China Council for International Cooperation on the Environment and Development

Roundtable Meeting

Low Carbon Transformation for Green Urban Development

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Pudong Shangri-La Hotel, Shanghai, China
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<th>Description</th>
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<tr>
<td>AGM</td>
<td>Annual General Meeting</td>
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<td>CAE</td>
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<td>CCICED</td>
<td>China Council for International Cooperation on Environment and Development</td>
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<td>CCUS</td>
<td>Carbon capture, use and storage</td>
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<td>EIA</td>
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<td>Flue-gas desulphurization</td>
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<td>IPCC</td>
<td>Intergovernmental Panel on Climate Change</td>
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<td>MEP</td>
<td>Ministry of Environmental Protection, People’s Republic of China</td>
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<td>NDRC</td>
<td>National Development and Reform Commission, People’s Republic of China</td>
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<td>NOx</td>
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<td>OECD</td>
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<td>VOC</td>
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Opening session

Chaired by Mr. Xu Qinghua, Deputy Secretary General of CCICED and Director General, International Cooperation Department, MEP

Welcome remarks by Mr. Zhu Guanyao, Secretary General of CCICED

The China Council for International Cooperation on Environment and Development (CCICED or “the Council”) is a high level, non-profit international advisory body established upon the approval of the Chinese Government in 1992. The main task of CCICED is exchanging and disseminating successful international experience in the field of environment and development; studying key environment and development issues in China, putting forward policy recommendations to the leaders of the Chinese Government and policy makers at all levels, which are prospective, strategic and provide early warning; supporting and facilitating the implementation of a sustainable development strategy and development of a resource-saving and environment-friendly society in China.

Over the past 18 years, CCICED has provided a series of important recommendations to the Chinese government on major environment and development issues and has made unique contributions to China’s economic growth and environmental protection. CCICED has brought to China international sustainable development experience and has promoted exchanges and collaboration between China and the international community.

China’s rapid industrialization and urbanization since 1978 (China’s cities have grown from 216 to 660 and urban population from 172 to 608 million in 2008) is facing the compound environmental challenges of ever growing scarcity of resources, unbearable environmental pollution and ever deepening urban eco-deficits. From now on and for some time to come, China must address the new challenge of dynamically balancing ecological, social and economic benefits, while harmonizing urban-rural and inter-regional development.

In November 2009, during his meeting with CCICED foreign members, Premier Wen Jiabao emphasized that it was in China’s interest to build an environment-friendly society and a green economy, that it would be a long and difficult process, the key factor being to identify the correct direction and stay the path. In his speech at the 2009 AGM, Vice Premier Li Keqiang pointed out that the world was undergoing major restructuring and profound change, that the development of green, circular and low-carbon economies had already become a major global trend presenting China with both important challenges and opportunities.

Last year’s AGM recognized that, as China is responding to the financial crisis, making new progress in environmental protection and improving its plans and policies to ensure relatively rapid economic development, it should also take a long view of development well beyond the financial crisis, seize the opportunity to accelerate the green transformation of its growth model and lay solid foundations for a new industrialization and urbanization path, which will allow the country to better adjust to the new round of global restructuring around green economy.

This year’s Roundtable theme is “Low Carbon Transformation for Green Urban Development”. The purpose of the Roundtable is to share the Council’s relevant research findings, enable dialogue and exchanges between China and the international community, promote policy innovation and practice and provide a platform for dialogue and collaboration between decision-makers at all levels as well as foreign and Chinese experts and academics.
Opening remarks by Mr. Zhang Lijun, Vice Minister, Ministry of Environmental Protection, CCICED Member

In the wake of the compound crisis involving energy, environment, climate change and the financial turmoil, countries all over the world are exploring and putting into practice new scientific development models. The financial crisis in particular is offering a rare historical opportunity to create a healthier environment and development relationship; concepts such as low carbon economy and green economy have become the focus of global attention during the current new round of global economic restructuring. As China is entering the key phase in the transformation of its growth model, green development will possibly be the efficient countermeasure against the present compound crisis; it is clearly an important step towards ecological civilization, in perfect resonance with the building up of a resource-conserving and environment-friendly society called for by the Chinese government. The theme of this Roundtable – “Low carbon transformation for green urban development” – is extremely timely and significant; it underscores CCICED’s ability to keep up with the times and its profound understanding of China’s development needs.

China is currently facing both the negative impacts of the financial crisis and the severe challenges of abating pollution, reducing GHG emissions intensity and improving environmental quality. In addressing the above challenges, the Chinese government, guided by its scientific outlook on development, has put forward the strategic thought of establishing ecological civilization. Last year, the government proposed, while maintaining stable and relatively rapid economic development, to accelerate the transformation of China’s growth model, to restructure the economy and shift from promoting growth to promoting transformation, taking energy conservation and emission reduction as an important tool to restructure the economy and transform the growth model, and to let green economy play its role in eliminating development bottlenecks and optimizing economic development quality. This is the priority area for China’s policy development and also the area in which China is actively exploring a new path to environmental protection aiming at the convergence of environment and economy.

