

Cities

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Urban Energy Use and Greenhouse Gas Emissions in Asian Mega-cities

Partners: • [Institute for Global Environmental Strategies](#) (IGES), Japan

The nature of energy use and greenhouse gas emissions from cities is not well understood in Asia. Limited research on sectoral energy use exists for industries and urban transportation from the viewpoint of managing air pollution, but an overall energy and CO₂ picture is generally missing. In recent years, city policy makers are under growing pressure to take greenhouse gas emissions into consideration while planning, although any policy measure solely aimed at CO₂ reduction is a distant possibility for cities in Asia except for selected and relatively developed cities. The role of CO₂ emissions, especially in rapidly developing mega-cities, is significantly important in mitigating global emissions. In this context, discussions here are primarily centred on two of the mature mega-cities in Asia, namely Tokyo and Seoul, and two of the rapidly developing mega-cities, namely Beijing and Shanghai. For more information, please see: [IGES Project Website](#)

Transformation Processes in the Water Sector: The Importance of the Human Dimension

**IT Contributing
Project
No. C/2001/01**

Partners: • [University of Osnabrück](#), Germany

Transformation processes in the water sector – comparative analysis of development scenarios in a few selected urban regions of the world to achieve sustainable water resources management. Indicators for environmental, economic and social sustainability will be developed and applied to define target states and to monitor change. The research will

investigate technological, spatial and institutional redesign from an integrated perspective. To do so, it will use and develop methods in resource flow management, agent based modeling and stakeholder participation, novel information and communication technologies and public participation. The coordination of different stakeholder groups is crucial for the development of common strategies. A conceptual and methodological core project will investigate and coordinate research tasks that are of importance for all regions (e.g. investment decisions, modeling frameworks, methods for institutional analysis of stakeholder networks and regulatory frameworks, resource flow analysis). The research will address several scales by linking local – regional approaches embedded in a global perspective. Currently integrated water resource management is a topic of major interest. Numerous international programs and projects exist. However, most projects start from a natural science perspective. There seems to be a severe lack of international coordinated projects in the field of water starting from a social science perspective, taking the importance of the human dimension explicitly into account and integrating environmental, technological and societal aspects. The planned project will make a contribution to the focus cities and water. However, given the fact that cities cannot be viewed as isolated urban entities separate from their rural environment the proposed project will adopt a regional approach and take into account urban – rural interactions, in particular regarding the flows of water, nutrients and energy. The project will cut across the other themes of the IHDP by having strong links to the IHDP program on institutional change (IDGEC). For more information, please see:

- [Workshop report](#)
- [Project website](#)
- [Quarterly Newsletter on the Human Dimension in Water Management](#)
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Urban Policy Integration of Energy Related Environmental Issues in Selected Asian Mega-cities

**IT Research
Project No.
C/2001/02**

Partners:

- [Institute for Global Environmental Strategies](#) (IGES), Japan
- [Department of Urban Environment](#), Graduate School of Environmental Studies, Nagoya University, Japan

Cities in Asia are undergoing rapid transformation in terms of industrial production, people's lifestyles, social values, and infrastructures including transportation, drinking water, urban sewerage, and municipal solid waste collection and treatment systems. The increasing energy and material consumption in cities is a manifestation of the changes caused by the transformation, and greenhouse gas emissions call for our special attention. However, cities in Asia are confronted with multiple tasks for economic development and environmental protection. They tend to give their policy priorities to immediate, local issues and to regard global warming as a long term, distant issue. In fact, however, municipal policy to reduce energy consumption will bring multiple benefits to the community. It will help solve air pollution and traffic congestion problems, and will also facilitate the sustainable development of the city. The share of GHG emissions by developing countries will exceed that of industrialized countries in the mid 21st century, and a larger portion of the increase will be accounted for by the rapidly industrializing regions of Asia like China, South-east

