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# Comparative Study of National Responses to Climate Change

## Introduction

One of the main strengths of ISOCARP is that it is a truly global association of planners with some 80 countries now represented. This provides a powerful knowledge base regarding the theory and practice of planning world wide, knowledge that is disseminated and shared at Annual Congresses and other events and through the Society's publications. ISOCARP's international network has also facilitated the assembly of comparative material about the world's planning systems. Thus, in 1989 the Society published its first edition of the International Manual of Planning Practice (IMPP) and this has since been updated and expanded several times. The most recent and most ambitious version was published in 2008.

Over the last two years, ISOCARP has turned its attention to what is seemingly the most difficult environmental issue that we face, that of climate change, and this has led to the choice of low carbon cities as the theme for its 2009 Porto Congress. In parallel with that decision, the Society resolved

to carry out a further comparative study, this time asking its members to chart the policy course being followed by their own countries in response to climate change. The aim was to have the findings of the comparative study ready for publication in time for the Porto Congress.

This exercise took the form of a questionnaire which was sent to the heads of ISOCARP's national delegations (ND). Its purpose was to obtain information about the role of spatial planning in the shaping or maintenance of low carbon cities. However, it was also thought important to understand the overall national position regarding climate change and energy resources, as this should provide the context for spatial planning at any particular level.

Thus the questionnaire was in two sections, the first of which (Section 1) sought information on the strategic and policy context for any action programs being run, especially any involving spatial planning. The questions tackle five areas, including the nation-

al stance taken on the need for action, the possible role of targets at national and more local levels, and special challenges faced by the country, for example, acute dependence on fossil fuels or rises in sea level. The other two topics address the range of policies adopted by the country and the question of definitions.

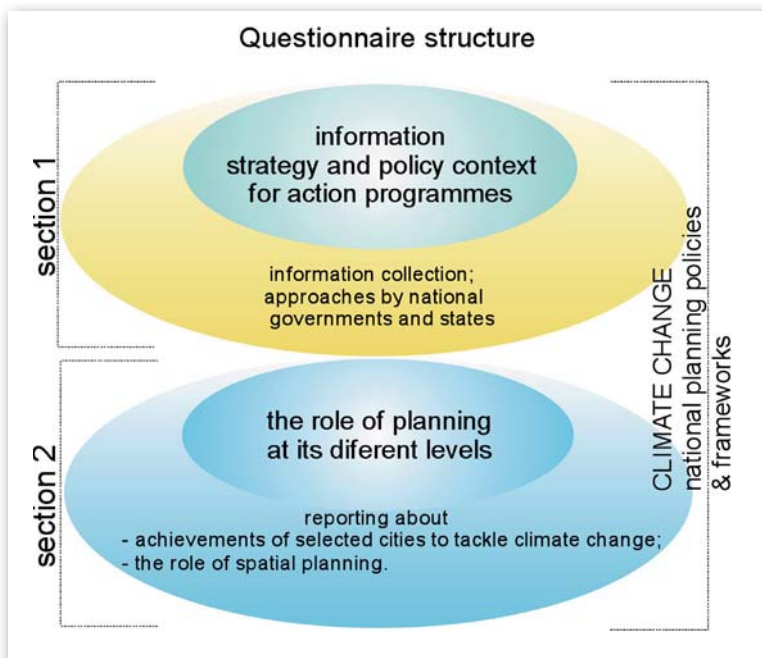
The two Section 2 questions focus on the role of planning at its various levels. The first of these requests information on the setting of national planning policies or frameworks aimed at tackling climate change, for example in terms of housing density or the pursuit of mixed use development. The second question invites respondents to provide information about the practical achievements of specific cities in tackling climate change, and about the role of spatial planning in this. Spatial planning is taken as anything that has a bearing on land use and the density, layout and essential functioning of our cities, for example transport, energy, and waste/recycling infrastructure.

This final question on the cities is an especially important one which relates most di-

rectly to the Porto Congress. There is a general acceptance that solutions at the level of the world's cities will play an essential role in global strategies to reduce greenhouse gas emissions, the primary underlying factor in climate change. So, a particular aim of the comparative study has been to seek practical examples of what is being done at the city and neighbourhood levels.

In the end, responses were received from a total of 26 countries, about one third of the total represented in ISOCARP. Given the complexity and, for many members, the unfamiliarity of the issues, this was a good result which was in line with our expectations. We present the responses in two forms. First, in what follows next we analyse each of the individual questions, across the range of countries that responded. Secondly, summaries of the individual national responses are presented in CD form (see inside the back cover).

