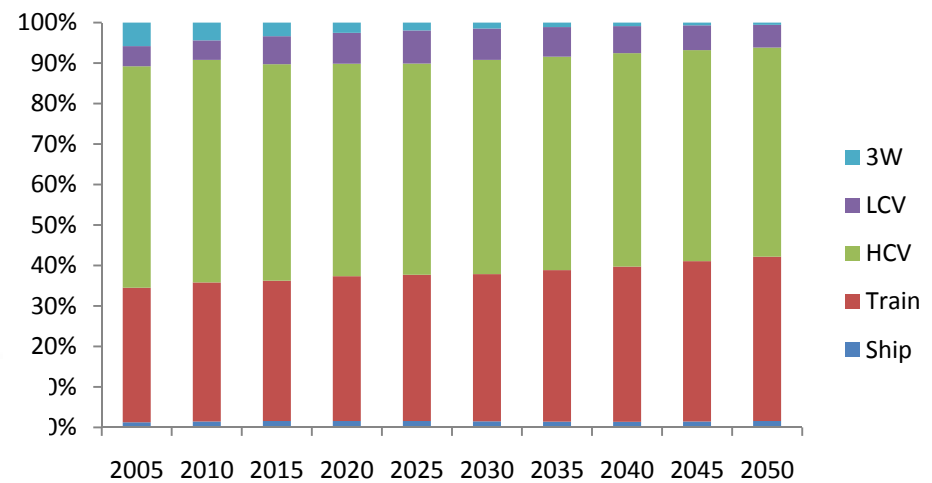


- Legend**
- Major Towns
 - Proposed Freight Corridor
 - Assumed Corridors

- Track Load**
- > 85% loading
 - < 45% loading
 - > 70% and < 85% loading
 - > 60% and < 70% loading

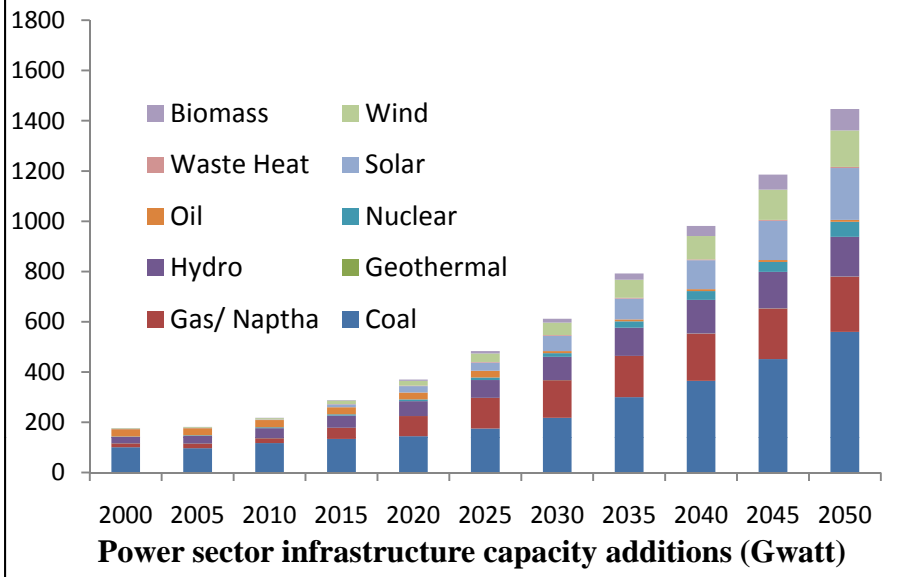
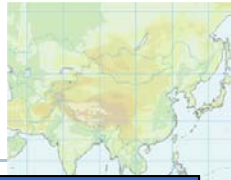


Freight movement by transport infrastructure type (Bn Tkm)

