

# Low Carbon Society Scenarios: India & Ahmedabad

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<u>Presented at</u> Sustainable and Low-Carbon Development in Indonesia and Asia: Dialogues between Policymakers and Scientists on Green Growth 16-17 February 2010, Bogor- Indonesia



Indian Institute of Management, Ahmedabad, India





### 1. Alternate Development Visions

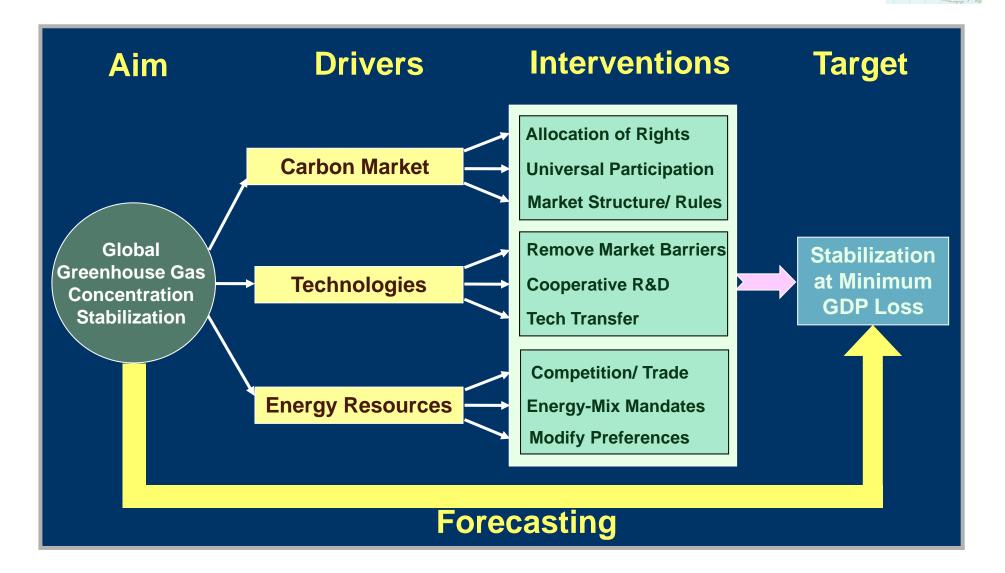
### 2. Scenario Development

### 3. Ahmedabad & India Scenarios

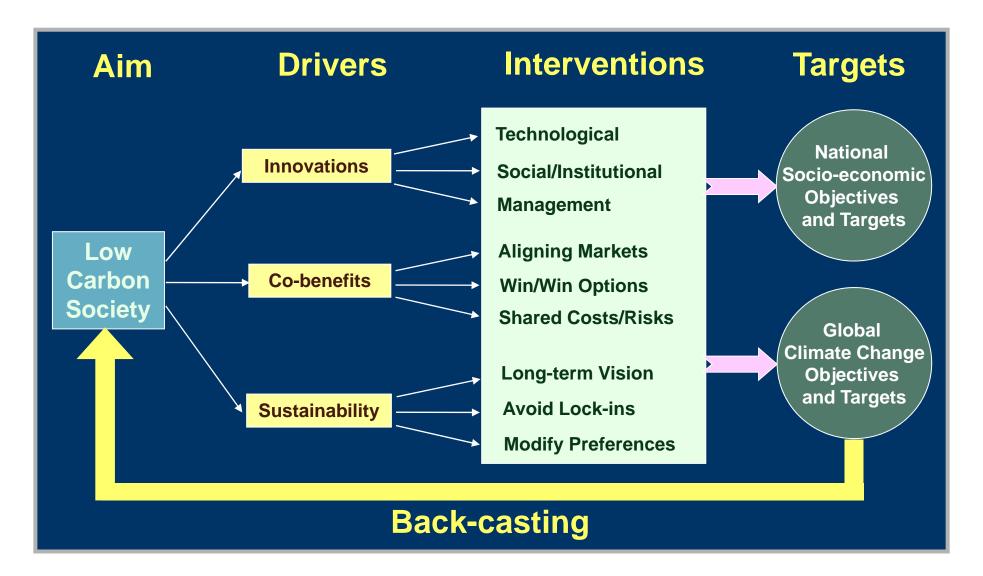
### 4. Policy Options



### **Conventional Climate Centric Paradigm**

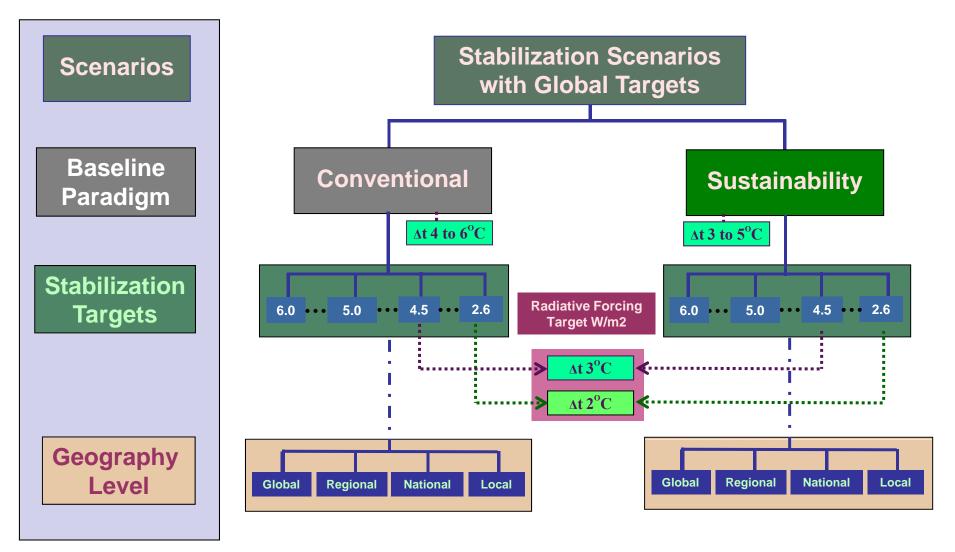






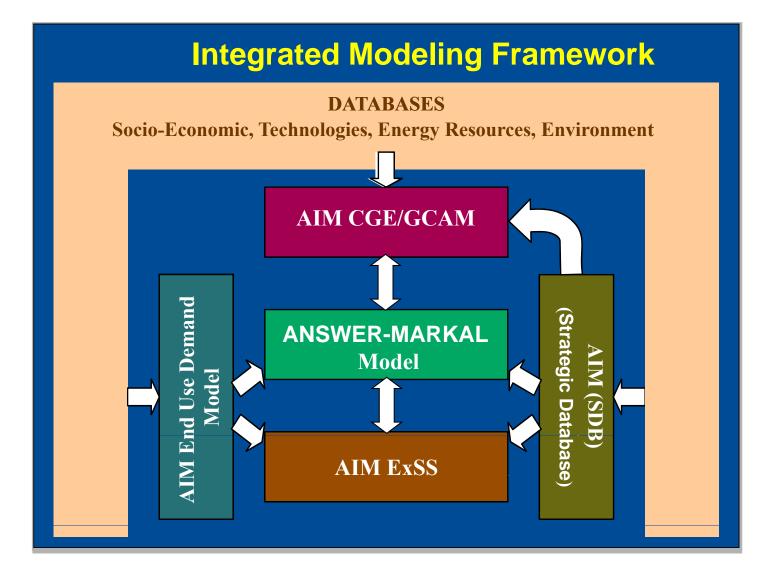






### **Integrated Modeling Framework**



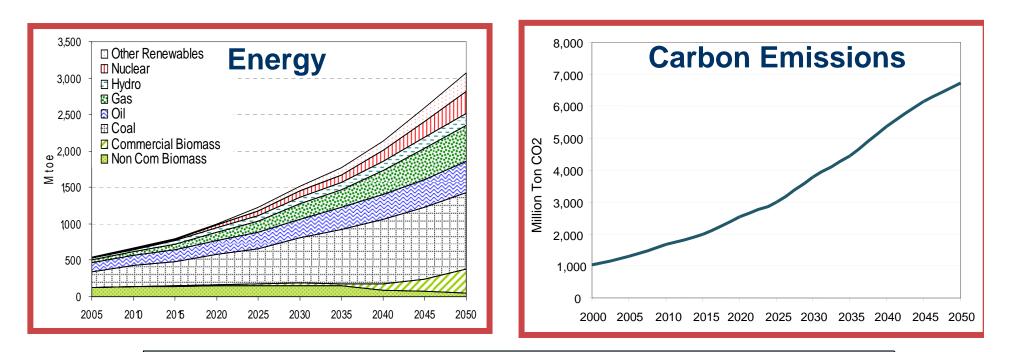




