

CLIMATE CHANGE AND LOW CARBON CITIES: A MULTI-LEVEL CHALLENGE TO POLICY MAKERS AND PLANNING PROFESSIONS

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Pierre Laconte

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President, Foundation for the Urban Environment, Brussels (www.ffue.org)

Vice-president, Scientific Committee of the European Environment Agency (EEA),

Copenhagen, pierre.laconte@ffue.org

ABSTRACT

New kinds of MULTILEVEL challenges and opportunities arise for decision makers from the fight against the effects of climate change and the search for urban and rural sustainability.

At world level, the climate change awareness has been remarkably fast (some 20 years) but the belated collective commitment towards effectively mitigating climate change, expressed by the Copenhagen Conference non-results, suggests looking at adaptation to inevitable consequences of climate change, and possible actions by regional, national and local decision makers, while pursuing coalition building efforts towards collective action to reduce emissions, at all levels of governance, without waiting for the effects to appear.

At world regions level, the pioneering policy/strategy response of Europe to the climate change challenge addresses a number of spatial planning facets: Europe-wide development trends and policies, energy production and consumption policies, natural heritage and biodiversity enhancement, coastal adaptation to rising sea levels. The European policies open an array of potential multilevel actions, of consequence to other world regions and to the developing world, through a North-South and South-South exchange of practices. The technicalities of emissions accounting and energy efficiency measurement open new fields for the planning professions.

At national level the coastal areas protection will be a tremendous investment opportunity once the ocean level increase resulting from Arctic and Antarctic and mountain ice melting will have become sufficiently evident to all as to trigger new behaviour, shaped by new policies. More generally the measurement of economic, social and environmental performance of countries and region "Beyond GDP" will require new professional inputs, in addition to the one of macro-economists.

At city and regional level the urbanisation and the resulting endless conurbations raise governance challenges of unprecedented nature. Taking only the challenge implementation of both emissions cuts and energy supply and demand management require planning skills of a new nature, at the interface of land-use planning, mobility planning and environmental planning. These skills should include the effective achievement of a low energy urban development, meeting the requirements of a fast population increase in some countries and the declining population of old industry spaces.

To save open land, emphasis should be put on rehabilitations and greening of urban brownfields and reconversion of surplus old industry lands to nature friendly bio-diverse new uses all require new skills. These include landscape architecture, ecologic engineering and restoration, synergies between urban infrastructure and water management and phyto-remediation to polluted soils, among others.

In short, maintaining urban and rural quality of life and urban cultural diversity in the wake of a global warming environment will require a new form of "planning with nature", a long-term exercise.

Case histories illustrate successful attempts by cities and urban regions to achieve sustainability.

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PART I – THE PLANETARY FRAMEWORK OF CLIMATE CHANGE POLICIES

1. FROM WORLD-WIDE AWARENESS TO REGULATORY ACTION – SOME KEY DATES

1968-1972 – THE UNESCO “MAN AND BIOSPHERE” PROGRAMME

The UNESCO 1968 Conference and 1972 Programme “Man and Biosphere” and its Scientific Committee on the Problems of the Environment SCOPE, aimed at exploring “Effects of Man on the Biogeochemical Cycle of Carbon in Terrestrial Ecosystems” (http://www.icsuscope.org/Unesco_scope.htm). This scientific programme, which covered atmosphere, ocean, terrestrial biosphere and fossil carbon reservoirs, showed for the first time the effects of man’s activities and its carbon release on climate and the perspective of an artificial global warming of the planet. In 10.000 years temperature variation has been of less than 1 degree.

The industrial age opened the Carbon Pandora box but it took two centuries to be noticed by scientists and practitioners alike.

1972 – THE “CLUB OF ROME” REPORT

The Club of Rome, a private think tank launched by industrialist Aurelio Peccei in 1968, commissioned the seminal report “Limits to Growth” (Meadows et al., 1972), which attempted modelling the consequences of a rapidly growing world population and finite resource supplies. It claimed that the growth rate of population and consumption was unsustainable. A 30-year update version was published in 2004 by Chelsea Green Publishing Company and Earthscan under the name “Limits to Growth: The 30-Year Update”. In 2008 Graham Turner at the Commonwealth Scientific and Industrial Research Organisation (CSIRO) in Australia published the paper “A Comparison of ‘The Limits to Growth’ with Thirty Years of Reality” and found that changes in industrial production, food production and pollution are all in line with the report's predictions (Turner 2008).

It is remarkable that in less than 20 years the issue became the subject of top political action, besides being scientifically confirmed.

1987-1988 – THE BRUNDTLAND REPORT AND SETTING UP OF IPCC

At UN level the Brundtland Report and the World Commission on Environment and Development (1987) were seminal, by linking environment and development with one another ('integrated environment management'), including urban development.

The Intergovernmental Panel on Climate Change (IPCC), created in 1988, aimed at being a link between scientists and political decision makers towards an implementation consensus, what succeeded, with ups and downs. The IPCC first assessment report was completed in 1990, and served as the basis of the Rio United Nations Framework Convention on Climate Change. It is to be noted that IPCC has proven a remarkably resilient and light institution, working as a network and involving governments but without unanimity rule (<http://www.ipcc.ch/meetings/session31/doc15.pdf>).

1992 – THE RIO EARTH SUMMIT

The United Nations Framework Convention on Climate Change (UNFCCC) was produced at the United Nations Conference on Environment and Development (UNCED), known as the Earth Summit, in Rio de Janeiro 1992, to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. There was no mandatory mechanism (last day veto by President Bush: "The American Way of Life is not negotiable"). The Convention however provides for periodic "Conferences of Parties to the Convention" (called COP) and updates (called "protocols"), able to set mandatory emission limits.