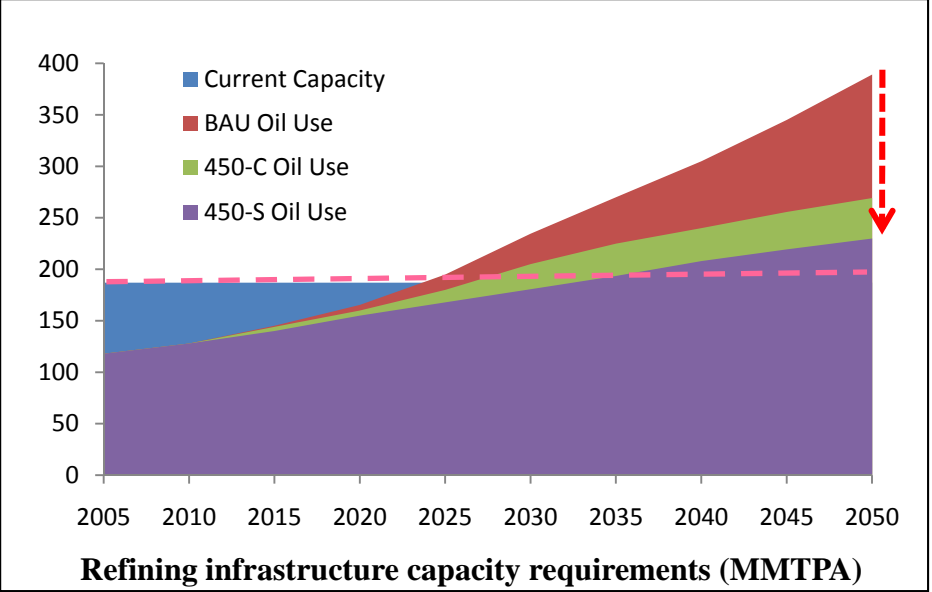
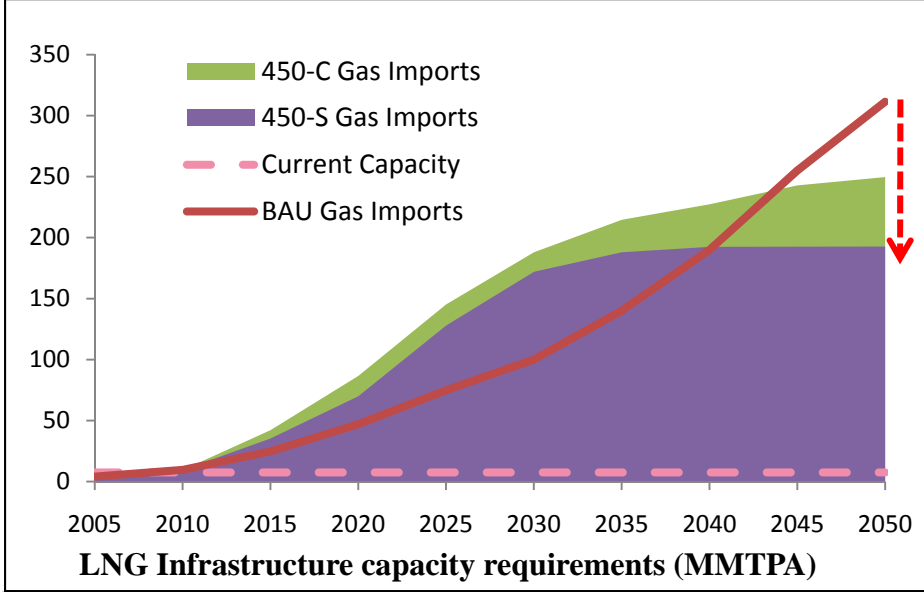


Sectoral shares in freight transport infrastructure (%)

Energy Infrastructure



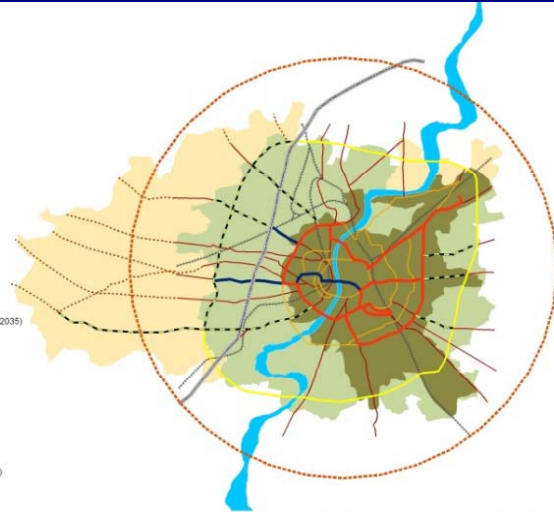
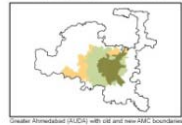
- **Replace and Reduce Fossil Use**
 - Coal
 - LNG
 - Petroleum
- **Shift to Low Carbon Electricity**
 - Nuclear
 - Renewable
 - CCS (End-of-Pipe)



