

# **Integrating Carbon Management Into the Development Strategies of Cities**

7 May 2004

## ***Research Plan (PROTOCOL)***

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### **INTRODUCTION**

The purpose of this research plan is to outline a set of guidelines for the development of contributing case studies and synthesis working papers to the APN-funded project on Integrating Carbon Management into the Development Strategies of Cities—Establishing a Network of Case Studies of Urbanization in the Asia-Pacific (APN 2003-16). These guidelines emanated from the discussion among case study leaders and the “project synthesis” team at the Initial Planning Meeting of the Project held on 25-27 September 2003 in Manila, The Philippines.

### **STUDY DESIGN**

#### ***Research Themes and Questions***

The overall goal of the project is to explore how carbon management—a carbon’s eye view of development—can be integrated into development strategies of cities. The way urbanization and urban transformations<sup>1</sup> unfolds in the Asia-Pacific over the next several decades has profound implications and consequences for carbon stocks and fluxes,<sup>2</sup> which in turn may further constrain, if not undermine, urban development processes and growth (Marcotullio, 2002; Bai & Imura, 2000)

To understand the present trend and possible future scenarios of urbanization and urban transformations in the region from a carbon’s vantage point, a “horizontal comparison” is undertaken by carrying out a comparative study with selected core cities in Asia-Pacific. The “horizontal comparison” among selected cities is undertaken by addressing the following themes and questions as shown in Table 1.

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<sup>1</sup> Urbanization is fundamentally the result of three processes: intrinsic population growth; migration adding population to existing urban areas; and human settlements reaching a certain threshold size after which they are formally consider “urban” in national statistics (Sheng, 2000).

<sup>2</sup> For this project the carbon stocks and fluxes include carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and black carbon. CO<sub>2</sub> and CH<sub>4</sub> are two of the most important greenhouse gases. Black carbon, on the other hand, is one of the classes of aerosols that impact radiative balances, and therefore influence climate. It refers to the various carbonaceous end products (chars, charcoals and soots) of the incomplete combustion of fossil fuel and biomass. Aside from climatic influences, black carbon is a major health concern in most cities in the Asia-Pacific region.

**Table1. Research Themes and Questions**

Theme	Research Questions
[1] Pathways	<ol style="list-style-type: none"> <li>1. What are the consequences of different pathways of regional development, especially urbanization and urban transformation, on carbon stocks and fluxes? Are certain patterns of urbanization and urban transformation less carbon intensive than others?</li> <li>2. How and why different pathways arise? What are the historical underpinnings of the different pathways of regional development? What were the important historical drivers of regional development path?</li> <li>3. What drive these different pathways at present? What is the role of internal (e.g., local politics) and external (e.g., development agenda) influences?</li> </ol>
[2] De-carbonisation	<ol style="list-style-type: none"> <li>1. What future urban forms, governance, institutional and cultural arrangements might be effective in facilitating the integration of carbon management as an explicit goal in regional development?</li> <li>2. What are some of the most important technological options (e.g., change, innovations, among others) that could influence carbon emissions, sequestrations and storage? What are the opportunities and constrains of adopting these options as part of regional development carbon management strategies?</li> <li>3. How could the de-carbonization agenda become an integral component of regional development strategies? Where do changes come from? What kind of instruments needed? Who needs to be involved? What are the trade-offs of adopting these strategies?</li> </ol>

**GUIDE FOR THE CONDUCT OF THE CASE STUDIES**

**Definition of Cases**

*Geographical Scope:* Recognizing the economic influence and ecological footprints of cities<sup>3</sup>, the case studies look at an urban region comprising the main city and its surround (See

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<sup>3</sup> Many cities have an extended influence over surrounding rural areas and hinterlands. The patterns of demographics, economic and ecological activities result to spatial configuration of an urban region with periodic urban concentrations and a semi-urban rural area.

Table 2). The project considers the peripheral areas with 10 to 50 per cent of urban land use as part of the urban region in defining the spatial boundary of the urban region, The area of the urban region considered in the research ranges from 500 to 5000 km<sup>2</sup> (See Table 2).

Pragmatic considerations of data availability by both administrative/political boundaries and present carbon outcomes accounting, however, may determine the actual spatial extent of the case study.