In response to the unrelenting impacts of the global financial crisis, the Chinese government adopted a series of countermeasures that enabled China to become the first country in the world to show signs of economic recovery. In 2009, China’s GDP reached 33.5 trillion RMB, growing 8.7% from a year earlier. At the same time, energy conservation, emission reduction and environmental protection made steady progress, owing to the fact that many initiatives adopted to combat the financial crisis targeted the strengthening of environmental protection and the acceleration of new environmental industrial development. In 2009, 2983 major energy conservation and circular economy projects were funded, 5.9 million hectares of land were afforested, increasing forest cover to 20.36%; soil erosion on 48000 square kilometres of land was brought under control. During the first four years of the 11th Five-year Plan, per unit GDP energy consumption cumulatively declined 14.38%, while COD and SO2 emissions respectively dropped 9.66% and 13.14%. The SO2 emission reduction target was met one year ahead of schedule.

China is actively developing green economy, by boosting low carbon industrial development and promoting green buildings and transportation. In China’s 4 trillion RMB economic stimulus package to cope with the financial crisis and stimulate domestic demand, 5% of investments directly targeted environmental protection; this percentage reaches 38% if are included indirect investments in infrastructure programs, restructuring, technology and post-disaster reconstruction indirectly impacting the environment. China’s green economy presently accounts for 8% of GDP, with total investments in the order of 6 trillion RMB during the 11th Five-year Plan.

China is also actively combating climate change. China has adopted a National Climate Change Programme and is energetically promoting economic and industrial restructuring, optimizing its energy mix, implementing policies aimed at conserving energy and improving energy efficiency, increasing its climate change R&D budgets, developing forest carbon sequestration and improving its adaptation capacity. The government has decided to cut its per unit GDP CO2 emissions by 40-45% compared to 2005 levels by year 2020; this is a mandatory target outlined in the country’s mid- and long-term development plans. At the same time, domestic statistics, monitoring and assessment methodology are being developed, as part of China’s voluntary actions against climate change.
During the period of preparations leading up to World Expo, Shanghai has made sound progress in industrial restructuring, in transforming its growth model, in strengthening environmental protection and ecological construction, and in combating climate change. World Expo will be a central showcase of new concepts and technologies promoting low carbon transformation for green urban development.

China is entering a critical phase of its development towards xiaokang society; it is experiencing an important period of rapid industrialization and urbanization. By the end of 2008, 607 million people were living in Chinese cities. The present urbanization rate of 45.68%, modest in comparison with developed countries, is expected to grow annually by 0.8% over the next 15 years. Prefecture-level municipalities (excluding the counties under their jurisdiction) presently generate 62% of the country’s GDP. Some progress has been made over the years in terms of bringing solutions to urban environmental problems, through the implementation of policies encouraging the qualitative assessment of comprehensive urban environmental control and the construction of model environmental protection cities.

If innovative thinking is not brought into play, if new urbanization paths are not explored, if the current energy-intensive, pollution-intensive, carbon-intensive growth model is not transformed into a low carbon, green, sustainable development model, the contradictions between the formidable growth of urban population and consumption needs on one hand and limited resources and environmental capacity on the other are bound to create bottlenecks that will block the path to sustainable urban development.

Foreign experts and government officials are thanked for their participation and contributions to China’s low carbon transformation for green urban development.
Invited remarks by Mr. Shen Jun, Vice Mayor of Shanghai

The theme of this roundtable meeting – Low Carbon Transformation and Green Urban Development – is the major challenge facing all countries around the world after the financial crisis and at the same time an important countermeasure against climate change, in perfect resonance with the building up of a resource-conserving and environment-friendly society actively pursued by China for many years.

Shanghai, a highly industrialized and urbanized megacity at the forefront of China’s opening up and reform, has a large population and a rapidly developing economy, but it lacks resources and has only limited environmental capacity. These characteristics dictate that Shanghai must follow a sustainable development path featuring reasonable structure, highly efficient use of resources and harmony between man and nature. Shanghai has been attaching great importance to environment and development issues for a long time and has taken environmental protection as a major tool to enhance its sustainable development, also taking energy conservation and emission reduction as an important means to transform its economic growth model. At the beginning of the 21st century, Shanghai established a Coordination Committee for Environmental Protection and Environmental Construction directly under the leadership of the Mayor; the city is presently implementing its 4th three-year Environmental Action Plan; annual environmental protection investments amount to 3% of municipal GDP (46 billion RMB).

During preparations for World Expo, the Expo theme “Better City, Better Life” was interpreted as meaning energy conservation and environmental protection: green and environmental concepts will permeate all aspects of Expo Park, including 4.7 megawatts of photo-voltaic capacity and 1000 clean energy vehicles ensuring 0-emission public transit. Expo Center was certified as a third-star green design building, the top class of green buildings in China, and is applying for LEED gold certification; LED lighting will be used in the Best Urban Practices Area; natural light will shine over Expo Boulevard’s Sun Valley. Other green features include natural sunshades at the China Pavilion, 4000 square meters of vertical greening on the façades of the theme pavilions, energy savings generated by the saucer shape of Expo Performance Center. Furthermore, Expo venues are making extensive use of green technologies: ice thermal storage, river water source and geothermal heat pumps, solid waste pneumatic conveying technology, water conservation and rainwater reuse technologies. Domestic and international pavilions will also be showcasing their own energy saving technologies and their reading of the Expo theme. This will be a low carbon Expo promoting sustainable development concepts and showing the future direction for urban development.

