

# **Low-carbon Development in Asia: Diverse Pathways toward a Common Goal**

## **Research Outline**

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## **Outline**

- **Goal and objective**
- **Components**
  - **Development patterns**
  - **Technology leap-frogging**
  - **Traditional values**
- **Questions for discussion**

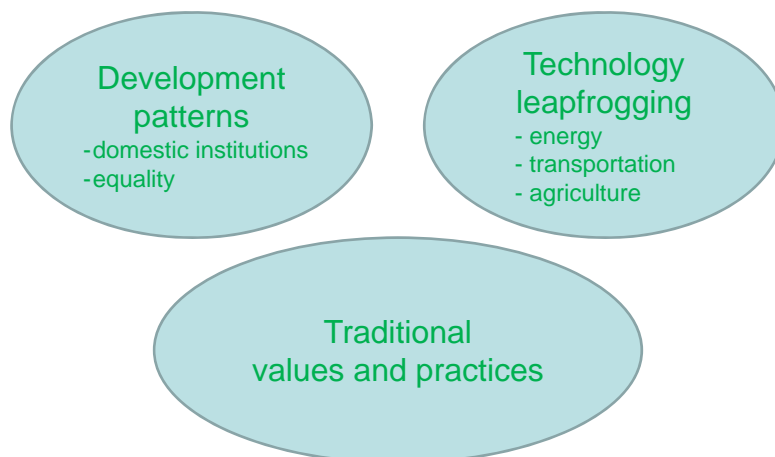
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## Goal and Objective

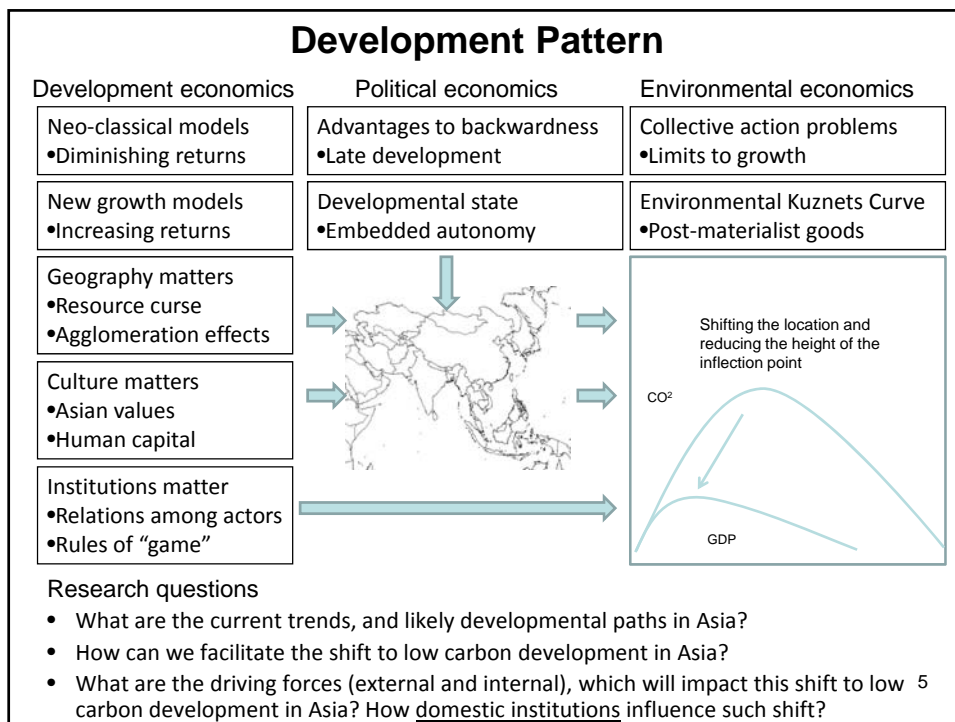
- Research project “Low-carbon development in Asia: Diverse Pathways toward a Common Goal” was launched in April 2009.
- Goal
  - Assess opportunities, potentials and limitations of developing Asia for taking low-carbon development pathways
- Objective
  - Determine how domestic institutions promote or inhibit low carbon development
  - Analyze enabling conditions which promote low-carbon technology leap-frogging
  - Review and identify traditional values and practices in Asia, which promote low-carbon development

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## Components



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### Decentralization and Low Carbon Transport: The Cases of India and Indonesia

- **Question:** Why have India and Indonesia achieved varying degrees of success implementing low carbon transport reforms?
- **These reforms require:**
  1. fiscal transfers to cover investment in public transport;
  2. strong vertical coordination to integrate fuel, vehicle and travel demand policies; and
  3. clearly defined implementing responsibilities to integrate mixed land use and mode shifting policies.