**Table 2. Project’s Case Studies**

Country	Urban Region (Main City + Surrounds)	Area (km <sup>2</sup> )
Philippines	Metro Manila + Laguna Lake Basin	3000
India	New Delhi + Surrounds	
Thailand	Chiang Mai + Lamphun Plan Area (including several districts)	500-1000
Indonesia	Jakarta (JABOTABEK)	4000
Vietnam	Ho Chi Minh + Surrounds	

*Time Scope.* The study focuses on the datasets from 1980, 1990 and 2000 (or similar time range). For scenario analysis, 2020 and 2050 time horizon will be used. Historical records will be also used in the case study narratives.

### Data Sources

The data and information for the study will be primarily taken from secondary data which include, among others, published papers, reports, and government data. The selected “core” case studies will be supplemented and complemented with published cases, as well as on-going studies and some unpublished studies in the region.

### Collaborative Process: Guiding Principles

As a collaborative endeavor, the project necessitates sharing of data, information, budget, and complimentary skills for the comparative case study analyses, as well as the conduct of each case study. Proper acknowledgment of one’s contribution (e.g., co-authorship of papers, and nice acknowledgment, among others) must be observed and upheld.

### Shared Questions, Datasets and Analyses

**Table 3. Pathways (Theme 1) Datasets and Analyses**

Research Questions	Datasets and Analyses
1. What are the consequences of different pathways of regional development, especially urbanization and urban transformation, on carbon stocks and fluxes?	<ul style="list-style-type: none"> <li>▪ <u>Characterize carbon outcomes:</u> Secure the 1980, 1990 and 2000 sectoral inventory of emissions and removals (industrial, transportation, electric utility, wastes, among others) using IPCC data and other sources.</li> <li>▪ <u>Identify the attributes of regional development:</u> Using 1980, 1990 and 2000 data, identify               <ul style="list-style-type: none"> <li>- forms of urban settlement</li> <li>- demographic growth</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>- population density (population urbanization ration)</li> <li>- urban-rural land ratio</li> <li>- sectoral mix of industry</li> <li>- shifts of region's dominant livelihood</li> </ul> <ul style="list-style-type: none"> <li>▪ Using a standard set of satellite images and maps, examine the net land use changes for the period (agricultural/forest-industrial/commercial ratio) and describe the land use histories of the region.</li> </ul>
<p>2. How and why different pathways arise?</p> <p>What are the historical underpinnings of the different pathways of the region?</p> <p>What were the important historical drivers of region's development path?</p>	<ul style="list-style-type: none"> <li>▪ Determine the historical legacies of the city- indicating the intent of the city (e.g., political capital)</li> <li>▪ Identify the historical role/niche of the city in the national, regional and global economy and polity (e.g., production sites)</li> </ul> <p>(Historical thematic maps may be helpful for the analysis)</p>
<p>3. What drive these different pathways at present?</p> <p>What is the role of internal (e.g., local politics) and external (e.g., development agenda) influences?</p>	<ul style="list-style-type: none"> <li>▪ Conduct a production (resource consumption ) analysis indicating the patterns of the city's <ul style="list-style-type: none"> <li>- economic growth rate (e.g., GDP growth rate, and industrial product growth rate)</li> <li>- industrial composition (share of each industry),</li> <li>- energy and materials used by key indicator industries (e.g., manufacturing)</li> </ul> </li> <li>▪ Conduct a city consumption patterns analysis indicating for example per capita energy consumption, automobile utilization, waste generation, among others</li> <li>▪ Examine policy commitments underpinning city production and consumption patterns such as social, legal and physical infrastructures (e.g., industrialization, globalization, foreign debt, among others)</li> <li>▪ Identify the role and niche of the city in the national, regional and global economy and polity</li> <li>▪ Map out different stakeholders benefiting/not-benefiting these pathways and the manner in which these stakeholders shape and influence policy and decision-making processes, including mass media (advertisement) and knowledge production processes in the city.</li> </ul>