Environmental issues are all about development and people’s livelihood. Green economy development and green growth have become a major international trend. The importance and urgency of low carbon and sustainable development is all the more obvious for a city like Shanghai, which is undergoing rapid industrialization and urbanization. Shanghai’s 12th Five-year Development Plan which is presently in preparation will cover the critical period of Shanghai’s transformation into an international economic, financial, trade and shipping center by 2020. This period will also require that Shanghai actively explore a resource-conserving and environment-friendly urban development path, providing developing countries with a model of harmonious economy and environment development. This is dictated by Shanghai’s own needs and will also be Shanghai’s contribution to the sustainable development of the country and possibly the whole world. In this respect, it is extremely meaningful to be holding in Shanghai a roundtable exploring urban green transformation and low carbon development.
First keynote speaker: Mr. Arthur Hanson, CCICED Member and International Chief Advisor:

China’s Green Prosperity Future

When discussing China’s green prosperity future, it is important to underline the term prosperity, because environment and development move far beyond the traditional notions of pollution control and environmental risks, which of course also have to be taken into account: environment and development actually looks at the new ways in which the economy can grow and prosper for decades to come.

This is not a topic that is of concern only to China; but it is of specific concern to the G20 countries, whose leaders said last year: “(...) we are working for a resilient, sustainable, and green recovery.” The UN’s Economic and Social Council for Asia and the Pacific very nicely outlined the path to a future of sustainable economy, in which there will be cradle-to-cradle resource use (which in China is called circular economy) within environmental limits, benefitting all people and following nature’s model of recreation, rebirth and renewal. That is an aspirational goal which is a long ways from reality in all countries of the world, but progress is being made as the world is starting along a pathway. This model depends very much on innovation in science and technology, in institutional change, in investment and management strategies.

What is needed is a balanced growth model, a tremendous restructuring of a traditional model of industrialization. China should first, during its present efforts to revitalize its ten key industries, consider reducing some of the overinvestment in heavy industry (which is going to lead not only to problems of finding markets for the products – iron and steel, for example –, but in excessive pollution); second, stimulated tertiary and service sector growth; third, further promote its ‘go green’ strategy, in terms of environmental industry and renewable energy technology. China has already committed to move towards green economy during the 12th Five-year Plan and beyond; major investments over at least the next 30-40 years will be required in order to reach all the objectives that are necessary.

The kind of domestic consumption that is stimulated particularly in Chinese cities over the coming decade or two is going to set a pattern that is absolutely essential for the rest of the world. The out of control consumption patterns seen in some western countries will hopefully be avoided and modest material expectations will be maintained. It is heartening to see two extreme examples relating to private transportation: on the one hand, there are approximately 150 million electric bicycles and scooters in China now and, on the other, the fact that recent efforts by a Chinese corporation to buy the Hummer automobile and have it produced in China will allegedly not follow through. These are the kinds of choices that will have to be made on the path towards low carbon economy and about the future of development in Chinese cities.

There are three energy and environment pillars for green growth: first, energy efficiency and productivity (the need for an energy productivity strategy, including a progressive, predictable approach to energy pricing); secondly, the sustainable use of coal (not an easy topic, but one in which there can be tremendous progress, considering the importance of coal in China’s energy mix); thirdly, the transition to LCE and what it means in practical terms.

A diagram of China’s energy flow shows a heavy reliance on coal and a huge flow going into industrialization and not as much going into transportation or in residential and commercial use. A huge amount of waste energy is also found to be associated with electrical generation, some of which could be captured and used in district heating, for example, in Chinese cities. Importantly, the diagram shows that there are choices to be made in China’s low carbon economy and about what the overall picture will look like in ten, twenty or thirty years. Apparently, the total amounts of energy flow will increase substantially, but much more will come from different sources other than coal. There are real choices about how much is going to end up in transportation as is in the US or in other uses, choices that can be influenced by decisions made today.

Another diagram, taken from a study produced by the Stockholm Environment Institute in cooperation with the “Chinese Economists 50 Forum”, illustrates 2050 carbon reduction scenarios: in a ‘Business as usual’ scenario, emissions would fly off the scale, a scenario that neither China nor the world can afford. Secondly, there are also pathways towards LCE, which will be good pathways for development, for people’s prosperity and health and the health of ecosystems. These conclusions are consistent with the work that CCICED and others have done: there is a future for all of our countries if we are rigorous about moving towards LCE.
The McKinsey Cost Abatement Curve shows on one side some of the high cost solutions, like carbon capture and storage, which may also be uncertain, in the short run at least. On the left-side of the curve are listed the savings obtained by increasing energy efficiency, by insulating buildings and by creating certain transportation models, etc. A major finding is presented here: most of the “savings” solutions can actually be done now and in cities. In McKinsey’s study entitled “China’s Green Revolution”, a series of sustainability clusters have been identified, as sectors on which to focus for low carbon transformation: power generation, emissions intensive industry (such as cement, iron and steel, etc), buildings and appliances, road transportation, agriculture and forestry. A majority of clusters – the first three in particular – have everything to do about cities.