1997 – THE KYOTO CONFERENCE OF PARTIES (COP 3) AND PROTOCOL

The principal update of the UNFCCC is the 1997 Kyoto Protocol (resulting from COP 3), which sets a mandatory reduction of 6 to 8% of GHG below 1990 levels between the years 2008-2012 by industrialised countries (listed in "Annex 1"). An "Annex II" lists those industrialised countries ready to help the rest of the world to meet the reduction objective, through an ADAPATION FUND. Inventories of greenhouse gas (GHG) emissions and removals were used to create the 1990 benchmark levels for the commitment. Specific provisions include:

- Flexible Mechanisms including emissions trading; Joint Implementation (JI); and the Clean Development Mechanism (CDM) which allow industrialized countries to fund emissions reduction activities in developing countries as an alternative to domestic emission reductions. One of the key elements of this agreement was that there would be no quantitative limit on the credit a country could claim from use of these mechanisms. Operational rules for international emissions trading among parties to the Protocol and for the CDM and joint implementation were set in 2001. Its proceeds are to feed an Adaptation Fund. Priority of funding goes to adaptation of countries exposed to climate change.
- Carbon sinks: Credit was agreed to for broad activities that absorb carbon from the atmosphere or store it, including forest and cropland management, and re-vegetation, with no over-all cap on the amount of credit that a country could claim for sinks activities.

2006 – THE STERN REPORT

The 2006 "Stern Review on the Economics of Climate Change", by economist Nicholas Stern (Stern 2006), examines the effect of global warming on the world economy. Although not the first economic report on climate change, it is the largest and most widely known report of its kind. The report shows effects of each degree temperature increase per sector and area.

Its main conclusion is that the benefits of strong, early action on climate change considerably outweigh the costs. It proposes that one percent of global gross domestic product (GDP) per annum is required to be invested in order to avoid the worst effects of climate change, and that failure to do so could risk global GDP being up to twenty percent lower than it otherwise might be. The Review states that climate change is the greatest and widest-ranging market failure ever seen.

2009 – THE COPENHAGEN CONFERENCE OF PARTIES (COP 15) AND “ACCORD”

The overall goal for the COP 15 in Denmark was to establish an ambitious global climate binding protocol and commitment for the period from 2012 when the first commitment period under the Kyoto Protocol expires. However President Obama and other world leaders decided in advance to limit the mission of the Copenhagen conference to a “politically binding” agreement that would punt the most difficult issues into the future, notwithstanding the fact that a large part of the diplomatic work that lays the foundation for a post-Kyoto protocol has been undertaken up to the COP15.

The conference actually produced only a non binding and non-unanimous “Copenhagen Accord”, declaration drafted on 18th December, the last day of the Conference, by 116 heads of state and Governments in attendance from all continents, on the basis of talks between USA and China agreeing on a no-commitment text (text available on <http://www.UNFCCC.int>).

The COP’s lack of commitment reflects the enduring gap between what the rich countries are ready to pay and the expectations by poor countries, and the general reluctance to an international control on the use of funds received.

The COP procedure also reflected an absence of dialogue between the biggest polluters (US and China), a common disregard of big countries for smaller ones and a general disregard by all for NGOs. The “Accord” confirms the need for a limitation of global warming to 2°, but without specifying how to get to that result. It does no longer mention the Adaptation Fund but expresses the intention to establish a new “Copenhagen Green Climate Fund”, financed “collectively” by developed countries to support actions on climate change, with a governance structure providing for “equal representation of developed and developing countries” (Mexican-Norwegian proposal). Norway suggested financing it through funds using proceeds from auctioning carbon emission allowances. The GIVING AWAY of allowances by governments to some sectors is however a major handicap to emissions trading schemes, as shown by the CO₂ depressed market price. The question of international control on the use of funds has not been settled. The total aim is a collective contribution from the developed countries of 100 billion\$ per year “by 2020” (Mackenzie 2009).

Actions on climate change mentioned in the Accord include “substantial finance for Reduced Emissions from Deforestation and forest Degradation (REDD-plus)”. REDD-plus is however subject to controversy about its applicability as a protection tool to keep biodiversity (<http://www.redd-monitor.org/redd-an-introduction>). The Prince of Wales created his own Rainforests Project in 2007 to find solutions to combating tropical deforestation, which he presented at the COP 15 (<http://www.rainforestsos.org>).

A paradox of the reluctance by developing countries to a world agreement is that many of them will be among the most affected areas or “hot spots” and ocean ports (OCDE 2009).

The COP 16, to be held in Mexico in 2010, may be better placed to reduce the North-South gap, while publicity around the 5th IPCC Assessment Report preparation may trigger a renewed awareness of US opinion and Chinese authorities.

2. COP 15 AFTERMATH AND PERSPECTIVES

The problems that were to be addressed remain on the agenda of concerned bodies and the public opinion. Latest findings suggest an acceleration of ocean level increase (Solomon 2009). The demographic perspectives will exert further pressure on world natural resources, in particular energy and water resources, while fossil fuel reaches its production peak. The likelihood of a peak before 2020 has been reconfirmed by the Nov. 2009 UKERC Report on Global oil depletion (<http://www.ukerc.ac.uk>). Discrepancies between energy demand and supply will therefore increase, leading to a structural scarcity and price increase. World climate awareness, if not corrective behaviour, is getting further momentum. Among others see <http://www.unep.org/climatechange> and the Report "UN-HABITAT Climate Change Strategy 2010-2013" (<http://www.unhabitat.org>).

