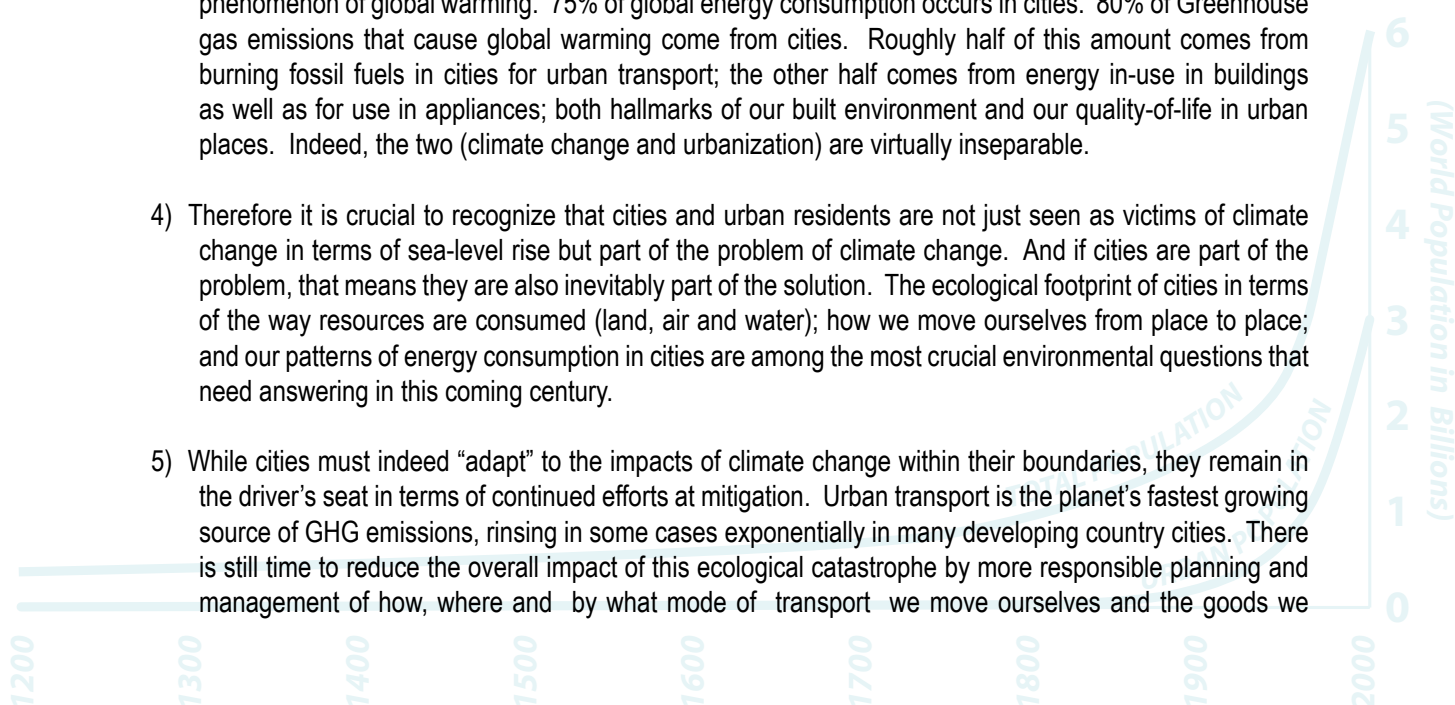


I. Climate Change, Low-Lying Cities and the Vulnerable Urban Poor

- 1) By 2030, three-quarters of the world's population will be urban, and the biggest cities will be found in the developing world. The growth of cities is expected to continue up to 9 billion in 2050. As climate change threatens to change the face of the planet, mega-cities loom as giant potential flood or other disaster traps, especially for billions of the world's urban poor – always the most exposed and the most vulnerable. Therefore, an important lesson on which we have plenty of experience to draw is this: taking preventive action and planning ahead to offset the worst. The United Nations has calculated that one dollar invested in disaster reduction today, can save up to seven dollars tomorrow in relief and rehabilitation costs.
- 2) Indeed, The world's 1 billion slum dwellers are most vulnerable when it comes to disasters. All too often, they live in places where no-one else would dare set foot – along beaches vulnerable to flooding (such as Dhaka), near sites prone to landslides (Hong Kong, Tbilisi), near polluted grounds or shaky structures that would be destroyed the instant an earthquake hit. (Yerevan). The risk of mass fatalities is greater given modern land use policies, rapid urbanization, and urban population growth. Tens of millions of people in mega-cities like Mexico City, Mumbai, Lagos, and São Paulo live in potential death traps: huge, densely populated slums located on fault lines or in flood-prone areas. There are major challenges for African cities. Africa has the highest rate of urbanisation of any region in the world and despite being a low emitter for now -3.6 percent of global emissions as a continent, it is the worst affected by climate change impacts.

II. Cities as the Primary Drivers of Climate Change

- 3) However, it is no coincidence that global climate change has become a leading international development issue precisely at the same time and at the same rate as the world has become urbanized. This is because how we plan, manage, operate and consume energy in our cities is the key driver behind the phenomenon of global warming. 75% of global energy consumption occurs in cities. 80% of Greenhouse gas emissions that cause global warming come from cities. Roughly half of this amount comes from burning fossil fuels in cities for urban transport; the other half comes from energy in-use in buildings as well as for use in appliances; both hallmarks of our built environment and our quality-of-life in urban places. Indeed, the two (climate change and urbanization) are virtually inseparable.