On behalf of ISOCARP, we express our gratitude to all those who took part in this valuable exercise which has provided much useful information.



## Countries Overview

Most of the questionnaire responses refer to the Kyoto Protocol which continues to be regarded as the most serious international effort to deal with climate change. As at February 2009, 183 states have signed and ratified this international agreement linked to the United Nations Framework Convention on Climate Change and aiming at combating global warming. It was initially adopted for use on 11 December 1997 and entered into force on 16 February 2005. Under the Kyoto Protocol, industrialized countries agreed to reduce their collective greenhouse gas (GHG) emissions by 5.2% from the level in 1990, in the period 2008-2012, while the reduction in GHG in Europe was set at an overall level of 8%.

*Green = signed and ratified;  
Red = signed, ratification declined;  
Grey = no position.*



The Kyoto mechanisms are emissions trading – known as “the carbon market”, the Clean Development Mechanism (CDM) and the Joint Implementation (JI).

There is practically unanimity among the 26 National Delegations (NDs) of ISOCARP that answered the survey on stating that their countries recognize the need to tackle climate change. In respect of Libya it is reasoned that a low population density and lack of relevant sources of carbon pollution make this a more relevant issue for other countries.

Nevertheless, this widespread recognition can vary from a vague or more committed awareness, to different levels of policy making through the negotiation and signing of agreements and, in just a few countries, promoting actions that have already contributed to the reduction of GHG emissions. A clear distinction between countries should be introduced at this point: at one extreme, the net emitters, corresponding mostly to developed countries, and the receivers of the effects which belong to the other extreme of the development ladder.

In the first case, the European countries stand out with their early signing of international protocols such as the United Nations Framework on Climate Change and the Kyoto Protocol, and there is a clear trend for most European Union (EU) delegations to mention the European Energy and Climate Package in their answers. There are some exceptions. Thus France concentrates on national legislation and technical studies. For its part, Poland, a relatively new Member State, responds that the public debate on climate change issues has been focused on emissions trade negotiations within the EU.

In the second case, proactive receivers of the effects like Bangladesh have already established Designated National Authorities and some interim sustainable development criteria for the evaluation of Clean Development Mechanisms.

The NDs for Brazil and Nigeria describe their countries as being both emitters and receivers, the matters needing to be tackled being deforestation and oil extraction practices, respectively. But they also refer to their sub-standard national development indexes as supporting lesser responsibilities compared to those of the more developed countries. The Uruguay delegation reports upon some NGO initiatives, but these have no funding support, while the country's construction sector proposes some eco developments.

While twenty of the NDs indicated that their countries had targets aimed at reduc-

tions of carbon emissions by 2025, in most cases these were quite unspecific. In the main, those that are set tend to address mainly the different sectors of the economy. For their part, several European countries (for example The Netherlands and the United Kingdom) have set specific targets in respect of renewable energy.

### Special Challenges

More than 3000 cities have been identified by the UN HABITAT report State of the World's Cities 2008/09 as facing the prospect of sea level rise and surge-induced flooding. In order to avoid this and other risks of dangerous climate change, global GHG emissions should peak within the next fifteen years but should be halved relative to 1990 by 2050, and then decline to less than 10 Gigatonnes (GT) of emissions (1 tonne per capita).

This challenge requires global action to sustain growth against the risks of climate change. Among the countries that face acute risks due to sea level rise are The Netherlands, Nigeria and Bangladesh. They are all densely populated, low-lying coastal countries with large river deltas. Furthermore, the Randstad, the heart of the Dutch economy, is largely situated below sea level.

In the Niger Delta, it is estimated that with a sea level rise of 30cm, about 1 to 2 million people will be directly affected. Other adverse effects of sea level rise are increased salinity of both surface and underground water, affecting aquatic plants and animals and coastal agriculture, as well as shortages of fresh water and the emergence of health-related hazards.

The vulnerability of Nigeria and Bangladesh is exacerbated by widespread poverty, recurrent droughts, inequitable land distribution, environmental degradation, natural resource mismanagement and dependence on rain-fed agriculture. A range of practical adaptation options have been identified, but underdeveloped human and institutional capacity, as well as the absence of adequate infrastructure, renders

many traditional coping strategies (rooted in political and economic stability) ineffective or insufficient. Much of the present action on existing climate change in Asian and African countries has been driven mostly by civil society, with support from donors. This has created a significant knowledge base and engagement with the public. In Nigeria, access to climate change information has been limited due to the worsening conditions of human development.