### National Analysis: MARKAL & End-Use Models

### **Base Scenario: Growth of Economy and Population**

From 2005-2050: Annual Economic Growth: 7.2% Annual Population Growth: 0.9% Absolute Growth in 2050 over 2005 Economy 23 times Population 1.56 times Energy ~ 6 times, Emissions ~ 6.5 times



### **Global Stabilization Target: 2°C**



### 2 Degree Stabilization Target



#### India unveils National Action Plan on Climate Change

30 Jun 2008, 1545 hrs IST, PTI Email

Print

#### Save Comment Text:

Share NEW DELHI: India on Monday unveiled its climate change action plan which does not set target reduction of greenhouse gas emissions but seeks to promote sustainable development through use of clean technologies.



The National Action Plan on Climate Change categorically states that India's per capita

exceed that of developed countries." The plan, unveiled by Prime Minister Manmohan Singh here, will be implemented thorough eight missions which represent multipronged, long-term and integrated strategies for

The document underlines that "India will engage actively in multilateral negotiations in the UN Framework Convention on Climate Change (UNFCC) in a positive, constructive and forward-looking manner."

"Our objective will be to establish an effective. cooperative and equitable global approach based on the principle of common but differentiated responsibilities and relative

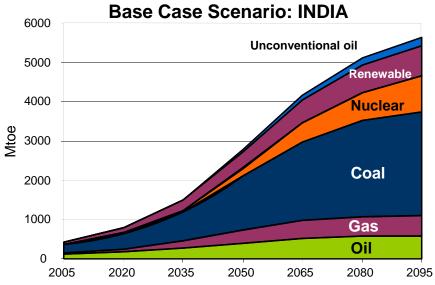
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PM releases the 'National Action Plan on Climate Change' in New Delhi (PTI) More Pictures

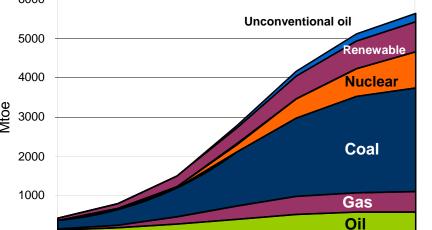
capabilities enshrined in the UNFCC," the plan document said.