At the level of civil society the debate that started with the Club of Rome Report some 40 years ago continues to be triggered by it. The Club of Rome Programme "A New Path for World Development" (http://www.clubofrome.org/eng/new_path). It focuses on five "clusters" of related issues within the overall conceptual framework of A New Path for World Development:

- Environment and Resources: This cluster relates climate change, peak oil, ecosystems and water. Radical and rapid social and economic transformations are needed to avert runaway climate change and ecological breakdown;
- Globalisation: This cluster relates interdependence, distribution of wealth and income, demographic change, employment, trade and finance. Rising inequalities and imbalances associated with the present path of globalisation risk the breakdown of the world economic and financial systems;
- World Development: This cluster relates sustainable development, demographic growth, poverty, environmental stress, food production, health and employment. The scandal of abiding poverty, deprivation, inequity and exclusion in a wealthy world must be corrected;
- Social Transformation: This cluster relates social change, gender equity, values and ethics, religion and spirituality, culture, identity and behaviour. The values and behaviour on which the present path of world development is based must change if peace and progress are to be preserved within the tightening human and environmental limits;
- Peace and Security: This cluster relates justice, democracy, governance, solidarity, security and peace. The present path of world development risks alienation, polarization, violence and conflict; the preservation of peace is vital by itself but is also a precondition for progress and for the resolution of the issues which threaten the future.

116 heads of state and government (the highest number in UN history and representing the highest share of the human population) were unable to agree on a binding GHG reduction agreement. This may refer us to the very nature of the human species and its evolution.

Through his ego, intelligence and greed the Homo sapiens has conquered the natural universe, its flora and its fauna, but humanity has not been able to restrain its own proliferation and overgrazing of natural resources, threatening its own future. In line with Charles Darwin's "Origin of Species" and, more recently, Richard Dawkins' "Selfish Gene" (Dawkins 1976) the Homo sapiens' ego is perhaps for him more important than the survival of the species. When a threat is globally perceived, global rules become acceptable (e.g. liquids in airplanes hand luggage).

As stressed by the Club of Rome: "will the values and behaviour on which the present path of world development is based be able to adapt on time within the tightening human and environmental limits?" This the hope one can formulate.

3. 2010, YEAR OF BIODIVERSITY

2010 has been proclaimed as the International Year of Biodiversity by the UN (<http://www.cbd.int/2010/welcome/>). Alongside the mega-risk of climate change (of which, biodiversity change is one of the forms of adaptation), stands another mega-risk: species extinction (biodiversity loss), which is no less important and by no means limited to rain forests. Planning professionals may contribute to innovative biodiversity enhancements (not just protection) within urban areas, through spatial planning and landscaping, development control, increasing local plant variety and best practice guidance. Cultural diversity should not be forgotten. It includes the enhancement of what makes cities different from each other, in particular their built heritage.

The challenges to Cities and-Regions and the planning professions do have to be addressed within this wider perspective. The institutional responses of the European Union are the first ones to provide a binding framework for member states governments and the professionals.

PART II – THE EUROPEAN UNION PIONEERING POLICY RESPONSES TO CLIMATE CHANGE - AN EXPERIENCE OF CONSEQUENCE TO OTHER WORLD REGIONS AND THE DEVELOPING WORLD

1. THE EUROPEAN UNION – A REMINDER OF ITS FUNCTIONING

1.1. General framework of the European institutions

The main institutions involved (“Brussels”) are:

- The Council of the European Union. The CONCILIUM is not a cabinet but an assembly of national ministers, with legislative powers, totalling some 250 ministers. One of its configurations is the Council of Ministers of the Environment. The European Summits of Heads of State and of governments and the European Presidency are the top bodies presently in place. The “Summits” building is under construction next to the “Consilium”.
- The European Commission. The EC is the executive body in charge of proposing decisions to the Council and implementing them. New Commissioners have been nominated in November 2009 and will start their duties in 2010. The EC is headquartered in the “Berlaymont” Building (sometimes dubbed “Berlaymonster”)
- The European Parliament. The EP is not a real Parliament as it has no legislative powers but its co-decision powers have been steadily increasing, lately through the Lisbon Treaty, which entered into force on 1 December 2009. Its work is mainly done through its own Committees. One of them is the *Committee on Environment, Public Health and Food Safety*.
- Besides these three main bodies, which are complemented by the Court of Justice (located in Luxemburg), the Economic and Social Committee and the Committee of the Regions have been set up with an advisory capacity. Other bodies are disseminated all over Europe, in particular the European Central Bank (Frankfurt). About the European institutional galaxy see Laconte, P. and Hein, C. (eds.) “Brussels: Perspectives on a European Capital”, Brussels 2007 (Laconte 2007).

1.2.A special case: The European Environment Agency (Copenhagen)

Besides the EU main decision-making bodies, some 30 agencies are fulfilling specialised missions. In the case of the environment, the European Environment Agency is the Agency gathering and disseminating national and international information relevant to the EU policies, including climate related policies (<http://www.eea.europa.eu>). In 2010 it will publish its five-yearly "European Environment State and Outlook Report - SOER", which includes the state of, trends in and prospects for the environment, supplemented by "indicator reports" focusing upon specific issues.

1.3. Other actors contributing in the shaping of policies/strategies

The strategies of the European Commission are elaborated through some 250 specialised expert Committees. Their power is not matched by their visibility.

A detailed information about the structure of these expert committees (sometimes called "Comitology") has been published in a German/English three volume limited edition in 2005 under the title "De Comitatus" <http://www.bartlebyandco.com/decomitatus.html>.

External interest groups aiming at influencing EU decisions include the private sector (industries, energy sector, sector associations, etc.), the regional and local authorities and the representatives of civil society. In 2009, at the initiative of the EU, a "Covenant of mayors" was signed by some 1000 municipalities (<http://www.eumayors.eu>). The Covenant of Mayors is a commitment by signatory towns and cities to go beyond the objectives of EU energy policy in terms of reduction in CO2 emissions through enhanced energy efficiency and cleaner energy production and use. A similar cities mobilisation took place in the US. The key to success is coalition building.