**Table 4: Decarbonisation (Theme 2) Datasets and Analyses**

Research Questions	Datasets and Analyses
<p>1. What future urban forms, governance, institutional and cultural arrangements might be effective in facilitating the integration of carbon management as an explicit goal in regional development?</p>	<ul style="list-style-type: none"> <li>▪ Review level and types of structures and processes to debate and create policy directions; level of people and sectoral participation in decision-making process</li> <li>▪ Determine the level of knowledge and awareness of carbon management</li> <li>▪ Assess the regional system’s (institutional arrangements, incentives and governance) potential to accommodate (+)/ hinder (-) carbon management</li> <li>▪ Identify existing regional incentives structures (e.g., subsidy, tax holidays, among others) for key Carbon sector contributor</li> <li>▪ Identify regional regulatory mechanisms (e.g., legislation, and city ordinances)</li> <li>▪ Propose mechanisms and policy incentives inducing behavioral changes of production and consumption resulting to net lower carbon emission or improves sequestration               <ul style="list-style-type: none"> <li>- incentives to adopt and invest on a more environmentally energy sources</li> <li>- increase energy efficiency; renewable energy</li> <li>- support for carbon management innovations</li> <li>- create carbon constituency and participation (governance)</li> </ul> </li> </ul>
<p>2. What are some of the most important technological options (e.g., change, innovations, among others) that could influence carbon emissions, sequestrations and storage?</p> <p>What are the opportunities and constrains of adopting these options as part of city’s carbon management strategies?</p>	<ul style="list-style-type: none"> <li>▪ Carbon Management technological options and innovations (products, processes and services) available; the researches undertaken in the city</li> <li>▪ Link of research vis-à-vis policy making, city ordinance, and program development; level of support (budget) from the city and private institutions to R &amp; D</li> <li>▪ Research culture in the city known as the center of innovation and exploration</li> <li>▪ Potential role of the media and education as knowledge production centers</li> </ul>
<p>3. How could the de-carbonization agenda become an integral component of region’s development strategies?</p> <p>Where do changes come from? What kind of instruments needed? Who needs to be</p>	<ul style="list-style-type: none"> <li>▪ Multi-stakeholder scenario analysis for (1) business as usual, and (2) a de-carbonizing path scenario</li> <li>▪ Conduct trade-offs and vulnerability analysis for a set of carbon management measures to be instituted in the city as part</li> </ul>

<p>involved?</p> <p>What are the trade-offs of adopting these strategies?</p>	<p>of the development strategies. Determine the consequences of decarbonisation on different sectors such as urban and rural poor livelihood; impacts on the other basic urban necessities such as water and food;</p> <ul style="list-style-type: none"> <li>▪ Determine the acceptability of these measures from different sectors. Who will most likely shoulder more of the costs of these changes? Who will probably oppose and block or support these measures?</li> <li>▪ Identify the main agents of these changes</li> <li>▪ Identify the type and mix of instruments needed</li> </ul>
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## GUIDE FOR THE SYNTHESIS PAPERS

### Syntheses Papers

There are two possible cross-case studies Working Papers (WP) that may be derived from the project:

- Pathways Working Paper
- De-Carbonizing Policies Working Paper

Each WP presents the conceptual message (hypotheses/theoretical contribution) of the paper, the analytic and methodological approach of the study, and an illustration using the core and related cases of the project. Policy implications regarding urbanization and urban transformation vis-à-vis carbon management shall be highlighted in each working paper.

## ASSIGNMENTS

Table 5 & 6 show the following assignments for the development of the case studies and syntheses papers, respectively.

**Table 5. Case Study Assignments**

Country	Main City + Surrounds	PIC
Philippines	Metro Manila + Laguna Lake Basin	Rodel Lasco Tonton Contreras
India	New Delhi + Surround	AP Mitra
Thailand	Chiang Mai + Lamphun Plan Area (including several districts)	Po Garden Jesse Manuta Louis Lebel
Indonesia	Jakarta (JABOTABEK)	Agus Sari
Vietnam	Ho Chi Minh + Surrounds	Ngyuen Hoang Tri

**Table 6. Syntheses Paper Assignments**

Theme	WP Title	PIC
Pathways	TBD	PI- Rodel Lasco Synthesis – Ooi Giok Ling AP Mitra Jesse Manuta
De-carbonisation	TBD	PI- Louis Lebel Synthesis- Tonton Contreras Agus Sari Po Garden