	1. Fiscal Transfers	2. Vertical Coordination	3. Clearly Defined Implementing Rules
India	**	**	*
Indonesia	*		

- **Hypothesis:** India will enjoy more success because it has more mature federal institutions.
- **Alternative Hypothesis:** Degree of decentralization does not matter as much as other variables.
- **Method:** Comparative case study of transport policies with interview data on implementation.

## **Financing Low Carbon Development in Asia: Comparative Study**

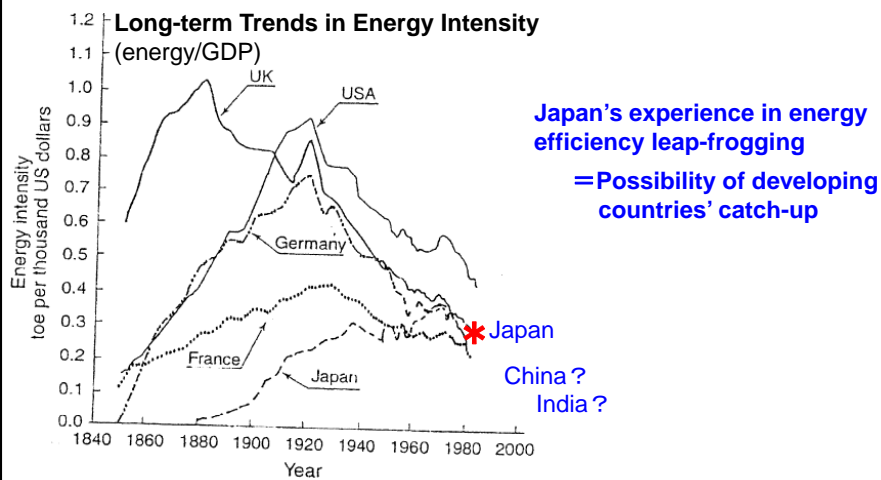
- **Background**
  - High saving rates and predominance of domestic capital in infrastructure investments imply the possibility of self-finance to low carbon development in China, India and Indonesia.
  - However, a key challenge is to ensure that investment will flow into low carbon energy technologies and energy efficiency in a timely fashion to avoid carbon lock-in.
- **Objective**
  - Determine how domestic financial systems promote or inhibit energy efficiency investments
    - How do different institutional structures of financial systems (e.g., indirect finance [via banks] in China and direct finance [through developed capital markets] in India) matter?
- **Methodology**
  - Comparative case study of institutional structures of financial systems

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## **What are the equitable and sustainable growth paths for developing Asia?**

- **Concept:**
  - In Asia, social, economic conditions of countries are quite diverse. To foster a long-term cooperation in the region, it is necessary to share a sustainable and equitable vision. Then, it becomes possible to develop effective growth paths toward low carbon societies in Asia.
- **Methodology:**
  - Using AIM models, an equitable long-term vision and the paths will be explored. Future climate frameworks for cooperation in Asia will also be examined under the considered development paths.

## Technology Leap-frogging



- **Research questions**
  - How can we facilitate technology leap flogging to promote low carbon development?
  - What would be mechanisms (international and national, market and non market) that could facilitate those leap-floggings to low carbon technologies?

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## Analysis on Low-Carbon Power Sector Development in Selected Asian Developing Countries

- **Objectives**  
Analyzes alternative, low-carbon power sector development path for the selected Asian developing countries by
  1. Identifying factors in promoting distributed power generation
  2. Examining potential leapfrogging RE technologies for distributed power generation (power storage and waste heat transfer), and their applicability to the selected Asian developing countries
  3. Examining various financial policy options to support low-carbon power development (adoption of carbon tax, Feed-in-Tariffs, subsidies)
- **Research Questions**
  - What are the key factors for promoting distributed energy system? (i.e. Is it policy-driven, or market-driven? )
  - What are the key leapfrogging RE technologies applicable to the Asian developing countries?
  - What is economically the optimal adoption and operation of distributed energy resources (DER) by a hypothetical Indonesian decentralized microgrid: 1) The appropriate level of installed capacity, 2) the least cost combination of DER technologies to be installed, and 3)how should the installed capacity be operated to minimize energy bill?
- **Methodologies**
  - Quantitative Analysis (Regression Analysis, Model Analysis with DER-CAM (Consumer adoption model))
  - Qualitative Analysis (Case Studies, Stakeholder Interviews)
- **Expected Outcomes**
  - Research findings to be reflected to policy recommendations for CCPL
  - Providing numerical inputs to NIES Model Team for LCS Scenario development
  - Determining technical and investment priorities in the private sector