CCICED produced its own view of China’s path towards LCE, by merging the above findings with its own scenario development and in-depth economic modeling with China’s macroeconomic models, to ascertain the feasibility, the means and impacts of moving towards a LCE. Yes, it is possible, but it will be difficult to go as far and as fast as possible, while maintaining economic growth and changing the nature of that growth towards a green growth pattern. It will require technology and innovation, markets and pricing, and institutional change—these are the foundation points of the house; it will also require strategies for low carbon sustainable industrialisation, urbanisation and transport, low carbon energy use, consumption patterns that stay within ecological limits and provide for modest well-being of all (this notion of xiaokang), and finally persistent efforts in rural land use. CCICED made a major point of taking this pathway or roadmap of China’s LCE forward to the State Council and also in our discussions with the Premier, last November; it is the way to go, it is feasible and should inform low carbon green urbanization.

Moving towards low carbon green development, special attention must be given to the following significant points: innovation, investment and maintaining high standards (Shanghai is one of the great leaders in doing this); compact urban design and liveable neighbourhoods (China doesn't have to follow where North American cities have gone wrong through urban sprawl); outstanding public transport and limits on the growth of private transportation; and modest living space and energy use.

With respect to China’s green prosperity future, three points need to be made. First, this is all about competition, both domestically and internationally, domestically between provinces and amongst cities and internationally between China, the US and Europe over global markets for green technology and products. China will be a very important and significant competitor, able to sell its green goods to other parts of the world and possibly emerge as the global leader in LCE and in low carbon urbanization. Secondly, the outcome will depend upon international cooperation and on China’s engagement with the rest of the world, on these issues of green prosperity. Thirdly, China can start with strong signals in its 12th Five-year Plan, the rest of the world hopefully listening and learning in that process.

Finally, it comes down to leadership. Leadership counts for a lot, whether it is city leaders, national leaders or whether it is leadership in international forums. If there is that leadership, great progress will happen in China and hopefully elsewhere in the world.

In Vancouver’s Olympic Village which will be sold off as housing, a sewage energy recovery project will meet the energy needs of 16 000 people, a practical example of urban LCE in action, which could be replicated in cities all over the world.
A Macro Strategic Study on China’s Environment and a New Path to Environmental Protection was conducted between 2007—2009. This major endeavour produced one General Report, an Executive Summary for the State Council, 4 task force reports, 29 special reports and 7 provincial-level reports.

1. Assessment of China’s overall environmental situation: During recent years, there has been positive progress in terms of the environmental situation: between 2005 and 2008, SO2 emissions, COD discharges and per unit GDP energy consumption have respectively decreased by 8.95%, 6.6% and 10.08%. Between 2005 and 2009, desulphurization and waste water treatment capacity have greatly improved; forest cover grew to 20% and desertification trends have been brought under preliminary control, as well as one million square kilometers of soil eroded land.

China’s overall environmental situation can be assessed as follows: while there have been improvements in some areas, overall degradation has not been controlled, the situation remains grave and pressure continues to increase.

Improvements include a dramatic drop of discharge intensity in key industries, some abatement of pollution from main pollutants in larger watersheds and a drop in conventional urban pollution indicators.

Overall degradation has not been controlled: air quality has been worsening in rapidly developing areas, often taking the form of regional pollution and increasing smog in urban clusters such as the Beijing-Tianjin area, the Yangtse River Delta and the Pearl River Delta; the acid rain situation has not improved in Central and Southern China, nor has lake eutrophication; the soil environment is further degrading and ecosystems are becoming increasingly fragile.

Environmental accidents are occurring ever more frequently and are compromising social stability. Inadequate environmental capacity, rapid economic development and sustained growth of energy and resource consumption are all contributing to growing pressure on the environment and on resources.

2. China’s new path to environmental protection: In the present context, China must actively explore a new path to environmental protection in line with its scientific outlook on development, recognizing: a) that environmental issues are fundamental to the people’s well being in terms of access to clean water, clean air and safe food; b) that environmental issues are also related to economic structure and development mode; c) the urgency of promoting the historical transformation of environmental protection, ensuring that economic development and environmental protection be given equal priority and planned in a comprehensive manner; d) that environmental protection should become the driver for economic growth optimization and permeate the whole chain of production, circulation, distribution and consumption; e) the need to let important ecosystems recuperate and be rehabilitated; f) the importance of building up ecological civilization and of achieving a balanced development of man, economy and nature.

The study further outlined specific measures to be taken (establishing an environmental strategic system suited to China’s conditions; setting up an overall defense system for pollution prevention and control; setting up an effective environmental governance system; improving environmental policies, regulations and standards; constructing a full-fledged environmental management system; creating a system for public participation in environmental protection), as well as:

- **strategic guidelines:** adopting prevention as a main approach and combining prevention and control; systematic management and integrated control; giving top priority to the people’s well being and taking up responsibility at all levels; guidance from the government and public participation;
- **strategic objectives:** by 2020, discharges of major pollutants are to be effectively controlled and environmental security effectively guaranteed; by 2030, complete control of total discharges of pollutants and complete improvement of environmental quality; by 2050, environmental quality compatible with the people’s rising living standards and with China’s status as a strong modern socialist society;
- **strategic tasks** with respect to water, air, solid waste, industry, urban and rural environmental protection, ecological and global environmental challenges.