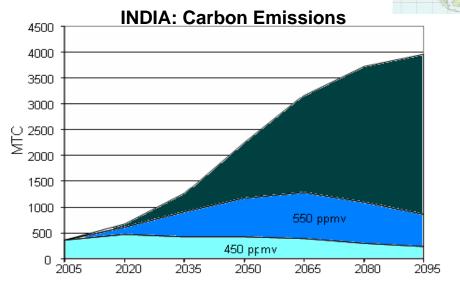


### Global & National Analysis: GCAM & AIM/CGE

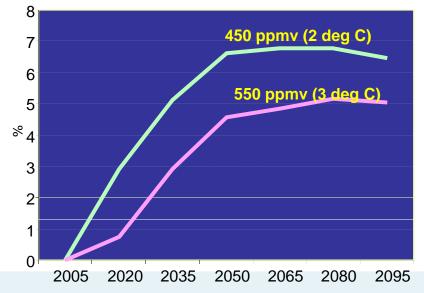


| Electricity Production (in EJ) and CCS Share (in %) |          |      |       |       |       |
|---|----------|------|-------|-------|-------|
|   |          | 2005 | 2035  | 2065  | 2095  |
|   | BAU      | 2.55 | 12.43 | 43.14 | 65.43 |
| Total Electricity<br>Production                     | 450 ppmv | 2.55 | 10.78 | 43.86 | 67.35 |
| (in EJ)   | 550 ppmv | 2.55 | 10.51 | 39.58 | 61.91 |
| Coal w/CCS  | 450 ppmv | 0.00 | 29.71 | 36.20 | 33.38 |
| (in %)  | 550 ppmv | 0.00 | 6.20  | 21.31 | 29.08 |
| Gas w/CCS   | 450 ppmv | 0.00 | 5.38  | 5.06  | 4.03  |
| (in %)  | 550 ppmv | 0.00 | 1.63  | 2.75  | 2.85  |
| Biomass w/CCS                                       | 450 ppmv | 0.00 | 5.72  | 10.67 | 11.83 |
| (in %)  | 550 ppmv | 0.00 | 0.71  | 3.19  | 5.54  |





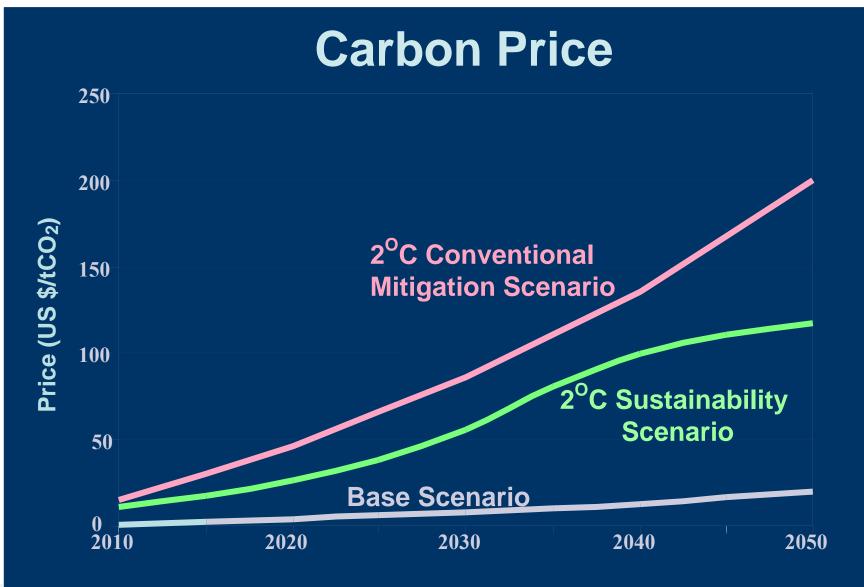
#### **GDP Loss for India**





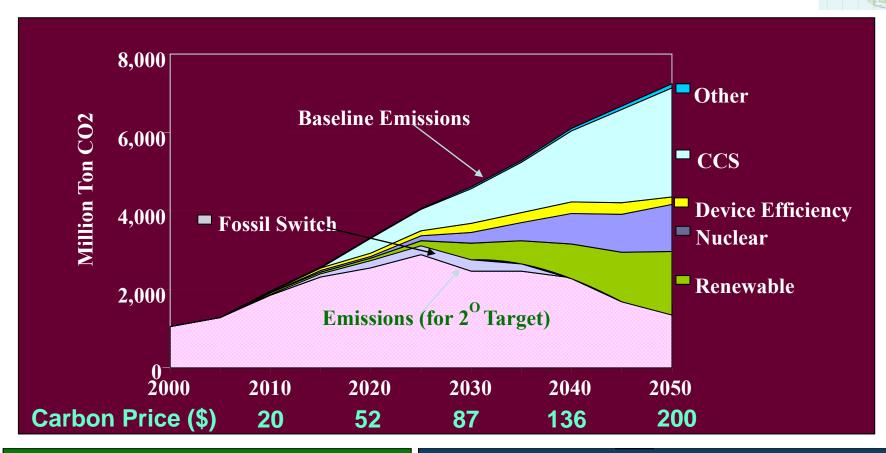
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### **Carbon Price Trajectory**





