

## **CONCRETE ACTIONS TAKEN BY CITIES TO MITIGATE, ANTICIPATE AND ADAPT TO CLIMATE CHANGE**

**"Reduction of gas emissions greenhouse effect and reduction of the vulnerability of the ecosystem impacts of climate change"**

### **Framing for the development of the first phase of a practical guide for cities**

Commission 1 "Ecological Region" organized on 15, 16 and 17 December 2010, a specific training about "Cities and Climate change". At the end of this training session, participants were required to write a summary comprising the main reflections and recommendations exchanged on this subject. We first found a community of problems and aspirations of a community to solve them. That's why we found interesting to witness these exchanges with other cities to share, promote and encourage new initiatives.

During the Congress of Metropolis held in Porto Alegre from 22 to 26 November 2011, the Region Ile-de-France proposed as part of the initiatives, developing a practical guide to exchange experiences to help cities deal with the problem of global warming. The first phase of this work, coordinated by îdF IAU<sup>1</sup>, will be presented at the Metropolis Board of Directors to be held in Guangzhou in 2012.

Regionally as well as nationally and internationally, we are all agreed that the effective action in the fight against climate change must be made on both approaches. The first step is to reduce emissions of greenhouse gases (mitigation). Then decrease the vulnerability of cities (prevention and adaptation). Local authorities are well placed to play an important role to develop tools and appropriate actions to deal with global warming.

Climate change is with us. A number of consequences can already be confirmed, and could become more widespread in the future. Work done internationally by scientists and synthesized by the IPCC (Intergovernmental Panel on Climate Change) emphasizes that even if all efforts to control Green House Gases (GHG) emissions were implemented, the anticipated climatic disturbances would be inevitable due to the inertia of the climate system. We must adapt to these changes<sup>2</sup>.

Climate change prevention must henceforth encompass as a whole actions to mitigate this phenomenon (reduction of GHG emissions, carbon sequestration) already in progress and actions to prevent and adapt (reduction of the vulnerability of natural and human systems) that are less engaged. A global conception is indispensable to minimize contradictions (such as air conditioning and GHG emissions) and maximize synergies (such as carbon sequestration and regulating climate in urban areas using vegetation) between these two types of actions.

In France, ONERC<sup>3</sup> was created by the Act of February 19, 2001, whose main tasks are:

- Collect and disseminate information on the risks of global warming

<sup>1</sup> Institute of development and planning

<sup>2</sup> Climate Adaptation Plan of the Ministry of Ecology, Energy, Sustainable Development and the sea, MEEDDM, June 2010.

<sup>3</sup> The National Observatory on the Effects of Global Warming

- Make recommendations on adaptation measures to be considered to limit the impacts of climate change;
- Work in accordance with the IPCC in France.

The Region Ile-de-France has just adopted the Climate Plan and the first action must be set up in early 2012. In November 2010 a study of urban heat islands was carried out by the Institute of Spatial and Urban Planning of the Region Ile-de-France.

### The fragility of metropolises face to climate change

Prevention and adaptation to climate change can be defined as our ability to adjust our natural and human systems in response to climatic phenomena or their effects to mitigate their negative consequences or optimize their positive effects. Be that as it may, climate change will result in costs for society. The impacts of climate change will not be spread uniformly from a geographical perspective or equitably in terms of territory from an individual or social perspective. The vulnerability of each city and of the most exposed activities and social groups must be assessed in order to take the appropriate measures.

"The most significant specificity of the impacts of climate change in urban areas is their interdependence. Because cities are highly integrated systems, the impacts in different sectors interact and should be considered in a holistic way, sector by sector approach is particularly unsuited to large cities: any impact affecting a part of the city potentially affects the other parts of it indirectly.<sup>4</sup>"

In view of their size and large populations (more than one million), impacts on the environment and complexity, metropolises are fragile and have specific vulnerabilities to climate change. Metropolises also represent an appropriate scale for understanding these problems both in terms of space and governance: all territories will be affected and altered by climate change. Environmental issues that could be considered traditional ones, such as air quality, access to potable water, waste management, and energy security, the clearing of green public spaces, the proximity of agricultural land, and the maintenance of biodiversity have become even more urgent with the issue of climate change. Similarly, social issues are now more central than ever. The challenge of climate change should be used to put into action responses that provide multiple social and environmental benefits (such as greener cities). Reduction and mitigation measures can also be a source of innovation, employment and activity (the development of local energy, restoration of buildings, the adaptation of infrastructure, new agricultural and forestry production measures, environmental engineering, etc.). Cities and inter-municipalities are powerful actors to implement effective policies to integrated mitigation. Different networks (electricity, transport, water ...) and the socio-economic world work together in a nested way.