Besides rises in sea level, important challenges in the areas of demographic growth, acute dependence on fossil fuel, drought and social conflict are also already being faced in many other countries.



The adaptation of landscapes and settlements to the effects of climate change is closely related to the history of The Netherlands: the Eastern Scheldt Storm Surge Barrier (top); the river Waal and the Ooypolder near Nijmegen (middle); the historical city of Deventer is occasionally flooded by the river IJssel (bottom) .

*Photos by Hans Dijkstra, BvB*



In Portugal, the dependence on fossil fuels for primary energy supply and a domestic energy production based on renewable energy and dominated by hydropower generation as the main source, highly vulnerable in drying weather conditions, led to a major societal goal of widening the scope of renewable energies and enlarging the supplied capacity.

There is a commitment to a leading role for the use of renewable energies, especially solar, wind, biomass, bioenergy, and ocean energy. The governmental drive to achieve the climate change objectives seems to be supported by the population as in an international survey in 2008, the Portuguese were among the most worried about climate change, and private adherence to renewable energies (solar and wind) is a fact.





Arga wind farm, Caminha (top), owned by "Empreendimentos Eólicos do Vale do Minho", operational since 2006; Pelamis unit (middle), owned by Enersis and Ocean Power Delivery, operational since 2008; Moura photovoltaic power station (bottom), owned by BP Solar, operational since 2009



Renewable technologies and services are developing fast and the Portuguese Government is supporting a wide range of measures to achieve progress in energy efficiency. This approach is followed by regional and sub-regional institutions, sectoral agencies and by the municipalities. Some major projects have already been implemented. These include the largest wind farm in Europe (Alto Minho I), which has a 240 MW capacity; this was initiated by four municipalities that launched together the field work and hired experts.

This trend towards increasing amounts of renewable energy is by no means a universal one in Europe. Thus France and Poland, as well as the Russian Federation to the east continue to rely very largely on nuclear and fossil fuel generation.

Dolna Odra Power Station – one of the biggest in Poland, located South of Szczecin, Poland.

*Photo: Krystyna Mieszkowska, 2009*



## Policies and Definitions

In addition to its efforts to hold back the sea, The Netherlands is placing considerable emphasis on mitigation policies to tackle climate change. These are both short term (up to 2020) and long term (up to 2050). Dutch policies are described in much more detail in the article 'The Netherlands 2020'.

In Portugal several plans, programs and measures concerned with energy efficiency, such as the National Energy Strategy published in 2005, the enactment of liberalization and legislative reforms in the electricity and gas sectors, and the second National Allocation Plan (NAP II) have been prepared. These plans and programs are being monitored by the National Agency for Energy (ADENE) and the General Directorate of Energy and the Climate Change Commission (CECAC). There are also a range of financial incentives aimed both at the general population and business. Portugal has also introduced the "Vehicle Renewal Programme" for increasing energy efficiency in private transport and "Green taxes" for private vehicles. In terms of policies for adaptation to combat climate change, the Portuguese Strategy for Climate Change Adaptation is still under public discussion.

The UK has introduced legislation covering both mitigation and adaptation. This includes, principally, the Climate Change Act 2008. This has enabled the establishment of a Climate Change Committee which has the remit to set binding carbon targets. Policies are in place that seek progressively to improve the energy efficiency of new buildings; carbon neutral housing will be required by 2016, for example.

UK policy has been heavily influenced by several ground breaking reports. Amongst these, is the Royal Commission on Environmental Pollution' report on The Urban Environment, which recommended UK priorities for sustainable urban transport, sustainable urban management, construction and design, and resource and energy efficiency. Also, the Stern Review of

2007 addressed the Economics of Climate Change, concluding that action pursued in the short term would be much less costly than leaving it to the long term.

In Brazil, the policies related to the energy sector determine special incentives for investment in renewable energy sources such as wind power and small hydro-electric plants. There is also a requirement that 1% of the budget of major energy producers be reinvested in energy efficiency projects, thus mitigating the cost of energy use. In the transportation sector, three core policies have a beneficial impact on climate change: 1) the biofuel policy, whereby all the diesel sold should include at least 3% biodiesel; 2) a policy on transport guiding a shift on the transport of goods from road to rail or water transport; and 3) public transport policies, geared towards motivating more people to rely on this mode.