Lastly, seven countermeasures were highlighted: strengthening the legal system, management system reform, increased environmental investment, innovative economic policies, management by region, science and technology and capacity building and environmental education.
Third keynote speaker: **Mr James Leape, Director General, World Wildlife Fund (WWF):**

*Low-carbon and climate-resilient urbanization in China*

All over the world, people are moving into cities and nowhere is that happening faster than in China. Thirty years ago, 80% of Chinese people lived in rural areas; today, nearly half live in cities. In the next 15 to 20 years, China’s urban population will be one billion, adding 350 million people to China’s cities. That will require new housing equal to the total present housing stock in Western Europe, or, in other words, the construction of two billion square meters of housing every year, which roughly equals all the housing built annually in the OECD.

This is a massive challenge, lying at the very heart of the climate challenge, because cities account already for 80% of global carbon emissions, urban residents using two to three times as much energy as the average. It is therefore no exaggeration to say that how the cities of China are built over the next 15 to 20 years will largely determine whether China can meet its target for slowing the growth of its carbon emissions. This trend also represents a huge opportunity, because China is building the cities of the future. It has a chance to build cities that are not only low carbon, but are in fact much better places to live – cities that have cleaner air, cities where you can read the newspaper on your way to work instead of sitting in traffic.

There are three dimensions to this challenge: first, how future cities are planned: you can build sterile canyons, snarled with traffic, where workers flee to distant suburbs at night or you can build vibrant communities where people work, live and play; you can build ring roads and parking garages, or you can build public transit, bike paths and sidewalks – the central question here being: will China build cities that are built for cars or cities that are built for people? The second fundamental challenge is how the buildings in future cities will be built, since this will define efficiency for decades to come: will they continue to be the largest energy users or will the buildings of the future be net energy producers? The third challenge is energy supply: will the energy for these cities be supplied by building more coal-fired power plants or instead by finding ways to drive efficiency and by building wind and solar?

Encouragingly, more and more Chinese cities are voicing an interest in low carbon development. Nevertheless, early experience shows that is difficult to translate that enthusiasm into robust low carbon plans and action. Low carbon success does not come from flagship projects, but from a systematic effort to identify the opportunities to improve the efficiency of energy use and to reduce the carbon that comes from energy supply. It requires a systematic approach beginning with an inventory of all carbon emissions; second, scenarios for the future urban growth need to be assessed, to see what challenges and opportunities are present; three, cities must set a target and define a plan which addresses both demand and supply, figuring out how energy use can be reduced and how energy needs can be supplied from low carbon sources; fourthly, local authorities have to make it happen, which is the hardest part: government working with businesses and consumers, trying to determine how to best translate plans into action.

The WWF is working with a number of Chinese cities that are already making progress in moving in a low carbon direction: Baoding, for example, was two years ago the first Chinese city to publish a carbon intensity target; it has now established a low carbon development plan, while showing over the last three years 40% annual growth in its low carbon industry. Shanghai is developing a low carbon plan and more than one hundred buildings have now installed real-time energy monitoring, to help them drive efficiency into their own operation. The Shanghai Expo, with its focus on low carbon cities, will be an important opportunity to provide a global showcase for what is being done here in China, what is being done in other parts of the world and what can be done in the future.

A low carbon development for China’s cities is both an imperative if China is to meet the challenge of climate change and to do its part in the global response to climate change, and an opportunity to build cities which transcend the Western model and are in fact much better places to live.

Discussion on the impact of cities on climate change should not ignore the impact of climate change on cities. There is no denying that urgent action is required to control climate change if catastrophic impact is to be prevented; but there is also no question that serious impacts are already upon us. Even if we succeed in mitigation beyond our wildest dreams, we are still destined to suffer significant sea level rise, devastating storms, drought and other disruption. Those impacts will hit
both coastal cities like Shanghai with coastal flooding and increased storms and inland cities which will suffer from water scarcity, increasing temperatures and the spread of tropical diseases. To be climate smart, a city must be both low carbon and climate resilient, addressing mitigation to reduce emissions and adaptation to be ready for the impacts that will soon be upon us.

International collaboration and exchange are truly important. China can learn much from such exchanges and China’s experience in moving towards low carbon development will also be a great asset for other countries.
Session 1

Towards Low Carbon Transformation: Opportunities for Urban Development in China

Chaired by Mr. Björn Stigson, CCICED Member,
Co-chair of CCICED’s Low Carbon Economy Taskforce
and President of the World Business Council for Sustainable Development

Introductory statement, by Chair Stigson

World population will reach 9 billion people in 2050, including 70% of urban residents. World urban population is only 3 billion today, but it will increase to 6 billion people in 40 years time. This represents a dramatic change, a huge challenge for China and the world. The World Business Council for Sustainable Development (WBCSD) has been doing work connected to these challenges, including: a) a four-year study on buildings entitled “Transforming the market”, as buildings represent about 50% of global energy use; b) a “Mobility for Development” report, which explores transport issues in fast growing cities in developing countries, Shanghai being one of the study’s four case studies; c) a Cement Initiative, cement being next to water the single most utilized material in the world; d) a Cement Sustainability Initiative, which includes work with the China Cement Association and Chinese companies (this project represents roughly 90% of global cement production capacity and has produced a technology roadmap to 2050); e) a recently launched Urban Infrastructure Initiative, a major program in which urban infrastructure is analyzed from a business perspective. The business community is fully engaged in such issues and appreciates the opportunity to work with different stakeholders, including CCICED.