Civil society organisations include citizen groups, which in the case of the environment have constituted a common structure: the "9 GREENS" (http://www.birdlife.org/eu/pdfs/fr_final.pdf).

2. EU POLICY/STRATEGY RESPONSE BY SECTOR

To address the climate change challenges, key milestones were defined by the EU: a 20% reduction (minimum) of CO2 emissions by 2020, as compared to 1990, in Europe; and a reduction of the greenhouse emissions by 2050 and after, so as to limit the increase of the temperature due to climatic change within 2°C. (Decision 406/2009/EC).

But the implementation of this overall commitment will necessarily depend on the strength of overall regulatory and taxation tools (Laurent 2009) and on sector implementation.

2.1 Policy/strategy on spatial development

Although land use as such is only marginally part of the EU treaties, many EU policies are having a strong effect on land use.

The "European Spatial Development Perspective" is a policy framework document adopted in 1999 by the Council of ministers in Potsdam, at the end the German presidency.

Together with the "Economic and social cohesion policies", the "Spatial Development policies" aim at a balanced development throughout the EU, "reducing structural disparities between regions and promoting equal opportunities for all". This aim is translated into a variety of financing operations, principally through the Structural Funds and the Cohesion Fund (see <http://www.ceu-ectp.eu>).

For the period 2007-2013 the regional policy funds represent 336 billion Euros, the second biggest item of the EU budget after the Common Agricultural Policy. The structural funds are specified by objectives. Objective 1 areas include the outermost regions and low population density regions.

These funds, managed by the Directorate General REGIO (Regional development), as well as the subsidies from the Directorate TREN (Transport and Energy), have encouraged dispersal of investments into exurban areas and peripheral regions, to the detriment of existing cities.

The proponents of dispersal (“polycentricism”) include the interest groups representing infrastructure developers looking for subsidies, the oil, concrete and automobile industry looking at more vehicle travel and the 154 peripheral maritime regions (<http://www.crpm.org>). To sum up, subsidised polycentricism meant more urban sprawl, more motorised road transport, more fossil fuel consumption and more GHG emissions, in contradiction with the global warming mitigation discourse.

At the margin of the regional policy, the URBAN I and II programmes have been able to finance some 200 individual cities projects by giving them direct access to Brussels funds, what led to some remarkable results (Lecce in Puglia for example). The dispersed cities lobby proved unable to prevent the scrapping of this successful programme. It has been replaced by URBACT, a mere exchange network of experiences between selected cities, their selection being controlled by central governments.

A change in territorial cohesion policy has recently emerged, as a result of the 2007 Leipzig conference of the Council of Ministers (Lisbon to Leipzig Declaration – <http://www.fona.de>).

Following this Conference, cities are re-emerging both as motors of regional development and actors in combating global warming and resource depletion.

The territorial cohesion policy has somehow moved from deprived regions to deprived urban neighbourhoods.

The EU Stockholm Cities and Climate Change Conference Report “Cities – Part of the Solution” is indicative of this new EU emphasis. (<http://www.se2009.eu>).

2.2 Mobility and infrastructure policies

The regional funds also have privileged heavy infrastructures, mainly highways, airports, dams, etc.

The annual EU transport subsidy alone amounts to 280 billion € per year, around half of this amount for roads, according to the EEA 3/2007 Report “Size, structure and distribution of transport subsidies in Europe” – <http://www.eea.europa.eu>.

High-speed rail Transport European Networks could have been achieved from the 60’s, in line with the Japanese Shinkansen, which is operational since 1964 and makes profits since 1967 (<http://www.japanrail.com>). Instead a Trans European Road Network was financed, as the result of a common lobbying by road, oil and automobile interests, while rail interests were dispersed among countries, sectors involved and rival associations.

Meanwhile the World ANNUAL deaths on the road quietly raised to 1.3 MILLION, confirmed in November 2009 by the latest findings of the International Transport Forum (OECD) – <http://www.internationaltransportforum.org>.

2.3 Energy efficiency and alternative energies – Energy supply

Confronted with the perspective of fossil fuel depletion, energy suppliers look for alternatives. The EU policy is to encourage them (Dir. 2009/28/EC). According to the EEA reports, namely the Energy and environment report – EEA Report 6/2008, the most promising are photovoltaic concentration, wind farms and at a later stage, the tapping of the coastal energy resources.

Bio-fuels are unfavourably considered by the EEA and by the 2007 OCDE-ITF Report “Bio fuels: Linking support to performance” Its conclusion is that “US bio fuel tax subsidies are to grow and grow”, resulting from a coalition building between industrial agriculture and oil producers seeking

alternatives. Side-effects on food for humans and feed of animals, and on deforestation are emphasized by both reports, including “Indirect land-use Change”. Brazil is strongly supporting biofuels (Joint letter from developing countries on implementation of sustainability criteria for biofuels 15/12/2009) The nuclear energy remains a contentious issue. Producers have put forward its low emissions but rely on future technical progress to find solutions to safe nuclear waste storage, recycling of old plants and exposure of plants to large-scale incidents (see Brand 2009).

Access to a distribution grid at any time and at fixed conditions is essential for the market of alternative energy suppliers (huge storage facilities not being available with present technologies).

What kind of grid?

THE SUPER GRID

Super-grids are a European as well a world issue. China for example is now massively investing in 4 huge wind energy concentrations, requiring a super-grid to serve the consumer areas.