To control deforestation, the federal government has established a plan under three axes: 1) legalising land use in the Amazonian area, giving titles of property, when appropriate; 2) monitoring and controlling environmental standards; and 3) enabling the sustainable use of the forest.

A national adaptation strategy for Belgium is under construction and the Flemish government is working on an adaptation plan. Flanders has adopted a regional climate action plan for 2006-2012. Among the range of measures is a commitment to reduce GHG emissions from buildings by 30% by 2020. The Brussels Region has developed an Air and Climate Plan for the period of 2002-2010. This brought together the issues of air quality and climate change and identified 5 action domains: transportation, buildings, fostering of renewable energy, industry and decreasing citizen exposure to pollutants.

SwissEnergy is a specific and directly effective instrument for Swiss federal government and cantons to implement their energy and climate objectives. In accordance with the CO<sub>2</sub> Act, measures are primarily based on the principle of voluntary

action. The CO<sub>2</sub> fee and “climate cent” are intended to complement the SwissEnergy programme. The cantons are searching for joint measures for a sustainable energy supply, energy planning and energy-efficient mobility. The legal and financial (budget) prerequisites for a cantonal promotion programme currently exist in 22 cantons.

Most of the countries that participated in the study still do not have clear definitions on what is meant by a zero carbon development, for example. . However, a few countries such as Belgium, France, Netherlands, Portugal, United Kingdom and Switzerland have made progress in this regard and are setting their own definitions. Belgium seems to have a well defined understanding of “Climate neutral”, “CO<sub>2</sub>-neutral”, “CO<sub>2</sub>-free” & “Zero Emission neighbourhoods” whereas France recognises a definition of “Eco-District” and “Green City”. In the Netherlands, the following three expressions, CO<sub>2</sub> neutral, climate neutral and energy neutral are often used interchangeably although they have different meanings. These terms concern the energy consumption of (existing) buildings or areas. For its part, Switzerland has defined its own label of excellence on energy performance and this had been awarded to about 175 Swiss municipalities by early 2009. In Portugal, the Certificate for Energy Efficiency for Buildings was introduced in January 2009. Most of these definitions used by the participating countries place their main emphasis on primary energy use giving less priority to the energy used for transport, construction, etc.

## Spatial Planning

In the main, the developing countries do not have specific planning legislation at the national level directly related to tackling climate change, although at the local level they have master plans or other spatial planning tools that guide sustainable development. India and Kosovo have environmental protection legislation to minimize/mitigate the environmental impacts of development activities. In Israel, municipalities are required to carry out surveys of air pollution, GHG emissions and their sources, to define a guiding vision and policy for their areas, together with quantitative reduction goals and to prepare an urban master plan accordingly.

Some European and Latin American countries have attempted to integrate spatial planning with national and regional strategies to tackle climate change. They have also taken some specific planning initiatives at local level which are mentioned below:

Belgium’s 2009 Spatial Planning Decree contains new prescriptions concerning energy saving and the development of collective energy systems. I.

In Brazil, national policy requires that all cities of over 20000 inhabitants and all those comprised within an official Metropolitan Region must have a Participatory Master Plan. At the state level, there is São Paulo’s example of integrating the climate variable throughout all environmental regulation. The State’s Plan on Climate Change determines that land use regulation shall take into account the possibility of climate disasters and be used as a tool to facilitate sustainable transportation and to decentralize public services and economic activity.

The biggest challenge of France is to guide urban growth through densification of urban areas, and the recovery and reuse of wasteland. Similarly Dutch spatial planning is characterized by the objective to achieve compact and lively towns.

Some mandatory regulations have been issued in Portugal concerning the inclusion of energy efficiency in Regional Plans. Ur-



ban Mobility Plans are mandatory for district capitals and the same regulation applies to business or industrial parks with over 500 employees. These parks should have a mobility plan, including: shuttle/mini-bus service with modal connection points; banking services; restaurant services; newsagent and/or post-office services. The General Directorate for Land Use Planning and Urban Development (DGOTDU) has issued some energy guidelines for cities.

In 2008, the County Councils of Sweden were given the task to develop regional climate and energy strategies in order to reduce the discharge of greenhouse gases, increase the amount of renewable energy and foster energy conversion for a more cost effective use.

Local government in Switzerland has formulated a joint strategy for energy-related activities in the buildings sector. These prioritise energy-efficiency and the utilisation of waste-generated heat. At the municipal level, the SwissEnergy programme offers financial support and provides advisory services related to energy and mobility.