First session speaker: Prof. Shen Guofang, CCICED Member, Chinese Chief Advisor and Academician, CAE:

Brief Introduction of CCICED Policy Recommendations to the Chinese Government during CCICED AGM 2009

Professor Shen briefly introduced the policy recommendations to the Chinese government made by CCICED last November, during its 2009 AGM. The AGM’s theme was “Energy, Environment and Development”. There were three dimensions to the context of the meeting, namely the 60th anniversary of the foundation of the People’s Republic of China, the continuing financial crisis (China already showing signs of recovery) and the run up to the Copenhagen Conference (China having committed to reduce its energy intensity by 40%--45% by 2020). At the time a sense of multiple crises was emerging, involving the economy, energy, the environment and climate change.

The seven recommendations were closely entwined with China’s economic and social environment. The first recommendation summarized the Council’s understanding of the overall situation. Recommendations 2 to 6 emanated from the research findings reported during the AGM by the following five task forces, which had been working, since 2007 or 2008, on different aspects of energy and environment: Low carbon economy (LCE), Sustainable use of coal, Urban energy efficiency, Rural energy and environment and Economic instruments for energy efficiency and the environment. The seventh recommendation focuses on China’s 12th Five-year Plan which is presently being formulated. The fact that both the National People’s Congress and the Chinese People's Political Consultative Conference held earlier this year both focused on LCE clearly demonstrates the far-reaching social impact of CCICED’S recommendations.

(1.) Develop a green economy and speed up the green transformation of economic development: On the basis of the Council’s assessment of China’s economic and social situation, from the perspectives of scientific development, ecological civilization and strategic consideration for long-term competitiveness, China should consider green economy as an
important approach to promote the transformation of its economic development mode and should develop a national strategy for green economic development as soon as possible.

(2.) Develop LCE with consideration of both the international and national contexts: Considering both the international and national contexts, China should develop a national Low Carbon Economic Development Plan as soon as possible, including strategic objectives, specific tasks and measures. Low carbon pilot demonstrations should be initiated within key industrial sectors and selected urban and rural locations. LCE lifestyles and opportunities should be promoted widely to China’s citizens. Furthermore, China should identify the strategic objectives of LCE; develop and implement operational policy mechanisms; optimize energy structure and develop low carbon energy sources; establish an industrial system featuring low carbon emissions; analyze the possible impacts on China’s trade and economy of a climate change “border adjustment tax” and consider how implementation of LCE initiatives might ease this threat.

(3.) National strategy for sustainable use of coal, coal being China’s major energy source (70%). Not closely related to the Roundtable theme, this topic was not presented in detail.

(4.) Take more innovative approaches to address the key energy and environment issues in urban development: China should thoroughly assess its urbanization policies of the past 30 years, and identify an overall strategy for a new urbanization path based on lower energy growth and carbon emissions and on overall higher environmental and social quality of life. The new urbanization road should focus on improvements to the key areas of rapid energy consumption increase such as in urban buildings and construction, transport and daily-life energy demands, urban consumer behaviour and lifestyle, urban climate change awareness, and strengthened policies to facilitate sustainable urban development throughout China. More specifically, China should focus its urban energy conservation efforts on energy savings from daily life activities; reduce the scale and rate of urban construction and improve building quality; explore a new road for urbanization by building up low carbon cities; develop energy efficiency policy for urban construction, promote energy-saving technology and standards and build energy-saving and low-carbon buildings; deepen reform of district heating networks in Northern China and significantly reduce heating energy consumption; make mass transportation and non-motorized transportation (NMT) a national strategic priority.

(5.) Strengthen policies for energy and environment in rural development including greater attention to climate change adaptation. Rural issues not being the focus of the Roundtable, this recommendation was not presented in detail.

(6.) Reform and improve economic instrument policies in order to enhance energy efficiency and environmental management levels: China should consider setting a substantial increase in energy productivity as a national target; reform and improve policies of pricing, energy and environment-related taxation and green credit; and establish an insurance system for environmental damage and pollution liability. More specifically, China should increase energy prices as a long-term incentive to improve energy productivity; implement an environmental tax system reform with a focus on improving existing environmental taxes and establishing new ones; improve and strengthen green credit policy and fully utilize the role of financial institutions in environmental protection and energy saving; establish and improve environmental pollution liability insurance regulations and policy system.

(7.) Recommendations concerning the 12th Five-Year National Economy and Social Development Plan: preparations for the 12th Five-Year Plan (2011 to 2015) should give attention to strengthening China’s capacity for sustainable development including incorporation of green economy and LCE as a key element of the Plan; promoting green growth and future prosperity based on transformative environmental protection, energy efficiency and innovation as strategic priorities; laying down a solid foundation for rapid development mode change involving a new path of industrialization and urbanization and adaptation to the new round of global economic restructuring featuring green economy.
A vision for a sustainable urban future is coming from historical Italian cities. In the context of Expo 2010’s Best Urban Practices Area, Italy will showcase its most beautiful historical cities, which inspire the innovative solutions for tomorrow’s urban environmental greening and which Italy and China are testing in the framework of their bilateral environmental cooperation since 2000.