Low Carbon City Planning: Co-benefits



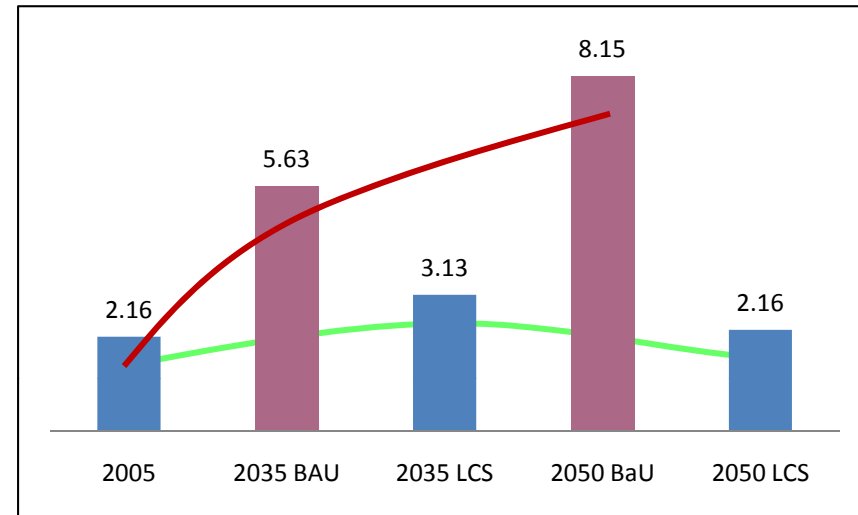
Ahmedabad City: Pop. In 2010 - 5.5. Million



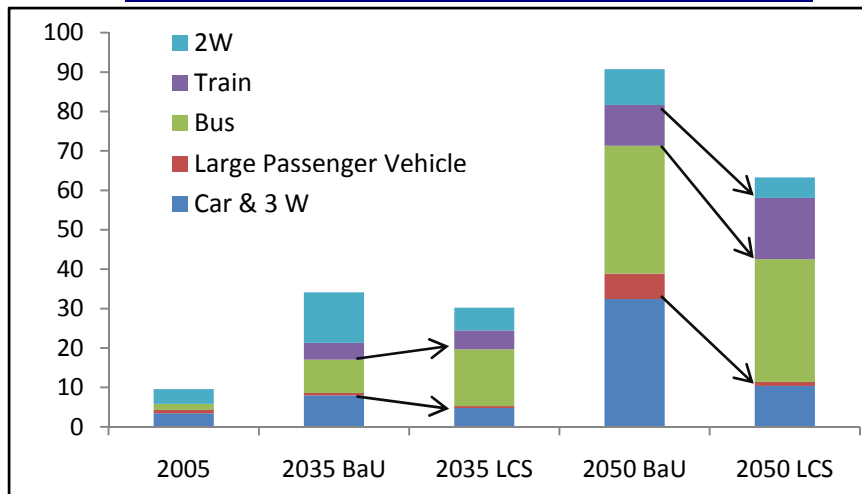
Note: Based on Ahmedabad Janmarg Map, AMC 2010

External boundaries not authenticated

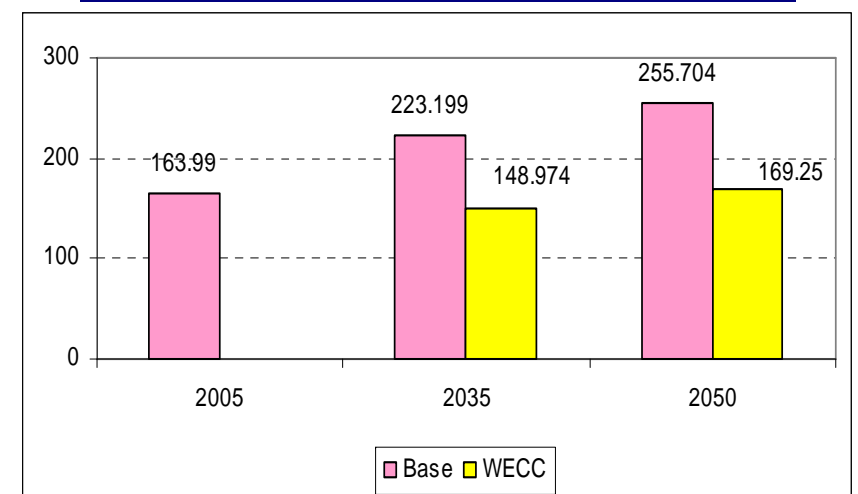
Per Capita CO2 Emissions (Ton)