# **Mitigation Options: Conventional**



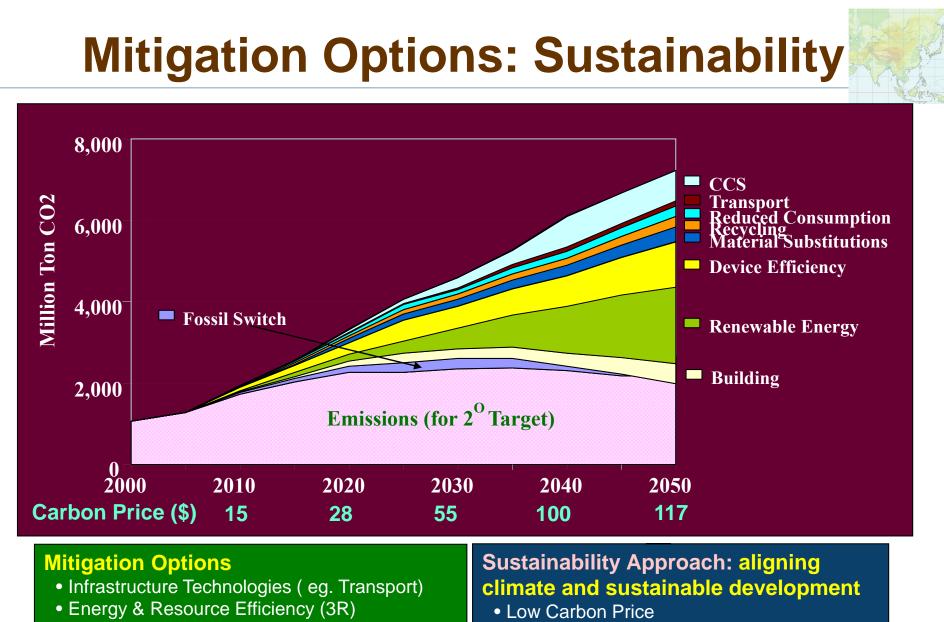
### **Mitigation Options**

- Energy Efficiency
- Wind/Solar/Biomass/Small Hydro
- Nuclear/CCS

### Conventional Approach: transition with conventional path and carbon price

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



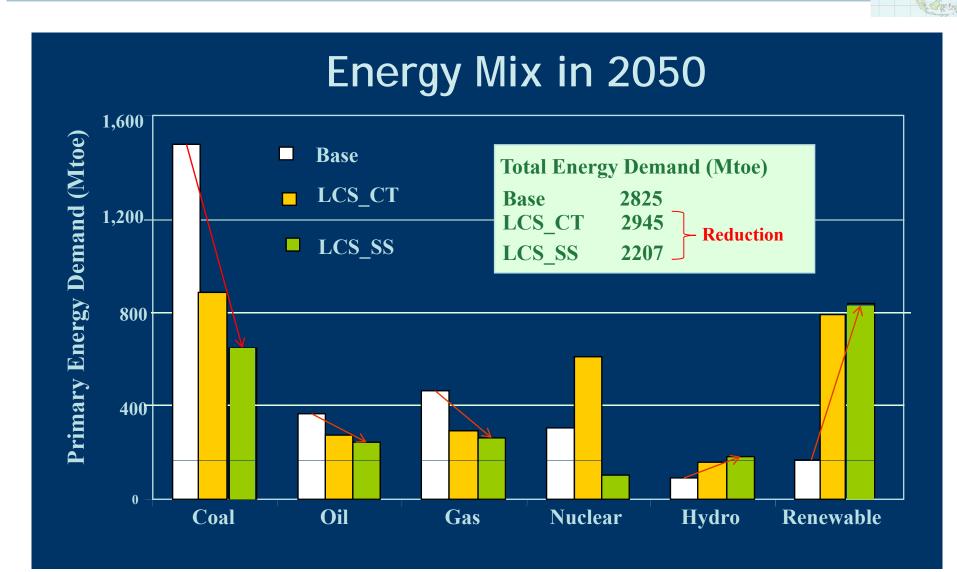


- Process Technologies
- Urban Planning, Behavioral Changes