- 4) Therefore it is crucial to recognize that cities and urban residents are not just seen as victims of climate change in terms of sea-level rise but part of the problem of climate change. And if cities are part of the problem, that means they are also inevitably part of the solution. The ecological footprint of cities in terms of the way resources are consumed (land, air and water); how we move ourselves from place to place; and our patterns of energy consumption in cities are among the most crucial environmental questions that need answering in this coming century.
- 5) While cities must indeed “adapt” to the impacts of climate change within their boundaries, they remain in the driver's seat in terms of continued efforts at mitigation. Urban transport is the planet's fastest growing source of GHG emissions, rising in some cases exponentially in many developing country cities. There is still time to reduce the overall impact of this ecological catastrophe by more responsible planning and management of how, where and by what mode of transport we move ourselves and the goods we



produce and consume around our urban areas. The problem is compounded by the fact that millions, upon millions of our urban residents living in developing country cities have virtually no access at all to any sort of motorized transport, much less a private automobile. We need to pay closer attention to the coming environmental implications when these same urban residents also demand mobility just like any other urban resident. What will be the global environmental impacts when meeting this upcoming mobility demand?

III. Cities, Urban Planning and Energy Consumption Patterns

- 6) While cities in the developed world confront problems originating primarily from overconsumption, metropolitan areas in the developing world face a much more complex set of energy dilemmas. On the one hand, the vast majority of urban residents in cities throughout the Southern hemisphere suffer from inadequate access to modern energy systems. On the other hand, even at low per capita levels of consumption many of these cities are generating very intense forms of pollution.
- 7) As cities have sprawled ever farther and farther from their cores, this has vastly increased levels of energy consumption not only from transport but even in terms of other sorts of building and household energy distribution costs. Low-density, sprawling cities are two to three times more expensive to provide public services than those cities more densely populated. For example, a recent survey has indicated that in New York city, per capita GHG emissions are among the lowest in the United States. This is because less energy is needed to heat, light, cool and fuel buildings in this densely populated city because houses are packed closer together and are below average in size.