Looking at a view of Venice, one can see the map of Huairou New Town Master Plan developed in recent years, which is a contemporary urban design with human dimensions.

Buildings in Trieste are the source of inspiration behind the Sino-Italian Eco-efficient Building at Tsinghua University. This facility, housing the new Sino-European Center for Climate Change, is testing innovative solutions for reducing energy consumption in the building sector and for testing new building materials that reduce the sector’s environmental impact.

Lucca, a beautiful Tuscan city which embodies the human dimension of urban development, has developed eco-biking for sustainable urban mobility. Inspired by Lucca’s eco-biking, the eco-motorbike was developed in Shanghai through the Italian Technology Center established at Tongji University in 2005: it is a hybrid motorbike that will be produced in China to meet sustainable mobility demand in the urban areas of Chinese cities.

Looking at the map of Ortigia, the downtown of Siracusa, one can see Beijing’s intelligent traffic plan for the Olympic Games, an intelligent transport system area designed in collaboration with Beijing municipality, with a view to managing urban transport and environmental controls focused on the monitoring of traffic pollutants. From this experience are emerging many suggestions towards sustainable mobility planning in China’s megacities.

Looking at Parma and its buildings, one can see the Environmental Convention Building (the “4C“ building) built by Italy in Beijing. Combining beauty with efficiency, it incorporates technologies which can cut energy consumption and emissions by 40-50%, as compared with the conventional technologies used in Beijing’s public buildings.

Looking at Siena, its organization and building materials, one can understand Italy’s involvement in the restoration of Shanghai Expo’s B2 Pavilion, which will host the Best Urban Practices Area. The pavilion design focuses on the use of sustainable and resistant materials, such as those used to build Siena over the centuries.

Looking at the former salt storages in Venice, which were built without air conditioning or heating, one can see yet another pavilion built by Italy for Shanghai Expo, the (B3-2) New Pavilion, a showcase of sustainable urban practices. The interior of the ancient salt storages inspired the design of the Pavilion’s energy-efficient environment.

Finally, taking the houses of Capri as a starting point, Italy is designing Beijing’s Energy-efficient Ecological Village, in cooperation with China’s Ministry of Science and Technology and Ministry of Construction. The eco-village will test new standards and guidelines for energy-efficiency and environmental protection in China’s residential sector. An accounting methodology for CO2 emission reduction is also being prepared, as a CDM Program of Activity.

The Green Energy Laboratory, built in cooperation with Italy in Shanghai’s Jiaotong University, will be the test lab for the development of new technological solutions for China’s urban sustainable development. In the framework of this activity, China’s first efficient micro-turbine was built – a very interesting option to supply electricity, heat and cooling, with with 90-95% efficiency compared with the conventional efficiency of about 50-60%. Through this solution, energy consumption can be reduced by 30-40%.

In conclusion, looking at the past, we come back to the future: by looking at the past of Italian cities, one can find many of the solutions that are needed in order to address future urban sustainable development.
A two-year study conducted by the Chinese Society for Urban Studies came to the following conclusions:

First, there is a strong relationship between global climate change, carbon emissions and urbanization. Climate change has recently evolved from a scientific consensus into common global action. GHG emissions are recognized to be not only closely related to industrialization and urbanization, but also to the urbanization development model. The speed and scope of China’s urbanization are unprecedented. According to the UN, the world’s cities, while occupying only 2% of the Earth’s surface, account for 50% of world population, 80% of global GDP, 80% of global pollution discharge and 75% of global GHG emissions. China’s urban population share is lower than world levels, but its cities still consume respectively 86%, 75% and 80% of the nation's steel, cement and energy, while emitting 85% and 90% of the country’s COD and CO2.

Secondly, under the influence of climate change, cities are facing transformational development trends. A global consensus is emerging that low carbon eco-city development is the pathway towards urban transformational development. The eco-city concept has been around since 1971. The UN and the World Wildlife Fund are developing principles and standards. Masdar is a well-know international example. In China, more than one hundred cities have set eco-city objectives and an additional 50 are establishing low-carbon city targets. Well-know Chinese eco-city pilots include Tianjin’s Eco-city, Caofeidian International Eco-city in Tangshan, Turfan, Baoding, Huainan, Shenzhen, Dongguan, etc; low carbon concepts have also been put forward in the process of reconstructing Beichuan after the earthquake in Sichuan.

Thirdly, China is developing a long-term vision for low carbon eco-city transformation. The growth of China’s energy consumption and GHG emissions being predicted to continue for some time to come, the core issue of ensuring balanced development between economy, environment and energy must be addressed. China cannot adopt the Western urbanization model, it must follow a new, low carbon model and strive to first achieve net reductions in total energy consumption and emissions and then alleviate contradictions between energy consumption and carbon emissions by the time urbanization is basically completed. Even under a low carbon development scenario, total carbon emissions will continue to grow annually and peak only towards 2035. China’s present international obligations strictly address relative emission reduction; after 2030, the international community will be calling for China to drastically reduce its emissions in absolute terms. In this context, the vision for China’s low carbon urban transformation is as follows: a) by 2050, China’s urbanization rate will reach 50% and urban economic contribution to GDP 90%; b) the total output produced by urban unit energy consumption and resource consumption will be 15-20 that of year 2000; c) attempts to achieve zero-growth in energy consumption by 2040 and zero-growth in GHG emissions by 2035, thereby achieving UN goals ahead of time.