### Diverse Technology portfolioBottom-up/Demand-side actions



# Implications for Primary Energy Mix

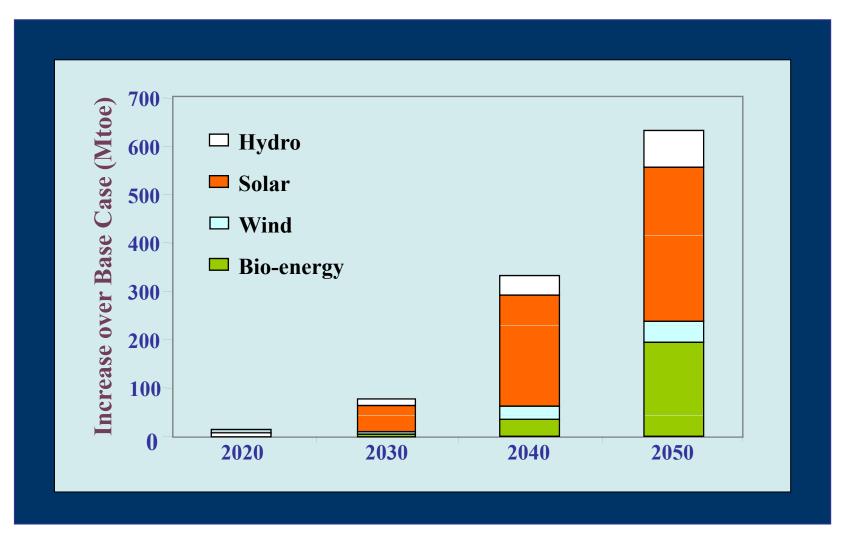






### **Additional Renewable Energy**

### (in Sustainability Scenario over Base Case)





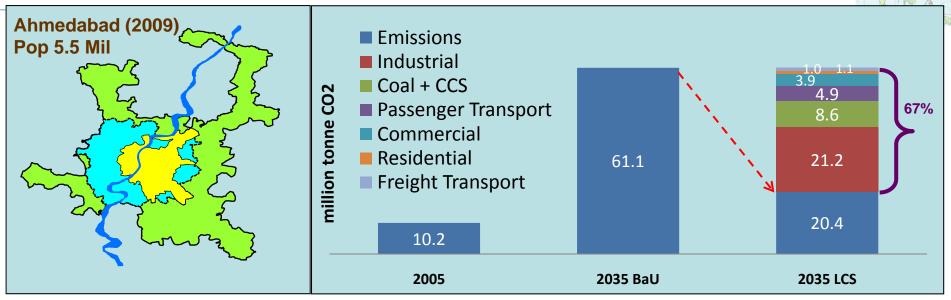


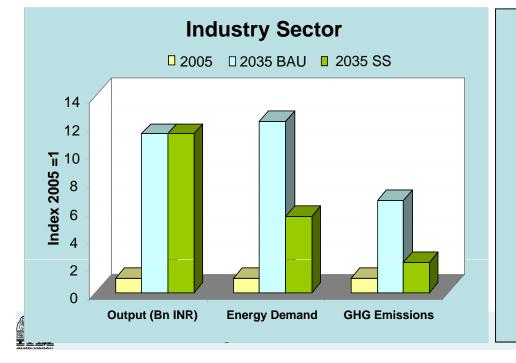


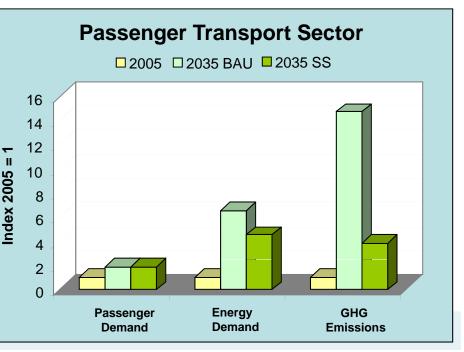
# Developing Local Scenarios : Ahmedabad LCS Study