IV. Cities and Energy Efficiency

- 8) There is a growing consumer class, in both lower and middle-income countries, but always primarily located in cities, consuming an extraordinary amount of private transport and other major appliances such as refrigerators and air-conditioners. Quite often the regulatory frameworks in terms of environmental protection and enforcement in these particular countries and cities are lacking. This is creating a huge stress on the global environment. In order to successfully answer this challenge, we need stricter energy efficiency standards in fuel consumption from transport as well as appliance manufacturing and importation applied across the board in developed and developing country cities alike. After all, the majority of energy is consumed in cities. Therefore, it is an urban issue. Best practices can be shared between cities of both north and south.
- 9) Large-scale primarily urban-based electricity utilities in developing countries and cities have a strong economic incentives to regularize electricity provision to slum communities and other urban low-income communities in order to reduce and avoid so much technical loss. This idea is particularly important in countries and cities that rely on coal-based electricity generation. Reducing the overall energy consumption footprint in this manner will have strong positive global environmental benefits.
- 10) The ecological footprint of most cities is expanding, leading to rapid deforestation which lead to climate change and global warming. What is needed are more sustainable community forestry practices even within urban boundaries to provide more sustainable bio-mass consumption patterns as well as act as carbon sinks for CO₂ emissions.
- 11) Although new energy technologies can play in improving urban sustainability, energy efficiencies can also be enhanced at the city level by reorganizing urban services and directing growth in specific directions. Perhaps the best example of this strategy can be found in the city of Curitiba, Brazil. Urban planners, working in close consultation with local residents and businesses, began by designating a number of transport corridors that ran along the axes of the city as open only to authorized buses. These corridors

substantially improved the efficiency and reliability of public transport, resulting in a very high level of usage. Furthermore, this coordinated planning allowed real estate developers to build new properties in specified locations, with the confidence that the public would have easy access to their commercial and residential areas on the transit lines. These low-cost strategies have resulted in improved transport efficiencies and lower rates of urban pollution in Curitiba. Many other cities, including Copenhagen, Portland, Singapore, Surabaya, Toronto and Zurich, have pursued similar strategies of reorganizing existing urban areas in order to improve transport efficiencies.

V. Urban Policy Implications and Best Practices

- 12) Given the likely consequences of climate change, urban managers throughout the world are facing a closing window of opportunity in which to undertake proactive strategies of damage control. As the financial costs of global warming begin to mount, fewer and fewer cities will have the resources to foster the diffusion of new energy technologies that could reduce environmental impacts. The time for concerted action is clearly upon us. But are there alternative energy technologies that could provide solutions to the energy-related developmental constraints that are emerging in both affluent and impoverished cities? A growing body of evidence suggests that the answer to this question is a tentative yes.
- 13) A variety of options exist to reduce municipal outputs of greenhouse gases in the developing world: (a) Pricing energy products to cover their economic costs, thus encouraging conservation; (b) Removing market imperfections that impede efficient energy use in households, industries, enterprises, transport, and the public sector; (c) Reducing losses in the supply of energy, e.g., generation, transmission, and distribution losses to urban electricity consumers; (d) Promoting the substitution of cleaner alternative fuels and technologies, e.g. crop residues for agro-industries and households, and natural gas in industry and transport; (e) Improving transportation systems through pricing, investment, technological options, and regulatory measures to reduce urban traffic congestion; and (f) Managing peri-urban lands to maintain green zones and increase forested areas that, through photosynthesis, are important sinks for CO₂. However, even if they were successfully implemented now, these measures would not preclude the unavoidable need to develop urgent pro-poor adaptation measures in cities.
- 14) For example, in Bogotá, Colombia, former Mayor Enrique Peñalosa recently led a campaign to improve the quality of urban life. A relatively inexpensive but effective public rapid transit system was developed using existing bus lines with dedicated bus lanes. The city also promoted walking and bicycle use through hundreds of kilometers of bicycle paths and pedestrian-only streets. Pollution levels have declined and commuting times during rush hours have been cut in half. In addition to the improvements in transportation, public parks were built or rebuilt, new schools were built, public libraries were built, and schools and libraries were linked through computer networks. Among the achievements were a substantial increase in school enrolment and a substantial reduction in the crime rate. Bogotá has also been experimenting with selectively banning cars on certain days, and the experiments have proven popular.
- 15) Not only are there opportunities in the area of urban transport planning and land use planning, there are also opportunities in low-cost housing provision. For example of the Kuyasa Low Income Urban Housing Energy Update Project, in Cape Town. Kuyasa, a low income housing settlement in Cape Town is a registered CDM project that is retrofitting housing units with solar water heaters, new showers, hot taps and drains, ceilings and ceiling insulation, and energy efficient lighting. The project will cut reliance on fossil-based energy consumption by about 137,000 tonnes of carbon dioxide equivalent over 21 years.