- In the EU “Solar Concentration Power” plants are sprouting now in Southern Europe (e.g. Spain’s Andasol plant to serve a 200.000 population). In a longer-term perspective EU originated projects include the ambitious “Desertec” project (<http://www.desertec.com>). Its White Book describes a scenario of electricity demand and supply opportunities by renewable energy in the integrated EU/MENA region up to 2050, and stresses the need of international cooperation to achieve economic and environmental sustainability. It includes an energy cable connection to Europe.

THE SMART GRIDS

Other interests on the contrary plead for regional/local smart grids as incentives to local production of alternative energy. In the US, the Pacific Northwest Smart Grid Demonstration Project illustrates this movement, in opposition to the nation-wide Super grid proposed by President Obama (H.R. 1774: Smart Grid Advancement Act).

The answer probably lies in a correct modelling of the peaks in production compared to the peaks in demand at respective locations and of the links required to keep a regionally balanced supply in face of diverse climatic conditions. See proposed Greenpeace North sea electricity grid including links between wind farms (<http://www.greenpeace.org>).

2.4 Energy efficiency and alternative energies – Energy consumption

The best alternative kilowatts are the ones not used, through increased energy efficiency and thriftier consumption.

Therefore “Buildings are the powerhouses of tomorrow” (Jeremy Rifkin – <http://www.foet.org>).

This happens through lowering consumption (isolation) and using the sunlight and other features.

Today’s roofs can embody the photovoltaic panels. Windows can be PV captors and micro energy savings may be adding up to a positive energy balance.

However the innovations in energy supply and demand can only be achieved if strong regulations give them an economic justification.

That is why Germany has become a pioneer in energy savings. Particularly promising energy-saving projects are so-called cross-sector technologies supplying heat, mechanical energy and light, and which work the same everywhere. If they are successful in one sector, they can be easily applied in other sectors.

According to the study "Potentials and Economic Effects of an Ambitious Energy-Efficiency Strategy for Germany", conducted by the Federal Ministry for the Environment, these technologies account for 65 percent of total end energy consumption in German industry (Schroeter 2009).

Japan, the US and China now happily engage on the same track.

Besides energy savings in new constructions, the saving of the energy stored in existing constructions and neighbourhoods, besides any heritage considerations, is making a case for restoration instead of replacement by "low energy" materials or eco-enclaves.

2.5 EU nature and biodiversity policy – Natura 2000 Directive and programme

The "Natura 2000" 92/43/CEE Directive is the centrepiece of EU nature & biodiversity policy. It enables an EU-wide network of nature protection areas. The aim of the network is to ensure the long-term survival of Europe's most valuable and threatened species and habitats. It is comprised of Special Areas of Conservation (SAC) designated by Member States under the Habitats Directive (Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora). It also incorporates Special Protection Areas (SPAs) which they designate under the 1979 Birds Directive.

Natura 2000 is not a system of strict nature reserves where all human activities are excluded. Whereas the network includes nature reserves, most of the land is to continue to be privately owned. The emphasis is on ensuring that future management is sustainable, both ecologically and economically. The establishment of this network of protected areas also fulfils a Community obligation under the UN Convention on Biological Diversity (<http://www.cbd.int>). An example of implementation of the Natura 2000 Directive has been the natural reserve created by the Port of Antwerp to replace the loss of open land resulting from the extension of its docks.

Natura 2000 applies to Birds Sites and to Habitats Sites, which are divided into bio geographical regions. It also applies also to the marine environment. Resilient biodiversity and climate change are indeed narrowly linked.

2.6 European forestry strategy as climate change mitigation tool

Forest policy falls within the sphere of competence of the Member States, not of the EU (result of a paper industry common lobbying vs dispersed forestry interests). This may be regretted considering the importance of forests as carbon reserves, but the EU nevertheless contributes to the implementation of forest management through common strategies based on voluntary sharing of responsibilities. EEA has published reports about forestry inventories in Europe and potential for biomass production (http://www.eea.europa.eu/publications/technical_report_2006_9).

At national level, forestry policy is implemented through the national forest programmes (NFPs). The NFPs address issues such as the productive function of forests and their contribution to rural development, their role in the protection and enhancement of biodiversity, and the related social, recreational and cultural aspects. With a view to improving cross-sector cooperation, the NFPs need to be fully embedded in the national sustainable development strategies.

Community action in support of forest management covers several areas of activity, in particular:

- Rural development policy: this has been the main instrument for the implementation of EU forestry strategy at Community level;
- Protection against fires and air pollution: Community measures have resulted in a considerable amount of information and operational developments. However, air pollution and forest fires continue to be major problems;

- Bio-diversity conservation: the "Natura 2000 " network includes forests. However, the need to map, study and monitor forest biodiversity both inside and outside protected areas remains;
- Climate change: forests can make a major contribution to reducing emissions caused by fossil fuels, but the use of biomass for energy purposes has not yet been developed to its full potential in the EU. It is also necessary to consider measures relating to the adaptation of forests to changed climate conditions;
- Competitiveness of the forest-based and related industries: European consumers need to be better informed about the advantages of using wood from sustainably managed forests. There is also a need to create an enabling environment within which the forest-based industries can enhance their competitiveness and foster timber use;
- Research: the Community research framework programmes and European cooperation in the field of scientific and technical research (COST) support and further develop the competitiveness of the forest sector.

2.7 EU inland water resources protection policy

Directive 2000/60/EC establishes a framework for Community action in the field of water policy. By means of this Framework Directive, the EU provides for the management of inland surface waters, groundwater, transitional waters and inland coastal waters, in order to prevent and reduce pollution, promote sustainable water use, protect the aquatic environment, improve the status of aquatic ecosystems and mitigate the effects of floods and droughts. Fields of potential cross-sector water competition relevant for adaptation and Important factors for adaptation to and water resources issues are of particular consequence to the planning professions (EEA Report 8/2009 – <http://www.eea.europa.eu>). The Member States have to identify the river basins lying within their national territory and assign them to individual river basin districts. River basins covering the territory of more than one Member State will be assigned to an international river basin district.

