



UN HABITAT

GLOBAL REPORT ON HUMAN SETTLEMENTS 2011



## HOT CITIES: BATTLE-GROUND FOR CLIMATE CHANGE

*World's cities responsible for up to 70 per cent of harmful greenhouse gases while occupying just 2 per cent of its land*

Urban centres have become the real battle-ground in the fight against climate change and cities will neglect their role in responding to this crisis at their peril. Not just their own peril but that of the world. This is the tough and urgent message of UN-HABITAT's new **Cities and Climate Change: Global Report on Human Settlements 2011**.

According to the report, the world's cities are responsible for up to 70 per cent of harmful greenhouse gases while occupying just 2 per cent of its land. What goes on in cities, and how they manage their impact on the environment, lies at the core of the problem. It is the combination of urbanization's fast pace and the demand for development that poses the major threat.

"Cities are responsible for the majority of our harmful greenhouse gases. But they are also places where the greatest efficiencies can be made. This makes it imperative that we understand the form and content of urbanization so that we can reduce our footprint," said Joan Clos Executive Director of UN-HABITAT. "Understanding the contribution of cities to climate change will help us intervene at the local level. With better urban planning and greater citizen participation we can make our hot cities cool again."

### EXPANDING CITIES

Cities and large urban centres are already where most of the world's population live. By 2030, an estimated 59 per cent of the world's population will live in urban areas, with developed countries as the most urbanized at 81 per cent. Meanwhile, in developing countries the average is projected to be around 55 per cent by 2030. Every year sees the addition of 67 million new urban dwellers, and 91 per cent per cent of these is added to the populations of cities in developing countries.

### CITIES AND CLIMATE CHANGE: THE FORM AND CONTENT

To understand and map the impact of cities and climate change, the report highlights the major factors that influence the total and per capita CO<sub>2</sub> emissions of urban areas:

- A city's geographic situation — influencing the amount of energy required for heating, cooling and lighting;
- Demographics — the size of the population influences the demand for space and services;
- Urban form and density — sprawling cities tend to have higher per capita emissions than more compact ones;
- The urban economy — types of economic activities and whether these emit large quantities of greenhouse gases;
- The wealth and consumption patterns of urban residents.

### EMISSIONS: CITY BY CITY

A city by city comparison shows how even within countries there are large differences in emissions.

- *In the case of Washington, overall per capita greenhouse gas emissions are surprisingly high compared with the other North American cities – with a value of 19.7 tonnes CO<sub>2</sub> equivalents per capita each year, compared to a US average of 23.9 tonnes. Though Washington has very little in the way of industrial activity, it has a relatively small population in relation to the large number of offices for government and related functions.*
- *By contrast, New York City's emissions are relatively low for a wealthy city in a developed country. This is the result of high population density, small dwelling size, an extensive public transport system, and a large number of older buildings that emphasize natural day lighting and ventilation.*

In comparison to North American cities, the contribution of urban areas in Europe to climate change is relatively low. European urban areas tend to be more compact. They tend to have lower car ownership and car usage

rates, smaller, more fuel-efficient cars, reducing emissions from private transportation. They tend to have more effective public transportation networks, which are deemed socially acceptable to a broader range of individuals. Furthermore, urban areas in Europe have higher levels of densification and lower levels of sprawl in comparison to North American cities.

- London's overall CO<sub>2</sub> emissions in 2006 were 44.3 million tonnes – representing 8 per cent of the UK's total emissions, and a slight decline from the 45.1 million tonnes produced in 1990 despite a rise in population of 0.7 million people during the same time period.