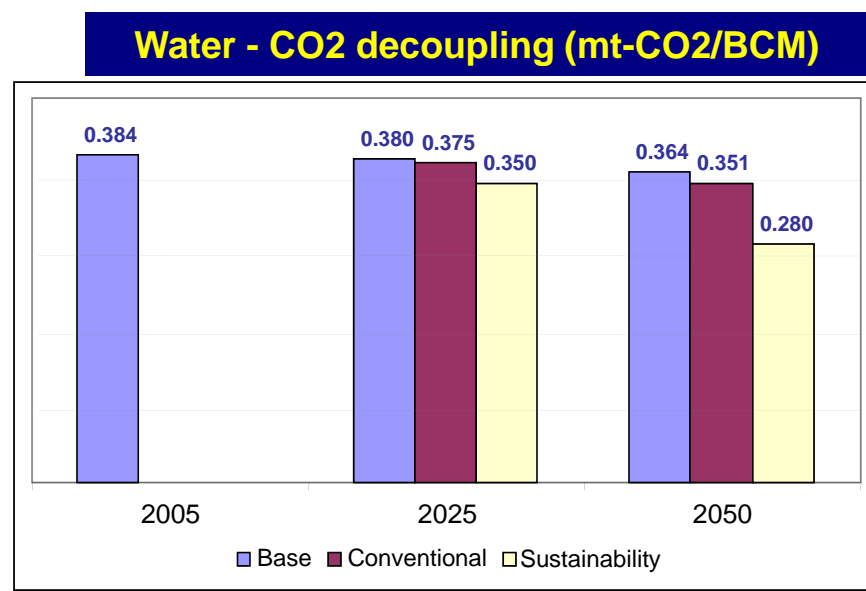
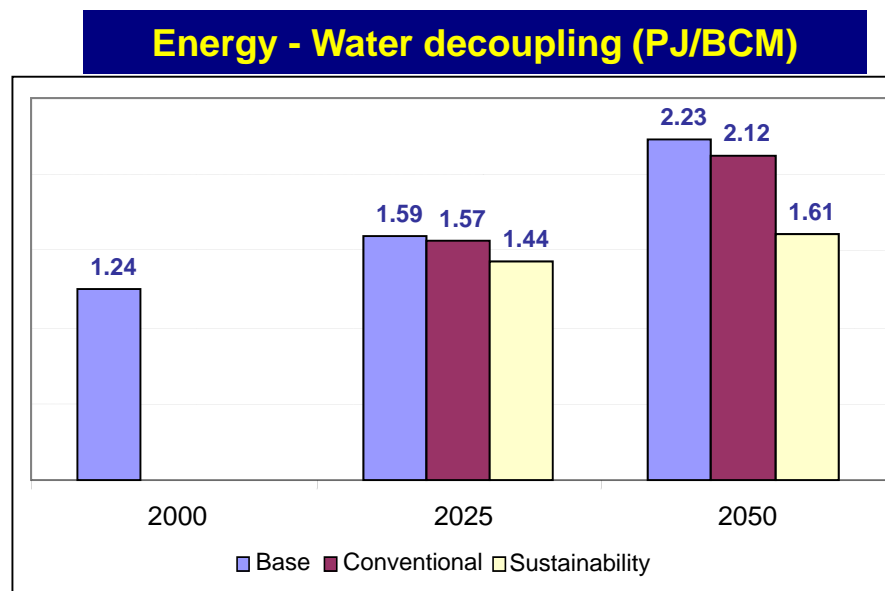