## **Technology leapfrogging: the experience of private firms in the energy and transport sectors in selected Asian developing countries**

### **Concept**

Technology leapfrogging (TL) is described as where industrializing countries:

- avoid the resource-intensive patterns of economic and energy development by leapfrogging to the most advanced energy technologies available, rather than following the same path of conventional energy development undertaken by industrialized countries (Gallagher 2006);
- technology transfer is found to be a common feature of TL (Sauter and Watson 2008)

### **Objective**

- Examine the institutional mechanisms that effectively facilitate TL in Asian developing countries  
Specific (Year 1)
  - To document the key issues, challenges and opportunities confronted by private firms engaged in the development and transfer of low carbon technologies; and,
  - To identify the policies and measures which have assisted private firms in successfully carrying out technology transfer which have led to low carbon technology leapfrogging

### **Methodology**

Using a case study approach, Year 1 will be the conduct of interviews and focused group discussions (FGDs) with the following:

- 1) pre-selected private firms in Indonesia (focus for Y1), India and China engaged in energy technology leapfrogging;
- 2) Pertinent government agencies/ bodies involved in TT/TL either as a policy-making, regulatory, financing institution; and,
- 3) NGOs/research institutes involved with local policy analysis of the energy and national innovation systems

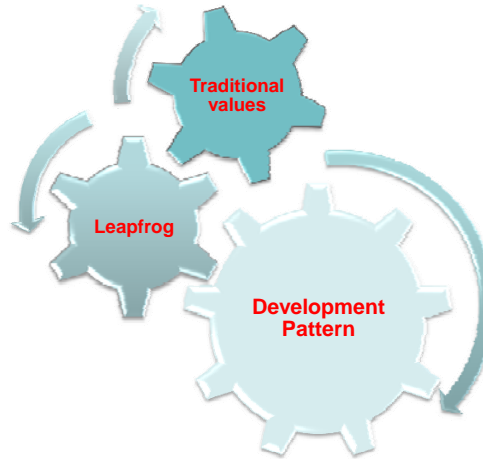
## **Low Carbon Agriculture for Low Carbon Society**

- **Background**
  - Agriculture contributes, directly and indirectly, to significant GHG emissions in AP region.
  - Current and future trends indicate an increasing share of direct and indirect energy use in agriculture
    - Increased mechanization due to rural outmigration, irrigation pumping, and transportation
- **Objectives**
  - To assess the capacity of Asian agriculture to contribute to low carbon society
  - To identify both indigenous and leapfrog technologies and policies with potential to scale up in agriculture sector in AP region
  - To identify research, technology and policy gaps for maximizing the mitigation potential of agriculture in AP region
- **Methodology:**
  - Delphi survey/expert elicitation, carbon abatement costs, multi-criteria methodologies, and country case studies
- **Expected Outcomes:**
  - Identify entry points for infusing LCS practices in Asia Pacific Agriculture with possible strengths and weaknesses.

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## Traditional values and practices

- **Background**
  - Values matter in choosing a pathway toward low-carbon development.
  - Development paths should be compatible with traditional values and practices.
- **Objective**
  - Review and identify traditional values and practices in Asia, which promote low-carbon development



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Bottom line is....

**Much of Asia is  
in a good position to realize  
low-carbon development (?)**

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## Roundtable Discussion: Questions

- **Development pattern:**
  - Is Asia better positioned to achieve low-carbon development than other regions?
  - What kind of political institutions promote or hinder low-carbon development?
- **Technology leap-frogging:**
  - How can key stakeholders (governments, enterprises etc) facilitate technology leap frogging to promote low carbon development?
  - What would be mechanisms (international and national, market and non market) that could facilitate those leap-froggings to low carbon technologies?
- **Traditional values/practices:**
  - Does Asia have distinguished values that promote low carbon development?
  - What are the local values and practices in Asia that can contribute to low carbon development?
  - How can such values be integrated and mainstreamed into policy and action which promote low carbon development?

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