Asian countries, and India, which in total have more than 40 % of the world population. Energy use will be bound to rise as these countries increase their industrial production; provide better basic services such as electric lighting, refrigeration, air conditioning, and health care; use more vehicles for urban transport; , and build new cities that require large quantities of energy intensive construction materials such as iron, cement, bricks and plastics. Within the region, the most significant increase of energy consumption and GHG emissions will take place in large cities which have rapidly expanding populations that enjoy higher living standards and material affluence than the people living in rural areas and smaller cities. Increasing demand for passenger mobility and freight transport will be reliant upon increases in the number of automobiles, which not only create problems such as traffic congestion, air pollution and noise having serious health and quality of life implications, but that also will be a major cause of increasing energy consumption and CO2 emissions. Large cities such as mega-cities are playing important economic roles as industrial and commercial centers of their countries, receiving larger investments by government and private sectors. These cities also have a significant share in the overall national emissions of greenhouse gases, including CO2 and CH4, but they also emit gases such as CO, NOx, and SOx, and particulate matter. As a consequence of their comparative wealth, these cities are in a better position than the rest of the country to be able to adopt more advanced technological interventions and other measures to protect the global environment. The problems and difficulties these large cities are faced with today will be those which smaller cities will be following in the coming future, and actions of large cities will be a model for other cities. Thus the study conducts comparative studies on large cities in order to provide a basis for countries to consider their comprehensive action strategies to promote sustainable development by employing efficient use of energy and resources to reduce environmental load. **Event**

28-30 January 2004: [International Workshop on Policy Integration towards Sustainable Energy Use for Asian Cities: Integrating Local Air Pollution and Greenhouse Gas Emissions Concerns](#), Institute for Global Environmental Strategies, Kanagawa, Japan. (Download announcement [PDF](#)) For more information, please see:

- [Workshop summary report](#)
- [Project website](#)
- [Project proceedings](#)

The Global Cities-Global Change Initiative: Understanding Interactions of Urbanisation with the Global Atmosphere

**IT Contributing
Project
No. C/2001/04**

Partners: • [National Center for Atmospheric Research](#), USA

In the very broadest terms, the Global Cities/Global Change Initiative addresses three questions:

1. How could the development and diffusion of innovative applications of information technologies and fuel cell power sources influence urban structure and metabolism? Which components in transportation and electrical energy systems are most subject to change? Are technological changes likely to be policy driven or innovation driven (market pull or technology push)? What factors are most likely to limit the adoption and

diffusion of new technologies in the urban environment?

2. Can a transdisciplinary approach to urban design using innovative new analyses, measurement techniques, and simulation methods produce a more robust knowledge framework and design toolkit for the design and exploration of alternative urban futures?
3. How could an urbanized global population of nine billion co-evolve with the stabilization, or reductions, of atmospheric concentrations of trace gases and particles at local-to-global scales?

The results of the Global Cities/Global Change Initiative will address past, present, and future urban-atmosphere interactions. We hypothesize that the relatively independently developed institutions and policies that influence the nature of technology development, urban infrastructure design, social change, and the economic structure of cities lead to widespread dysfunctional system characteristics (e.g., traffic congestion, air pollution, sprawl, etc.). Urban design must be an integrative process using systems thinking, adaptive management methods, and state-of-the-art simulation tools. See the project [website](#) for more information.

Event

4 - 22 August 2003: [Advanced Institute on Urbanization, Emissions and the Global Carbon Cycle](#), Boulder, Colorado, USA

Application before January 31. IT endorsed.

Complex Systems: Cities and their Environment

A Biocomplexity Incubator Project

IT Research

Project

No. A/2001/06

Partners:

- [University of Connecticut](#), USA

The proposed program is fundamentally an incubator program with a limited budget. It will include an integrated research component as a part of the incubator effort. Two major activities are being undertaken: In collaboration with the Environmental and Societal Impacts Group of the National Center for Atmospheric Research, this project will sponsor a summer/fall 2002 conference on the carbon and water metabolism of cities. It will strive to understand how those systems have arisen and what their effects are, and it will envision alternatives with lesser environmental impact and greater societal benefits. It is designed to produce a book. The second activity involves research to be undertaken by a doctoral student in the University of Connecticut's Department of Civil Engineering. His work will be supervised by Richard Rockwell, of the Institute for Social Inquiry, and Garrick, of the Connecticut Transportation Institute. The design is that of a life-cycle analysis of three modalities of transportation (auto, bus, and light rail) to be deployed on the corridor between Hartford and New Britain, Connecticut. The development of a quantitative life-cycle model is planned. Parallel support exists in the form of the present IHDP and START programs, which receive

substantial but inadequate support from many governments; in the program now being developed by the PI through the Asia-Pacific Network and with what might become a program of the Inter-American Institute; in the Asian activities of IGES; and the new urban quality of life focus of the science plan of the European Community U.S.