3. EUROPEAN COASTAL PROTECTION STRATEGIES

3.1. Issues and overall EU coastal protection adaptation strategies

Coastal communities have often responded to erosion with so-called "hard" engineering solutions, for example, by constructing various types of marine protection structures and breakwaters. While reducing coastal erosion locally, these structures tend to interfere with the natural transport of sand and cause coastal erosion further down the coast. Of the 875 km of European coastlines that started to erode within the past 20 years, 63% are located less than 30 km from coastal areas altered by recent engineering works.

However, "soft" protection techniques, such as sand nourishment - when sand is taken from somewhere else to reinforce eroding dune systems and beaches - can also backfire. For example, in some cases sand was taken away from sea grass areas, which are ironically effective in limiting coastal erosion.

An EU-wide study "Living with Coastal Erosion in Europe: Sand and Space for Sustainability" (http://www.euroSION.org/project/euroSION_en.pdf) was commissioned in 2001 by the Directorate-General Environment of the European Commission upon an initiative of the European Parliament. Its aim was to evaluate the social, economic and ecological impact of coastal erosion on European coasts and assess the needs for action.

It recommended:

- Strengthening coastal resilience by restoring the sediment balance. This will require identifying areas where essential sediment processes occur, and identifying "strategic sediment reservoirs" from where sediment can be taken without endangering the natural balance.
- Taking the cost of coastal erosion into account in planning and investment decisions. Public responsibility for possible risks and damage restoration should be transferred to the direct beneficiaries and investors. This would result in a higher degree of care.
- Making responses to coastal erosion pro-active and planned. Instead of the current piecemeal approach to "fix" coastal erosion when it happens, a long-term and more planned approach is needed. It should be based on regional coastal sediment management plans aimed at restoring coastal resilience. The plans should comprehensively assess what is at stake and what the costs and consequences of different policy options (protect - do nothing - abandon the area).
- Strengthening the knowledge base of coastal erosion management and planning to ensure informed decisions and the application of best practice.

Administrative, legislative, societal and political factors impede adoption of practical coastal management. The conflicting interests of coastal protection and those of nature conservation often generate political conflicts around projects of dyke reinforcement. Major changes in perception of 'coastal protection' coupled with changes in attitudes to property will be required if this principle is to become an integral part of coastal protection strategies (Seavy 2009).

Adaptation strategies vary from country to country. In the UK, the Thames Flood Barrier has proven useful but could have been combined with a bridge. The Dutch integrated approach is an example of possible consequence to typhoon exposed places such as HK, Singapore and Taiwan.

3.2. The case of Holland's integrated adaptation process to climate change

The Zuiderzee Works (Dutch: Zuiderzeewerken) are a man-made system of dams, land reclamation and water drainage works, and the largest hydraulic engineering project undertaken by the Netherlands during the twentieth century. The project involved the damming off of the Zuiderzee, a large, shallow inlet of the North Sea, and the reclamation of land in the newly enclosed water body by means of polders. Its main purpose was to improve flood protection and create additional land for agriculture.

The single biggest structure in the project was a 32 km long dam, the "Afsluitdijk", protecting the Dutch from the North Sea. When the Afsluitdijk was completed in 1932, the Zuiderzee became completely dammed off and from then on would be called Lake IJsselmeer. Total cost of the dam was equivalent to 700 million (2004) US dollars.

The "Delta Works" are a series of constructions built between 1950 and 1997 in the southwest of the Netherlands to protect a large area of land around the Rhine-Meuse-Scheldt delta from the sea. The works consist of dams, sluices, locks, dikes, and storm surge barriers. The aim of the dams, sluices, and storm surge barriers was to shorten the Dutch coastline, thus reducing the number of dikes that had to be raised.

Along with the Zuiderzee Works, they have been declared one of the Seven Wonders of the Modern World by the American Society of Civil Engineers.

3.3. The case of Belgium's coastal awareness

The 64 km strongly urbanised sea coast has been the subject of a coastal management study called "Vlaamse Baaie 2100", by a consortium of consultants and enterprises (Baaie 2009). It aims at

creating a string of barriers and islands on sand banks off the coast, some for wind farms (Thornton Bank) and others for housing. It also considers the creation of off shore barriers supporting wind farms.

In the case of Antwerp, the quays of the Schelde have been the subject of a special protection study called "Stad aan de schelde", which recommends heightening the protection walls to 2.25 m (Van de Put 2007) followed by municipal awareness campaigns about the issue.

PART III – SUSTAINABLE CITY-REGIONS – CHALLENGES, TRENDS AND PRACTICES

1. THE MEGALOPOLIS/ECUMENOPOLIS CHALLENGES

1.1. Urban demography

The urbanisation has reached the level announced by Doxiadis 40 years ago (*Ecumenopolis: Tomorrow's City*, Constantinos *Doxiadis*, Britannica Book of the year, 1968) but is still far from having reached its apex.

Another estimated 1.8 billion inhabitants will need housing by 2030. The majority of this growth will be in urban areas. To reckon with this projection, we need to be building a new city for a million inhabitants every week, year after year. Meanwhile the oil production peak will reduce fossil fuel energy supply. Climate change will generate additional constraints.

These issues are intrinsically linked to spatial development patterns. City and regional planners need to be poised to help address them. Traditional models serving as time-tested examples for future developments, allied to new technologies may help find innovative planning tools for sustainable urbanisation and low energy cities. But governance is the prerequisite for implementation.