In United Kingdom, local authorities at municipal and county council levels have set their own targets for CO<sub>2</sub> emission reduction. For example, the Mayor of London has set the target of reducing CO<sub>2</sub> emissions in London by 60% by 2025.

## Case Studies

In this section several projects aiming at reducing greenhouse gas emissions are described. Most of the projects deal with energy and a smaller number with transportation. Other projects are neighbourhood oriented and integrate several domains in the drive to achieve sustainable developments.

These projects are not representative of all the countries that participated in the survey. Projects in The Netherlands and in the United Kingdom are described in earlier essays in this Review

## City-wide Projects

In Belgium, five cities are involved in the Cli-

mate Alliance (Ghent, Torhout, Zemst, Zorssel and Zwijndrecht) and six cities in the project Energie-Cités (Anderlecht, Brussels, Brussels Capital Region, Genappe, Liege and Namur). Two cities have received the Climate Star Award, an initiative of the Climate Alliance to reward best practices that could serve as an example: Eupen (2004) and Ghent (2007). The 2004 Award focused on renewable energy and the 2007 Award was centered on environmental-friendly traffic schemes. The city of Ghent developed a Barometer of Sustainability used for all urban projects based upon the LEED (Leadership in Energy and Environmental Design) and BREEAM (BRE Environmental Assessment Method) standards. A further scheme will be introduced for business areas.

In India, the city of Delhi is implementing the following measures in order to achieve low carbon city status: building specifications for rainwater collection compulsory in all buildings larger than 100 m<sup>2</sup>, designing mixed use and high density projects, developing multi-modal transport systems, keeping 20% of city area as green, increasing forest cover from 23% to 33%, recycling domestic waste, using a minimum of 25% fly-ash in all road construction works, introducing clean fuels and replacing fossil fuel power plants by combined heat and power plants.

Despite the shortcomings of the Lithuanian territorial planning system, some municipalities are currently implementing integrated urban sustainability plans. The master plan of Vilnius promotes energy efficiency by renovating the existing Soviet-era housing stock (approximately 4000 buildings) and aims at modernizing and renewing public infrastructure networks, creating public spaces, and implementing park and ride systems.

In Portugal, since the early 90s, the reduction of energy consumption at city level has been undertaken by several municipalities. Relevant cases include the historical centre of Évora and the former Expo 98 site, at present a neighborhood in which



Nations' Park on former Expo 98 site in Lisbon /an energy efficient CBD. Photo: Paulo Pinho

Lisbon's average energy consumption per capita has been halved while service levels are at the peak, representing a new CBD.

Other energy saving initiatives worth mentioning are related to the public transportation system in the city of Porto and its metropolitan area: the longest subway network launched in the nineties in Europe and the bus fleet in the city, 50% of which runs on natural gas.

Several municipalities on the northern bank of Douro Valley, namely Vila Real, Régua, Santa Marta de Penaguião, among

others, have restructured the heating systems for public schools and converted them into forest biomass energy systems under a global plan. Public facilities such as swimming pools have also been recon-verted to micro-generation. Lighting on bus shelters is being generated by associated photovoltaic panels.



Energy saving Metro Rail in Porto. Photo: Cecília Silva

## Ecological Neighbourhoods

In France, the project of Maine-et-Loire eco-neighbourhood covers 17 ha and encompasses 500 houses. Among other things, the project seeks to reduce the amount of road surface and, instead, to provide an attractive pedestrian environment.

In Slovenia, the spa Snovik integrates energy efficient technologies; in Komenda, a low-energy housing project is being built and the municipalities of Bovec, Kranjska Gora, Bohinj and Idrija are investing in sustainable transport models.

In Sweden, municipalities are expected to plan for good living environments. Hammarby Sjöstad is one of the newest districts in central Stockholm. The project is based on an eco-cycle model that handles energy, sewage, and water for homes, offices and other activities within the district. The goal is to create a residential environment based on sustainable resource usage. Combustion of waste is used for heating up the water in the district heating system.

Enköping is a small town near Stockholm with about 20000 inhabitants. The

municipality has developed a similar energy project through the collaboration with several partners. A bio-cycle solution was designed that uses the nutrients from sewage products and ashes from energy production, thus reducing the discharge of nitrogen and phosphorus to Lake Malaren and the Baltic Sea. Waste from crops, logging and recycled wooden material is used as bio-fuel in the municipal heating plant, producing heat to 95% of the consumers and generating 50% of the local electricity needs. Residual ash is used to make fertilizer used by local farmers.