Climate change will affect human health in direct and indirect ways that are often misunderstood or poorly internalized<sup>5</sup>. Several types of action are proposed in the MEEDDM (French Ministry of Ecology, Energy, Sustainable Development and the Sea) climate adaptation plan, with human health to be considered in its modern sense and extended to include well-being:

<sup>4</sup> The National Observatory on the Effects of Global Warming

<sup>5</sup> French Ministry of Ecology, Energy, Sustainable Development and the Sea

- Closer monitoring and surveillance
- Studies and research into the relationship between climate change and air quality, and impacts on human health
- The evaluation and management of health impacts on water or the quality of buildings (air indoors, etc.)
- Promotion of the multi-functionality of green spaces and urban and peri-urban forest
- Prevention and responsibility for preventing the heat island effect and the impact of heat waves.

Climate change will alter the distribution areas of living species. In this context, cities must pose less and less of an obstacle to their movement and become more open to participating more in frameworks of ecological continuity. Within this framework, studies must be conducted to evaluate the most climate-resistant plant species.

Territorialized actions on energy and climate must be articulated and integrated into local planning tools (in the broader sense, including agreement between stakeholders and public participation in decision-making). To do this, scales and themes should be diversified.

Metropolitanization imposes a change of scale. The future of all spaces, whether built up or open, is linked. Measures cannot be limited to developed spaces or cities alone, and metropolises must address the issue of peri-urban green areas. The multifunctionality of open spaces should be promoted not only for environmental issues, but also social issues by focusing in particular on food security, continuity in circulation, and access to resources.

Current and future mobility is exposed to the effects of climate change. The aim is to ensure the movement and security of people and goods. Transport is one sector that should see the most profound changes both in technology and policy. This sector is also directly associated with urban forms and functions (access to employment, services, leisure areas, social ties, lifestyles, etc.).

### **Urban structure and planning documents**

Urban development and buildings are also affected: cities are characterized by roads, rails and waterways, apartment buildings and activities, green spaces and leisure areas. The infrastructures of cities are long-lasting; hence the need to take adaptation to climate change into account in all urban planning documents. Urban development and the construction of sustainable buildings (good solar orientation, improved land permeability, the capture of rainwater, etc.) must be given preference with a view to reducing overall GHG emissions.

Climate change will lead to an across-the-board increase in natural risks that result in pressures on all cities. However, coastal cities, cities at high altitude, and cities in arid environments will be even more vulnerable. Low-lying coasts, which are often densely populated, are particularly threatened by erosion and/or submersion due to the expected rise in sea levels. The preservation of mangroves is indispensable. Mountain cities are subject to erosion, land movements, and greater pollution of the atmosphere. Cities in arid environments will experience greater tensions in relation to water supplies and water cycle management (violent flooding).

The expected increase in temperatures and longer periods of drought will increase the risk of forest fires and increase the frequency of heat waves aggravated by urban heat islands.

Climate change will influence the dynamics of the water cycle in terms of quantity and quality. It must be possible to evaluate what changes are likely to occur, but also to prepare for these changes in order to avoid floods, which in themselves can affect health (water quality) and food security.

The energy sector must adapt to climate change in a very broad-ranging context that includes lower GHG emissions, energy sobriety, household fuel poverty, the increase in demand for air conditioning in summer, and the securing of infrastructure and supplies. Energy security must be guaranteed through a diversification of energy sources. However, it also involves the bioclimatic adaptation of buildings (passive ventilation).

### **Governance and the important role of local authorities**

Thought must be given to methods of governance and participation, in order to improve coordination and agreement across all territorial levels. Participative democracy is an important lever for mobilizing and securing popular support.

Information provided to the public on climate change must be reinforced by greater communication. This is true in particular of measures implemented, which must be shared and made visible, in order to prompt good behavior within populations and to promote recognition of the actions of local elected representatives.

Decision-makers, elected officials and agents of local authorities need specific training to be able to make better decisions in the process of anticipation and in crisis management. Agenda 21s, which are open to different levels of communities, are very suitable supports for all of these initiatives.

Proposed measures should consider numerous uncertainties that persist in relation to climate evolution and its consequences for our societies. All implications of these consequences must be assessed to avoid any potential negative effects and to conserve solutions that do not have said impacts.

Greater interdisciplinary is required in the area of research. To ensure this outcome, the partnership between research and public decision-makers and between basic research and applied research must be encouraged and research-action developed.

Stakeholders in territories are increasingly aware of their responsibilities in the area of climate change prevention, but are hindered by a lack of common tools and frames of reference. It is essential to encourage exchanges between "most advanced" metropolises and "less advanced" metropolises in these areas: these would lead to a different distinction being drawn between "developed countries", "emerging countries" and/or "developing" between the member metropolises of Metropolis.