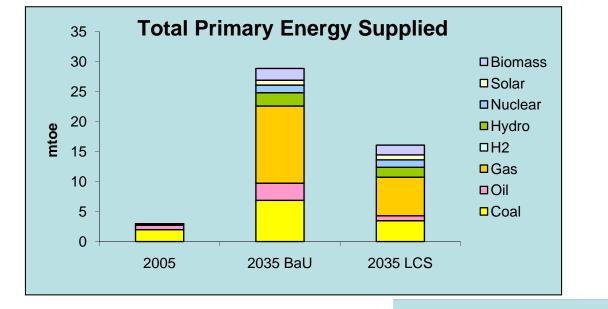
### Low Carbon Scenario: Ahmedabad

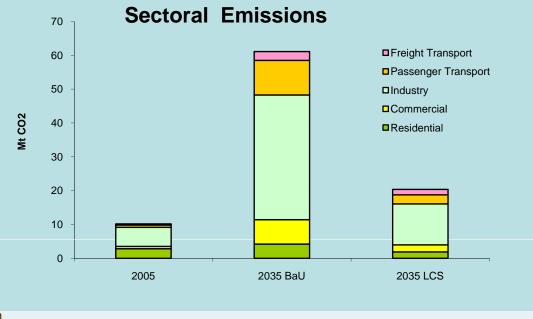




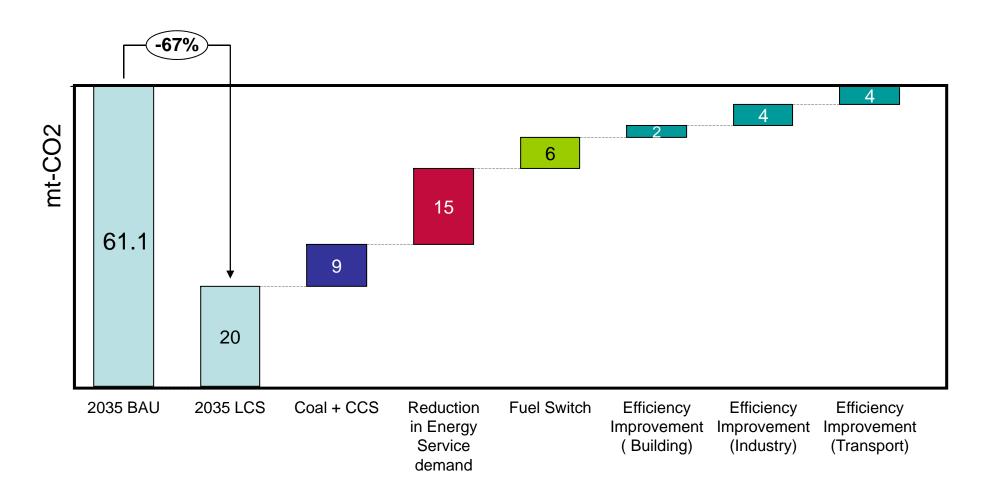


# Low Carbon Scenario: Ahmedabad

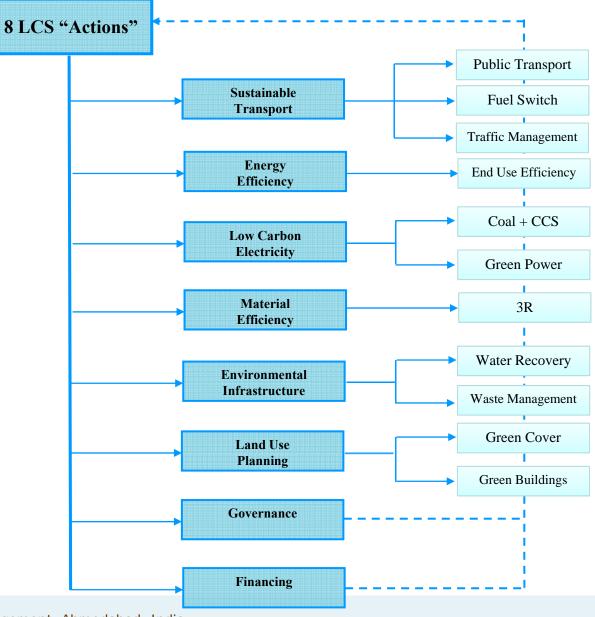




### **Emission Reduction Potential**



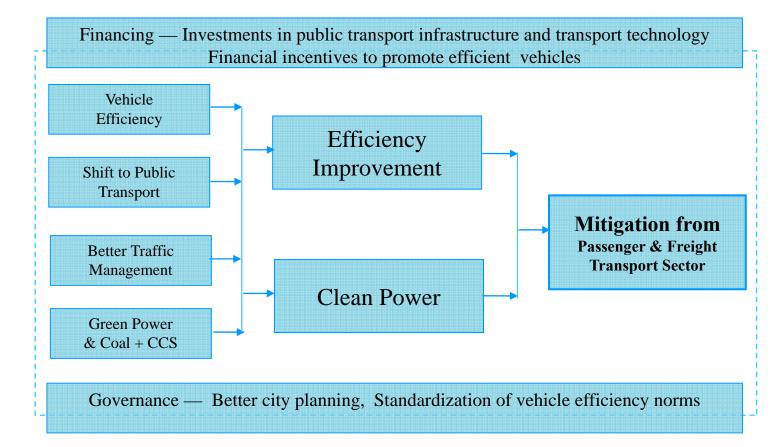
## **Ahmedabad Policy Package**





## **Action : Sustainable Transport**





#### Mitigation policy package for passenger and freight transport sector



### **Sustainable Transport Options**



- Land-use Planning
- Demand Management
- Infrastructures
- Integration of Services



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#### AHMEDABAD, INDIA WINS 2010 SUSTAINABLE TRANSPORT AWARD

Posted: 12 Jan 2010

Related to: BRT in India, Developing High-Quality, Low-Cost Mass Transit, India Contributed by: ITDP

FOR INMEDIATE RELEASE Press Contect Claudia Cumter, institute for Transportation and Development Policy (\$46) 839-8479, opunter@http.org

Ahmedabad's Jenmarg Bus Repid Transil System Reduces Cerbon Emissions, Dramatically Improves Residents Access

Cifes in Developing World Dominate Award

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OP Board President Enrique Peñalosa with cityrepresentatives from the city of Ahmedabad, India

Indian Institute of Management, Ahmedabad, India





### **Policy Options**



- Energy : Efficiency, Renewable, Nuclear
- Industrial Process: Energy & emission intensity, Logistics
- Infrastructure: Transport, Pipelines, Electricity T&D, Hydro (+Canals)
- Soft Solutions: Tele commuting, Demand Reduction, NMT
- Conservation/Behavioral: 3R, Material Substitutes
- Planning: Urban design, Industry locations
- End-of-pipe Solutions: ccs

### There is no silver bullet !



### **Thank You !**