1.2. The megalopolis governance

The "Urban Age" 2009 research paper "Istanbul, city of Intersection" (www.urban-age.net) presents comparative studies about the size and population of some of the world's largest conurbations like Istanbul, New York, London, Mexico and Shanghai indicate the unfulfilled quest for a governance blueprint, illustrated by a set of maps at the same scale.

The Berlin case is a unique example of city adaptation to most challenging institutional changes following Germany's reunification. An ongoing pilot study "Governance Analysis" will suggest an ideal type of framework for adaptation to climate change (Research News November 2009, Federal Institute on Building, Urban Affairs and Spatial Development). The weak results of the COP 15 will put adaptation to inevitable effects of climate change more in the forefront.

The oversupply of built space is a specific challenge in areas of old industrialisation world-wide and related urban sprawl, with shrinking population. The German research project "Shrinking Cities" has developed a body of international knowledge of the field It includes a world map of shrinking urban areas (<http://www.shrinkingcities.com>). The effort of Germany to integrate the New Länder has produced a number of initiatives, at the level of the Länder. The IBA Sachsen-Anhalt and the renovation of historic Kothlen can be cited as example (<http://www.iba-stadtumbau.de>).

Besides energy savings in new constructions, the saving of the energy stored in existing constructions and neighbourhoods, besides heritage considerations, is making a case for labour intensive restoration instead of replacement by "low energy" materials or new "eco-enclaves" à la Bedzed

(<http://www.zedfactory.com>).The energy inertia of existing buildings is often overlooked, as well as the contribution of built heritage to urban cultural diversity.

2. CITIES AND CLIMATE CHANGE—CITIES, PART OF THE SOLUTION

The latest OCDE Report “Cities, Climate Change and Multilevel Governance” confirms the related aims and shared benefits of sector mitigation policies to reduce GNG’s at urban scale (OCDE 2009).

The benchmarking of cities as to their GHG emissions remains a daunting technical challenge for those who want to engage in emissions trading (GHG Study Report 2009). More generally the measurement of economic, social and environmental performance according to “Beyond GDP” indicators will require new professional inputs, in addition to economics.

Climate change poses specific threats to cities located in hot spots of global warming. Mediterranean cities for example are to consider the effects of very hot summers by investing in cooling amenities (trees, fountains, ponds). The Paris hot summer of 2003 is estimated to become the standard.

2.1. From urban sprawl to sustainable urban development

Meanwhile the forecasted growth of the automobile, main contributor to GHG emissions is unabated. OCDE figures indicate that in the last ten years the population increased by 13%, the number of cars by 50% and the number of vehicle-km by 65%. The latest projections suggest unabated further growth perspectives in emerging countries.

While the 19th Century has been the age of the great railways and the urban rail, the 20th Century has clearly been the age of the automobile. Henri Ford’s large scale production of his Model T and his capacity to convince the governments to pay for the roads construction and maintenance, while urban rail had to pay for both and enjoyed no right of way on the street, entailed the end of self supporting rail public transport in the US cities. Street views of Chicago in the 30’s show streetcars locked in traffic. The automobile-based American way of life became the underlying principle of spatial development, linked to road development (“Predict and Provide”).

The effects of the automobile on cities are mainly the need to provide parking space during the 90% of its life-time it is not running. Space-consumption graphs show the area x time space use by mode ranging from 1 to 90 from pedestrian to automobile parked at work place (Laconte 2009).

The limits to road construction were shown by the UK Government 1995 SACTRA Report (<http://www.dft.gov.uk/pgr/economics/sactra>). This report shows the effects of new roads in terms of traffic generation and that the space need generated by new roads is higher than the additional space provided. New roads thus increase congestion, after an initial relief period, and enhance further urban sprawl. “URBAN SPRAWL” was the theme of the 44th ISOCARP Congress (Dalian) and its REVIEW 04.

The side effects of traffic in terms of personal safety, air pollution, stress and obesity have been shown again and again. The WHO warned that people walking or cycling less than a half hour per day were in danger for their health. Rental bike experiences proved successful in cities like Paris, Lyons and Barcelona (Guet 2009).

3. INTERNATIONAL SUSTAINABLE CITY PRACTICES

Case histories illustrate successful attempts by a few cities and urban regions to achieve sustainability. Some of them are mentioned hereafter.

In terms of national sustainability of a City-State, Singapore's integrated approach of urban development covers transportation, land use, pollution and water management (Mah 2009).

In terms of regional sustainability the case of Portland Oregon, which has limited its spatial urban extension, is clearly a best practice (Bragdon 2009). Vienna's urban and regional interface as well as the one of Zurich (city and region) can be considered as best practices.

Among large cities Chicago is credited with having adopted a most systematic greening policy and decentralised budgets for its implementation. A spectacular facet of it is the Green Roofs initiative (<http://www.greenroofs.com/projects/pview.php?id>).

NY City has recently developed a growing awareness of its urban environment. In Mid-town Broadway there are 5 times more pedestrians than cars but pedestrians get only 10% of the street space, while space taken on the street by a running car is about 20 times the one by a pedestrian. The City has now started to give some street sections to pedestrians (NYCDOT "Green Light for Midtown" 2009).

Curitiba, which developed highly innovative urban development tools (transfers of development rights, central boulevards, new parks and selective garbage collection) can also be considered a top-down best practice, which has influenced other cities in its region (Bogota) and elsewhere (Kunming).

Medellin has achieved a successful urban regeneration, making full use of citizen participation. High density urban regeneration in Tokyo, Seoul and Vancouver are to be mentioned.