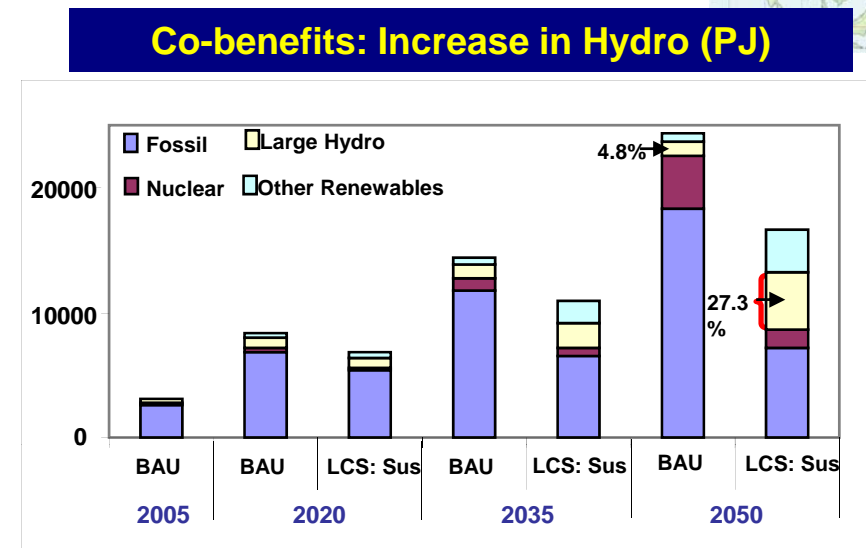
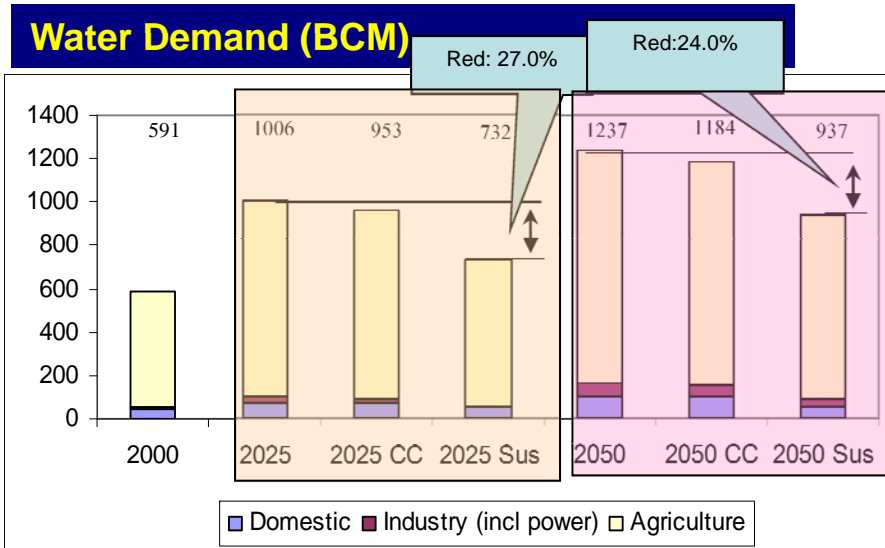
Co-benefits: Transport Transitions