In Switzerland, the Basel Pilot Region is a cooperative project (public private partnership) between Novat Atlantis and the city of Basel. The project functions as a practice-oriented laboratory of sustainability research, fostering the vision of a 2000 watt-society for sustainable energy use, i.e. a reduction in energy consumption from the current 6000 watt per person. Involving 170000 people, the project aims at showing that the quality of life will not decline with the implemen-



Bristol – Temple Quay, Bristol, United Kingdom  
 – a new energy efficient employment quarter.

tation of actions such as improving building materials and increasing energy efficiency, replacing fossil fuels with renewable energy sources and reducing CO<sub>2</sub> emissions.

Erlenmatt, a city district located at the northern edge of Basel city centre - to be developed under mix-use typologies in the coming years.



In Portugal as elsewhere in Europe, innovative buildings aiming at high levels of energy efficiency are already being built. Among other things they are demonstrating the potential for using solar energy and

they also prove that, even in hot weather it is possible to work in an air conditioning free environment. Moreover, in addition to providing electricity, photovoltaic panels have been found to be very useful as shading devices for the parking of hybrid cars or other uses.

### Other Specific Projects

In Russia is home to several projects aimed at mitigating climate change. They include the forestation of unused agricultural land in the Volga river region (2007), a municipal gas distribution system in Kaliningrad that reduced CO<sub>2</sub> equivalent emissions by 40000 tons (2005), and the use of forest biomass instead of fossil fuels in the in Nyzhny Novgorod region (Volga River basin) – the results show that fossil fuel costs can be reduced by 3-4 times, implying a reduction in GHG (Green House Gas) emission of 367000 ton per year. Also, the Moscow public transportation system can be seen as a particularly interesting example, its underground metro system transporting more



Solar XXI Building in Lisbon generates 80% of its energy consumption. Innovative energy concepts also take place in the surroundings. Source: "INEGI 2009" – Portugal

than 9 million passengers per day.

In Portugal, the efforts of Almada municipality in public transportation and green areas are worth mentioning. Many Portuguese municipalities are also improving riverbanks or coastal areas for pedestrian use along considerable extensions of land. This effort can be seen as an indirect way of fostering ecological lifestyles since longer trips for recreation purposes are replaced by short-distance trips and walking. The Metropolitan Area of Porto stands out as a large part of its coastal area has pedestrian corridors.

The Kyoto Protocol has stimulated the implementation of greenhouse gas reduction commitments in developing countries as an alternative to more expensive emission reductions in the industrialized countries financing these projects. In Bangladesh, for instance, Dhaka City is home to a population of 10 million that generates substantial amounts of municipal waste. However, the energy content of this waste is comparatively low (777-1444 kcal/kg) because of its high moisture content. The Ma-

tuail landfill is the first clean development mechanism project in Bangladesh (and the first sanitary landfill as well). It uses composting technologies and addresses issues of water pollution, spread of disease vectors, GHG emissions and odor pollution. Expected benefits reaped from the project include the reduction of 1 million tons CO<sub>2</sub> equivalent in a six-year period, the processing of 50000 tons/year of compost and the generation of 3-6 MW electricity from landfill gas extracted.

## Conclusion

These survey findings provide a useful snapshot of the 'state of play' in a range of countries around the world. They indicate that there is a general awareness of the need for action and they provide evidence that, at one level, national strategies are being formulated and, at the other, that some local areas are beginning to take action in terms of both spatial planning policies and otherwise.

So, the first steps are being taken towards combating change. But, collectively, the action taken so far is tiny and swamped by still rising emissions. If we are to avoid the worst effects, such action will have to be stepped up from the scale of the pilot project to mainstream action to achieve a lower carbon society globally. We will need to act at all levels, top down as well as bottom up, but particularly at the level of the city. In tandem with that, we must pursue the necessary international agreements and share our knowledge and understanding to achieve rapid progress along the low carbon path. •

## Annex: List of Participant Countries

Argentina	Namibia
Bangladesh	Netherlands
Belgium	Nigeria
Brazil	Poland
Colombia	Portugal
France	Russia
India	Slovenia
Israel	South Africa
Kazakhstan	Sweden
Kosovo	Switzerland
Lebanon	Tunisia
Libya	United Kingdom
Lithuania	Uruguay