# Low Carbon Society in Asia: Activities in India in 2012-13



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- 1. Low Carbon Society Framing & Modeling for India
- 2. Publications
- 3. Capacity Building and Dissemination
- 4. Year 2013-14: Way Forward



# LCS Framing: Rio+20



#### **Green Growth: Low Carbon and Inclusive Society**

- Mapping Transitions
  - Demographic; Urban/Rural; Income; Behavior (e.g. consumption); Institution

#### • Economics: Paradigm Shift

- Cooperation & Co-benefits (e.g. energy security, AQ)
- Finance (discount rates)

#### Policies

- Technology: Infrastructures; Targeted R&D + industry
- Coordinate policies to gain co-benefits
- Global carbon price

#### Green Growth and Low Carbon Modeling Applications •LC Transport Modeling for India

- National Level Modeling
- LC Modeling in three cities

### Modeling Low Carbon City

- Three small and mid-size cities
- Guidebook for Preparing LC Roadmap for a City



# Sustainable Low Carbon Mobility Framework





### **Soft-Linked Integrated Model System**



#### Soft-Linked Integrated Model System (SLIM)





### **Transport CO2 Reductions (Million Ton)**









Indian Institute of Management, Ahmedabad, India



# 2012-2013 Publications



# **Publications**



- UNEP Gap Report (2012)
- LCS Overview Paper for AME (Published)
- Paper on two low carbon pathways for India
- Technology Targets paper (Published)
- Building Sector Energy (Submitted in EP)





# Two low carbon development pathways in India

### M. Namazu, S. Fujimori, P. R. Shukla, Y. Matsuoka

**Accepted for publication in Journal of Envormental Perspectives** 



### Two low carbon development pathways in India

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Figure 1 population prospects in India

#### Figure 3a: GHG emissions



#### Figure 2 GDP prospects in India



#### Figure 3b: GHG emissions price





### **GDP and Energy Projection**





#### Figure 5: Total primary energy supply



Figure 4b: GDP loss



#### Figure 6: total final energy consumption





# Energy Consumption and Electricity Generation



Figure7: Household energy consumption

Figure 8a: Power generation - ADV Figure 8b: Power generation - CNV





### **Mitigation Measures**



Figure 9a: Mitigation measures - ADV



#### Figure 9b: Mitigation measures - CNV



# **Publications**

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Low carbon and clean energy scenarios for India: Analysis of targets approach Priyadarshi R. Shukla <sup>a</sup>, Vaibhav Chaturvedi <sup>b,\*</sup>

Framing and modeling of a low carbon society: An overview

Mikiko Kainuma <sup>a,\*</sup>, Priyadarshi R. Shukla <sup>b</sup>, Kejun Jiang <sup>c</sup>



# The Emissions Gap r **Emissions Gap Report** to 2" C or 1.5" C? **Bridging the Emissions Gap** The Emissions Gap Report 2012 UNEP



United Nations Environment Programme with the European Climate Foundation & National Institute of Ecology, Mexico

### **2011 Durban Climate Summit UNEP "Bridging the Emissions Gap" report**

United Nations Environment Programme with the European Climate Foundation & Ministry of Environment, South Africa

### 2012 Doha Climate Summit "Emissions Gap 2012" report

2010 Cancun Climate Summit

**UNEP "Emissions Gap" report** 

United Nations Environment Programme with the European Climate Foundation

55 scientists, 43 institutions, 22 countries

### What are we aiming for? Post-2020 goals for staying within 2°C target







### How can the 2020 gap be bridged? Bottom-up sectoral studies







# 2012-2013 Capacity Building and Dissemination



# **Capacity Building/ Dissemination**

- UNEP Workshop: Low Carbon Transport in India April 2012
- IPCC Scenario Workshop May 2012
- ISAP2012 July 2012
- AIM Training Workshop July 2012
- 1-day visit of AIM team to Tsukuba University July 2012
- LOCARNet 1<sup>ST</sup> Annual Meeting, Bangkok Oct 2012
- IPCC LA meetings at Vigo Nov 2012
- COP 18: Nov-Dec 2012







# **1.Asia Low Carbon Society Project**

## 2.AMPERE

# 3.LIMITS

# 4.CPO

## 5.IAMC





# **2013-2014** Way forward







- Global Target: 2 deg. C Stabilization
  - Global Carbon Price
  - Peaking
- National LC Plan consistent with the Global Target
  - Climate Change National Action Plan
  - Clean
- Strategy to implement the plan (e.g.)
  - Market Instruments (RE Certificates/ Clean Energy Certificates)
  - Finance
- Other issues (e.g.)
  - MRV/ICA (International Consultation & Analysis) of Domestic Actions (Cancun)



# Post-Doha Challenges: India

ia

- Domestic Actions (Guided by National Climate Change Action Plan)
- Enhanced Energy Efficiency measures (e.g. EE Certificates, CAFE)
- Renewable Energy Push (e.g. 20 GW Solar PV Target by 2022, RE Certificates)
- Mission on Sustainable Habitat (e.g. Building Codes, Low Carbon Cities Planning)
- Coal tax (\$1 per ton) and recycling of tax funds for clean energy
- International Instruments (e.g. Cap & Trade Pilot)
- UNFCCC Instruments
  - CDM and NAMAs
  - UNFCCC Funds (e.g. Green Climate Fund, Adaptation Fund)
- Bilateral Actions
  - Tech Transfer (e.g. CCS)
  - JVs (e.g. Transport: High Speed Rail, Freight Corridors)



# **Renewable Energy Certificate Mechanism:**



### **Institutional Framework at National Level**





# Perform, Achieve & Trade (PAT) Mechanism

(The market based mechanism through cost effectiveness approach for improving energy efficiency in energy intensive sectors)

### Methodology:

- Specific Energy Consumption (SEC) reduction targets for the 685 energy-intensive units which are designated consumers under the Energy Conservation Act
  - Targets would be % reduction of current SEC
  - Percentage reduction requirement based on:
    - Sectoral targets to achieve the national goal
    - Current SEC as a ratio of the best in the sector/ groups within a sector
    - Unit specific diversities (Next Slide)
  - Target setting for the power generation and fertilizer sectors through the existing tariff-setting processes
  - SEC measurement and verification by BEE through designated verifiers

Sector	No. of Identified DCs*
Aluminum	11
Cement	92
Chlor-Alkali	21
Fertilizer	22
Pulp & Paper	70
Power	154
Iron & Steel	110
Textiles	197
Railways	8

\*DCs: Designated Consumers



# Conclusion



# **Overview of Activities (2013-14??)**

- 1. Purposive LCS Research (for India & Global)
- 2. Integrated Model Development for India
- 3. Models, Tools, Guidebooks and Application for Cities
- 4. Publications consistent with AIM Research Activities
- 5. Capacity Building and Dissemination