**TABLE 3.11: COMPARISONS OF CITY AND NATIONAL GREENHOUSE GAS EMISSIONS, SELECTED CITIES**

City	GHG emissions per capita (tonnes of CO <sub>2</sub> eq) (year of study in brackets)	National emissions per capita (tonnes of CO <sub>2</sub> eq) (year of study in brackets)
Washington, DC (US)	19.7 (2005)	23.9 (2004)
Glasgow (UK)	8.4 (2004)	11.2 (2004)
Toronto (Canada)	8.2 (2001)	23.7 (2004)
Shanghai (China)	8.1 (1998)	3.4 (1994)
New York City (US)	7.1 (2005)	23.9 (2004)
Beijing (China)	6.9 (1998)	3.4 (1994)
London (UK)	6.2 (2006)	11.2 (2004)
Tokyo (Japan)	4.8 (1998)	10.6 (2004)
Seoul (Republic of Korea)	3.8 (1998)	6.7 (1990)
Barcelona (Spain)	3.4 (1996)	10.0 (2004)
Rio de Janeiro (Brazil)	2.3 (1998)	8.2 (1994)
São Paulo (Brazil)	1.5 (2003)	8.2 (1994)

Source: Dodman, 2009

The few detailed emission inventories from the developing world show much lower emissions than cities in the developed world, but with a wide gap between the rich and the poor in each country.

- A recent study in India showed that the average greenhouse gas emissions of the wealthiest 1 per cent of the Indian population are 4.52 tonnes CO<sub>2</sub> equivalents per annum, or more than four times as much as the 1.11 tonnes CO<sub>2</sub> equivalents per annum generated by the poorest 38 per cent of the population.

## EMISSIONS, SECTOR BY SECTOR

Trying to separate out the contribution of urban areas to greenhouse gas emissions by sector is complex but essential if urban policies and interventions are to make a difference. According to data from the IPCC, at a global level, 14 per cent of greenhouse gas emissions can be allocated to activities related to agriculture and 17 per cent to forestry.

For the rest, the main sources of greenhouse gas emissions tend to be urban based and include the combustion of fossil fuels, for electricity, cooking, transportation and industrial production.

- In countries relying heavily on coal for electricity it can be the single largest contributor to greenhouse gas emissions. A study of 15 South African cities indicated that electricity generation was responsible for more than 100 million tonnes of CO<sub>2</sub> emissions annually or 66 per cent of the total.

Globally, transportation is responsible for about 23 per cent of total energy-related greenhouse gas emissions, and 13 per cent of global greenhouse gas emissions.

- There are currently nearly 1.2 billion passenger vehicles worldwide. By 2050, this figure is projected to reach 2.6 billion – the majority of which will be found in developing countries. The report warns that as economies grow, transport activities increase and are expected to continue increasing in the decades ahead, especially with increasing levels of urbanization notably in rapidly expanding economies such as China, India and Latin America.

19 per cent of greenhouse gas emissions are associated with industrial activities.

- In Shanghai, between 1990 and 2005, 90 per cent of the energy was consumed by the industrial sector. Two towns in South Africa, Saldhana Bay and uMhlatuze contribute per capita emissions of 50 and 47 tonnes per year. Whereas, for example, the direct greenhouse gas emissions from industries in cities like Los Angeles, Prague and Toronto add 0.22, 0.43 and 0.57 tonnes of CO<sub>2</sub> equivalent per capita per annum, respectively.

The report quotes IPCC estimates that show global emissions from residential and commercial buildings at 10.6 billion tonnes of CO<sub>2</sub> equivalent per year, or 8 per cent of global greenhouse gas emissions.

- In the UK, residential buildings are responsible for 26 per cent of all CO<sub>2</sub> emissions, commercial and public buildings for 13 per cent, and industrial buildings for 5 per cent. In China, energy consumption of buildings accounts for 28 per cent of national energy consumption and contributes 25 per cent of national greenhouse gas emissions.

Emissions from waste represent about 3 per cent of total emissions.

- Despite being only a small contributor to global emissions, rates of waste generation have been increasing in recent years, particularly in developing countries that have been experiencing increasing affluence.

National governments need to take a local approach to transportation and energy consumption if we are to make our hot cities cool again.