**TIME LINE**

**Table 7. Schedule of Activities and Deadlines**

Activities	Nov 03	Dec 03	Jan 04	Feb 04	Mar 04	Apr 04	May 04	June 04	July 04	Aug 04	Sep 04	Oct 04	Nov 04	Dec 04
Draft Protocol and TOR														
Case and synthesis study proposal														
Case Study Working Papers- data sets and review of literature				1		2					3			
Synthesis Working papers- conceptual, general review				1		2					3	4		
Initial Reporting to APN					A P N									
Web Conference- case study teams														
Synthesis Meeting														
Final Reporting to APN														A P N

- 1- Submit a 2-page progress report of the study to the Principal Investigator, Dr. Louis Lebel, on February 15, 2004.
- 2- Study report—full outline, key points, some data tables, and extended abstract for E-conference.
- 3- Full draft suitable for friendly peer review and conference presentation.
- 4- Final draft ready for submission to journals.

**References**

Bai, X. & Imura, H. 2000. A comparative study of urban environment in East Asia: Stage model Of urban environmental evolution. *International Review for Environmental Strategies*, 1(1): 135-158.

Global Carbon Project. 2003. Science Framework and Implementation. Earth System Science Partnership (IGBP, IHDP, WCRP, DIVERSITAS) Report No. 1; Global Carbon Project Report No. 1. Canberra.

Marcotullio, P. 2003. Globalization, urban form and environmental conditions in Asia-Pacific Cities. *Urban Studies*, 40 (2): 219-247.

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28 November 2003

**TERMS OF REFERENCE - Asia Pacific Network Project on Integrating  
Carbon Management into the Development Strategies of Cities**

**Case Study Team Leader**

1. The primary responsibility of the case study leader is to ensure that this part of the collaborative study is implemented as outlined in the project proposal to the APN and the approved budget. This will include coordination of essential field work and secondary data collection, in line with the case study budget, and ensuring that project expenses are valid and properly documented.
2. A 2-page progress report of the study must be submitted to the Principal Investigator, Dr. Louis Lebel, on February 15, 2004.
3. A preliminary report of the study must be submitted in April 2004. The report must include the full outline of the study, key points, some data tables and extended abstract for the open web-conference in May 2004.
4. Case study reports, suitable for submission as part of a set to an international journal, and financial documents must be submitted to the Principle Investigator within two week of the final synthesis meeting in October 2004. Financial reports must be submitted before or at the synthesis meeting in October 2004.
5. The total APN budget for each case study is US \$ 4,000.00. US \$ 3,500.00 will be given upon receipt of the signed terms of reference, budget allocation and case study proposal. The remaining US \$ 500.00 will be released upon receipt of the final report for the final synthesis meeting.
6. Deviations from the agreed workplan, other duties, and changes in these terms of reference may be made upon discussion and agreement among the team leader and the Principle Investigator.

Agreed,

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Dr. Louis Lebel  
Principal Investigator

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Case Study Leader

Appendix 2

TOR – Synthesis Team Leader

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28 November 2003

**TERMS OF REFERENCE - Asia Pacific Network Project on Integrating  
Carbon Management into the Development Strategies of Cities**

**Synthesis Team Leader**

1. The primary responsibility of the synthesis team leader is to take the leadership in synthesizing and writing-up the main cross case study findings of the APN carbon management and urbanization project.
2. A 2-page progress report of the study must be submitted to the Principal Investigator, Dr. Louis Lebel, on February 15, 2004.
3. A preliminary report of the study must be submitted in April 2004. The report must include the full outline of the study, key points, some data tables and extended abstract for the open web-conference in May 2004.
4. Synthesis study reports, suitable for submission as part of a set to an international journal, and financial documents must be submitted to the Principle Investigator within two week of the final synthesis meeting October 2004. The final draft of the paper must be ready for submission to selected journals in November 2004.
5. The APN budget for the synthesis is US \$ 1,000.00. Payment of grants to support the synthesis studies will be made after receipt of the signed terms of reference, budget allocation and synthesis paper proposal.
6. Deviations from the agreed workplan, other duties, and changes in these terms of reference may be made upon discussion and agreement among the team leader and the Principle Investigator.

Agreed,

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Dr. Louis Lebel  
Principal Investigator

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Synthesis Team Leader

### Appendix 3:

#### Participants of the Initial Planning Meeting of the Project held on 25-27 September 2003 in Manila, The Philippines.

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