Vancouver planning tools such as the Vancouver City Planning Commission have been taken over by the Abu Dhabi Urban Planning Council (<http://www.upc.gov.ae/en/Home.aspx>). Abu Dhabi is organising its second GlobalCity Forum 2010 (9-13 April).

European cities have been the subject on many "green" rankings

The Siemens new "European Green Cities Index" ranking's first ten cities read as follows: Copenhagen, Stockholm, Oslo, Vienna, Amsterdam, Zurich, Helsinki, Berlin, Brussels and Paris (<http://www.w1.siemens.com/entry/cc/en/urbanization.htm?stc=wwccc020810>).

Berlin has taken advantage of the reunification to put in place strong urban design rules for new buildings in the areas formerly occupied by the wall, such as Friedrichstrasse, taking inspiration from the traditional urban blocs and their inner open space, such as Riemershof).

Hamburg has developed ambitious renewal plans and will be the European Green Capital in 2011 (<http://www.europeangreencapital.eu>). Competition is open for the following one http://www.ec.europa.eu/environment/europeangreencapital/about_submenu/com_toolbox.html.

Lisbon has redeveloped a large waterfront area around the former World Fair 1988 through the State run ParqueExpo '98 SA (<http://www.parqueexpo.pt>). This development systematically keeps in mind the future increase of ocean level.

Among medium size cities, Bilbao has been recognized as a successful example of revitalisation through culture investments (Vegara 2005).

Bordeaux's riverside rehabilitation and new tramway lines have revitalised the city (Guet 2008).

Manchester has brought 20.000 new residents along its derelict canals through sanitation, access improvement, cultural attraction points and Public Private Partnerships with developers capable of creating vibrant places around vibrant public spaces, such as Urban Splash – <http://www.urbansplash.co.uk> (Douglas 2009).

The same track is followed by Birmingham and Liverpool (rehabilitation of Albert Docks).

Freiburg is widely considered as the prototype of low carbon medium/small sustainable cities (<http://www.freiburg.de>). Bruges and the new university town of Louvain-la-Neuve in Belgium are in

the same league and attracting residents and tourists alike. They were presented together at UN-Habitat I in 1976. The Louvain-la-Neuve eco-features were the subject of a specific publication (Laconte 2009).

UN-HABITAT is sponsoring a World Olympiad of Urban Design Projects (W.O.U.D.), to be held in Oxford from 6 to 9 December 2010 (<http://www.woud2010.org>). This event will be launched at the WORLD URBAN FORUM 5 to be held on 22 to 26 March in Rio de Janeiro (<http://www.unhabitat.org>).

CONCLUSION

New kinds of MULTILEVEL challenges and opportunities arise from the fight against the effects of climate change and the search for urban and rural sustainability. They affect decision-makers and decision makers at international, regional, national and local level. Professionals have a proactive role to play at each level.

At world level, the awareness has been remarkably fast (some 20 years) but the belated collective commitment towards effectively mitigating climate change, expressed by the Copenhagen Conference non-results, suggests looking at adaptation to inevitable consequences of climate change, and possible actions by regional, national and local decision makers, while pursuing coalition building efforts towards collective action to reduce emissions, at all levels of governance.

At world regions level, Europe delivers a pioneering policy/strategy response to the climate change challenge. It is replicable to other world regions and to the developing world through North-South and South-South exchange of practices. The 2011 ISOCARP Congress, to be held in Nairobi, will be focusing on the developing world.

Taken as a world region, Europe opens an array of potential actions by states, regions and cities as well as by countries and a huge source of demand for professional services:

- Territorial development through regional funds. The on-going period of regional funds represents 336 billion Euros. The transport infrastructure subsidies represent 280 million per year.
- Energy. The EU commitment to reduce emissions and increase energy efficiency has a direct impact on engineering and planning professions. The technicalities of emissions accounting and energy efficiency measurement open an entire new field for the planning professions. The benchmarking of cities as to their GHG emissions remains indeed a daunting technical challenge for those who want to engage in emissions trading or charging (GHG Study Report 2009).
- Natura 2000 system. The creation of natural reserves as imposed by the EU is an opportunity for land-use planners in the broadest sense as well as for landscape architects.
- Inland water resources. Factors for adaptation to and water resources issues are of particular consequence to the planning professions.
- Coastal protection. Coastal areas protection will be a tremendous investment opportunity world-wide once the ocean level increase resulting from Arctic and Antarctic and mountain ice melting will have become sufficiently evident to all as to trigger new behaviour and new policies. It concerns all planning professions. Prevention dykes, earth movements, sand nourishment and space adaptation and design require specific professional skills and represent a challenge to planning education.

At city and regional level the urbanisation and the resulting endless conurbations raise governance challenges of unprecedented nature. Taking only the challenge implementation of both emissions

cuts and energy supply and demand management require planning skills of a new nature, at the interface of land-use planning, mobility planning and environmental planning.

New skills should include the effective achievement of a low energy urban development, meeting the demographic requirements of a world population increase and the declining population of old industry spaces.

To save open land, emphasis should be put on rehabilitations and greening of urban brownfields and reconversion of surplus old industry lands to nature friendly bio-diverse new uses all require new skills. These include landscape architecture, ecologic engineering and restoration, synergies between urban infrastructure and water management and phyto-remediation to polluted soils, among others.

In short, maintaining urban and rural quality of life and urban cultural diversity in the wake of a global warming environment will require in all world regions a new form of “planning with nature”, a long-term exercise.

At all levels the measurement of economic, social and environmental performance “Beyond GDP” will require new professional inputs, in addition to the one of macro-economists.

ISOCARP members, together with the members of IFHP and INTA, now bound by an agreement adopted by the three general assemblies, and those of their sister International (IFLA), Regional and National planning associations should be well equipped to tackle these new professional challenges.

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