Co-benefits: Water per capita (ML/million)



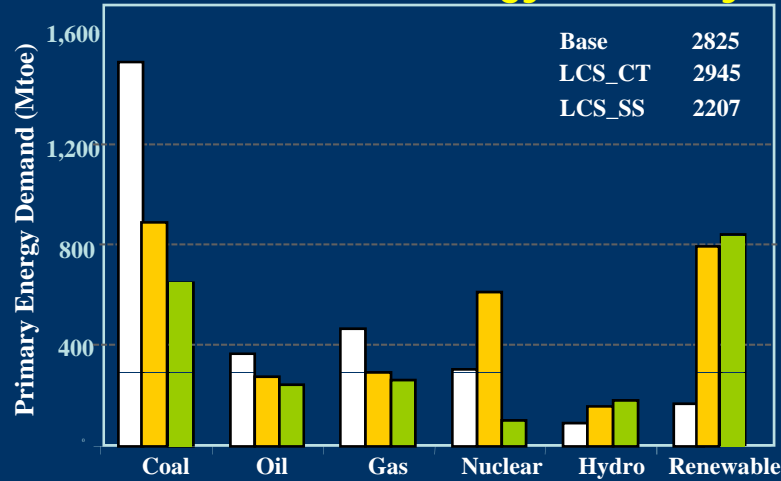
Co-benefits: Energy-Water Nexus



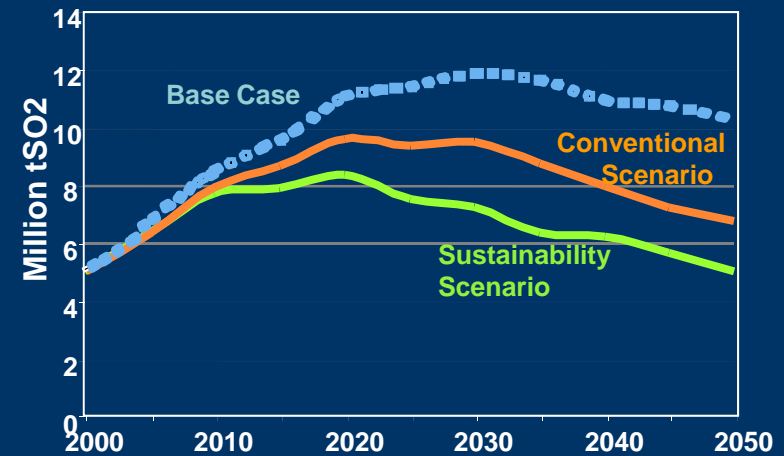
Co-benefits and Social Value of Carbon



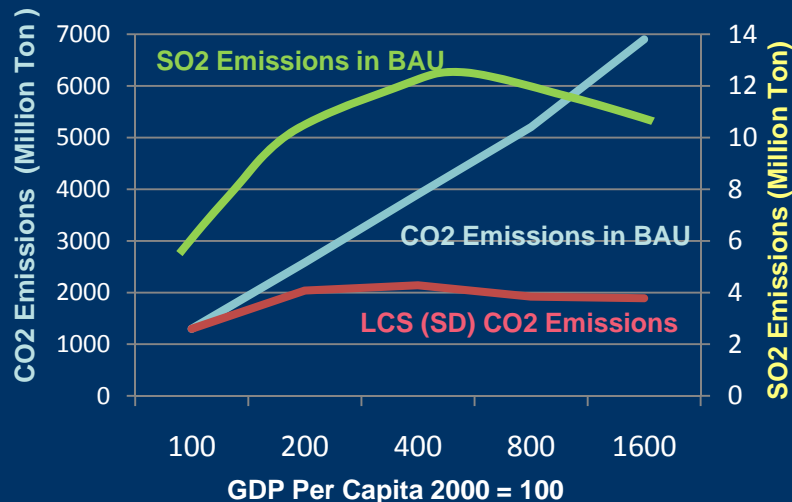
Co benefits: Energy Security



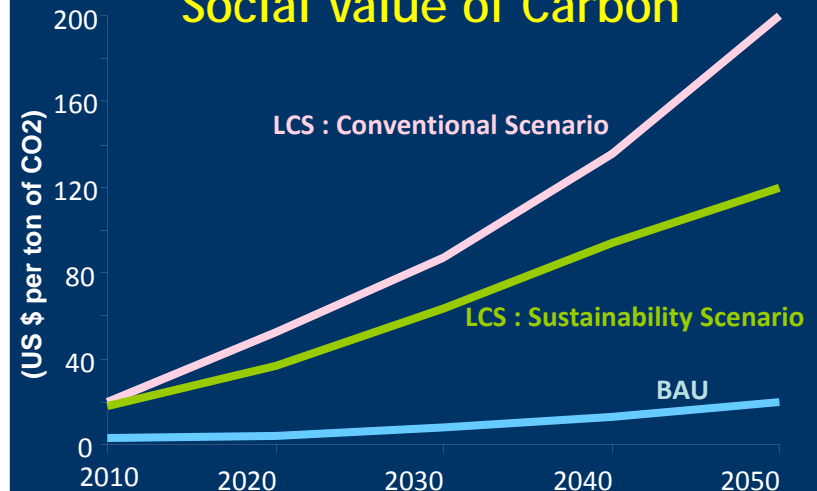
Co benefits: SO2 Emissions



Emissions and Income



Social Value of Carbon



Conclusions



Coordinated Policies and Actions

- Align Development and Climate Actions in a unified framework
- Coordinate and Link Bottom-up Actions with Top-down Vision and Policies

LCS Roadmap

- Link Low Carbon Actions and Development Targets
 - For 2020: Include climate commitments into BAU Assessment
 - For Long-term: Avoid technology and policy lock-ins into high emissions path
- 'Paradigm Shift towards 'Co-benefits' and 'Co-operation':
 - Co-benefits reduces welfare losses
 - Deliver LCS at Low Carbon Price

