Macro Considerations for Urban Low Carbon Mobility Plans

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Developing Low-Carbon Mobility Plans for Indian Cities
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1. What do we mean by Low Carbon?

2. Sustainable Low Carbon Mobility Framework

3. Macro Indicators for Sustainable Low Carbon Transport

4. Aligning National and Local Policies
What do we mean by Low Carbon?

Global Climate Stabilization Target

Copenhagen and Cancun Agreements

2°C Temperature Stabilization Target

IPCC Representative Concentration Pathways (RCPs)

Emission Paths for RCPs

Cells contain information about mitigation, adaptation, residual climate impacts

Ref. Krieger et. al. 2010

Available online (August 2011) in ‘Climatic Change’, Springer
Sustainable Low Carbon Mobility Framework

Objective

Low Carbon Transport

Options

Infrastructures

Space Design

Technologies

Behavior

Decisions/Indicators

Modes (avoid lock-ins)
Supply-push (public finance)
Market Integration (PPP)
Land-use (Zoning, V/H City)
Inclusion (Access)
Institutions (Decentralized)
Efficiency (Standards)
Taxes/Subsidies (Targeted)
R&D (Finance, IPR)
Awareness/Education ()
Governance (Policies, Rule)
Incentives (Tariff, Taxes)

Targets

National Socio-economic Objectives and Targets

Global Climate Change Targets

Back-casting
Copenhagen Commitments and Strategy

**Copenhagen Commitments**

- 20 to 25% Emissions Intensity Reduction from 2005 to 2020 (1.5 to 1.9% decoupling)
- Per Capita Emissions Below OECD Average (for ever)

**National Climate Change Action Plan**

**Implementation Strategy: 8 National Missions**

1. Solar Energy *(22000 MW PV + Thermal by 2022)*
2. Enhanced energy efficiency *(Avoided Capacity 19000 MW by 2014-15)*
3. Sustainable habitat
4. Water Sector *(20% water use efficiency improvement)*
5. Sustaining the Himalayan eco-system
6. A “Green India” *(20 Mil. Hectare Forestation; Forest cover from 23 to 33%)*
7. Sustainable agriculture *(Micro irrigation promotion in 40 m ha)*
8. Strategic knowledge for climate change
Aligning National and Local Policies

- Indicators are key to link **Low Carbon Actions** and Development Targets
  
  - ‘Paradigm Shift’ towards ‘Co-benefits’ and ‘Complementarity’
    - Co-benefits reduces welfare losses
    - Deliver LCS at **Low Effective Carbon Price**

- Transport Policy Assessment Methodologies should link:
  - **MACRO Indicators**: Aggregate, National, Long-term Indicators
  - **MICRO Indicators**: Sectoral, Local, Short-term
## Macro Indicators (17): Summary

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Air Quality Co-benefits of LCS

Co-benefits: SO2 Emissions

- Base Case
- Conventional Path + High Carbon Price
- Sustainable Development + Low Carbon Tax

Years: 2000 to 2050

Indicators: Million tSO2

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Energy Security Co-Benefits of LCS

Energy Mix in 2050

Primary Energy Demand (Mtoe)

- Coal: BAU (800), LC- Conv (950), LC- Sust (850)
- Oil: BAU (200), LC- Conv (300), LC- Sust (200)
- Gas: BAU (350), LC- Conv (450), LC- Sust (300)
- Nuclear: BAU (500), LC- Conv (600), LC- Sust (400)
- Hydro: BAU (100), LC- Conv (150), LC- Sust (100)
- Renewable: BAU (600), LC- Conv (750), LC- Sust (600)

Total Energy Demand (Mtoe)

- Base: 2825
- LCS_CT: 2945
- LCS_SS: 2207
LCS with Lower Social Value of Carbon

Price (US $/tCO₂)

2°C Conventional Mitigation Scenario
2°C Sustainability Scenario
Base Scenario

Analysis with ANSWER-MARKAL Model

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Urban Transport

Four ways to reduce GHG Emissions

1. Reduce emissions per Km
2. Reduce Emissions per unit transported
3. Reduce distances
4. Reduce number of trips
LCMP Methodology & Macro Considerations

- Technological choices
- Matching travel demand to technological choices
- Access / Affordability
- Investment requirements
Challenges of Alignment

- Importance of long-term perspectives due to long-life of transport assets

- The alignment of policies in order to realize co-benefits and avoid adverse lock-ins

- The key is alignment of
  - Local – National – Global
  - Short-term – Long-term
  - Top-down – Bottom-up
  - Macro - Micro