Fourthly, China’s action roadmap towards low-carbon eco-city development calls for the following actions: a) implementing low-carbon ecological concepts, adopting new urban construction models, developing a low carbon industrial structure; b) establishing multiple evaluation criteria, in order to steer low-carbon urban planning; c) carrying out pilot demonstration projects, to spread appropriate (low-cost and high-return) low-carbon technology; d) formulating relevant laws and policies, to support and ensure low-carbon development; e) promote green and healthy lifestyles; f) fostering extensive international exchanges, to gradually steer urban construction in the right direction.
Debate and Discussion
Moderated by Mr. Hao Jiming, CCICED Member; Professor and Department Dean, Tsinghua University and Academician of CAE

Leading comments by Mr. Li Junfeng, Vice President, Energy Research Institute, NDRC

We all realize the importance of low carbon development and green economy. However, in China, a major developing country, many excellent ideas end up being very difficult to put into practice. For example, major efforts to develop new energies were initiated in the early 1990s. China’s annual growth in renewable energy installed capacity has now increased to 10,000 MW for wind power and 100-200 MW for solar. China’s non-fossil energy share of total primary energy consumption was 8.5% in 2008 and an increase to 9% was expected in 2009, but this share actually dropped back to 8%, mainly because of a decrease in hydropower production caused by last year’s severe drought. This example illustrates the unrelenting efforts that are needed to bring about progress.

This is even truer for cities. Chinese cities are very different from foreign cities; the mandate and responsibilities of mayors are also quite different. While mayors of foreign cities are mainly responsible for people’s livelihood, environmental protection, and so on, Chinese mayors are also accountable in terms of GDP growth. People easily criticize the present overheating in terms of production capacity, but in periods of rapid growth, production capacity has to be increased. In this context, Chinese mayors need to demonstrate exceptional wisdom and drive in order to balance low carbon transformation and green development objectives on one hand and rapid economic growth targets on the other hand. When exploring such topics in international forums, the specific situation of China needs to be taken into account. How are we to go about low carbon development and green development?

One concern relating to low carbon development is that low carbon is measurable and can be clearly calculated. For example, it is not difficult to calculate how much carbon is consumed to produce one kilowatt of electricity or how much carbon is embedded in China’s GDP. Low carbon is a very transparent indicator, unlike green economy or circular economy. Of course, carbon consumption levels can also be obtained for green and circular economy, by performing conversions, but not as transparently as is the case for the low carbon concept. Mayors should exercise due caution when discussing or considering moving towards low carbon development, the metrics involved being extremely transparent and true to fact.

Achieving low carbon development will not be an easy task, but China has no choice. There is no walking away from the low carbon development path. The story of China’s coal production growth convincingly illustrates this necessity. It took China 50 years (1949-1999) for its coal production to reach one billion metric tons, but only a few years to produce an additional billion tons, between 1999—2004; China’s coal production now stands at 3.1 billion metric tons. A China Coal Association representative was saying yesterday that China had reached the limit in terms of coal production; nevertheless, demand is there and China apparently will just have to produce more. Clearly, without low carbon development, there is no future for China.
Leading comments by Mr. Gao Qing, Vice-Mayor of Changzhou City, Jiangsu Province

Situated at the heart of the Yangtse River Delta halfway between Shanghai and Nanjing, Changzhou, the cradle of China’s early industrialization, has developed into a modern equipment manufacturing center. Changzhou has been making progress towards low carbon transformation, a duty-bound and pressing endeavour considering its location upstream from Tai Lake. Changzhou recognizes that low carbon is both the new industrial engine and the pathway towards transforming its economic growth model. Low carbon concepts must permeate all aspects of economic and social life, from production and distribution to consumption, covering industry, agriculture, transportation, construction and the services industry. There are seven dimensions to Changzhou’s low carbon approach and future plans:

1. Setting low carbon urban development goals: Changzhou’s 12th Five-year Plan will be based on low carbon concepts, integrating per unit GDP carbon emissions as a binding target and combining a low carbon development strategy with ongoing work related to circular economy, clean production, environmental management systems, energy conservation and emission reduction. In terms of coordinating urban and industrial development, the city will further tackle energy conservation, emission reduction and restructuring in the short term, while adopting a diversified approach to longer term economic development, involving land use, integrated transportation systems, infrastructure construction and carbon sink measures.

2. Enhancing industrial conglomeration: Changzhou will continue to actively build up its five pillar industries – advanced equipment manufacturing, electronics, new energy, new materials and biomedical industry. These five sectors’ share of local GDP grew from 47% in 2007 to 61% in 2009. Among China’s prefecture-level municipalities, Changzhou’s photo-voltaic and wind power industries respectively rank 2nd and 4th nationwide. R&D investments presently account for 2% of GDP.

3. Exploring an industrial development pathway suited to Changzhou’s context: 48% of local output already coming from high-tech industries, Changzhou is planning to: a) forcefully develop new technology, low carbon and new economy sectors, hoping to become within three years a major national base for new energies, including low carbon technology for solar, smart grids, LED lighting, sustainable use of coal and new energy vehicles; b) combine energy conservation and structure optimization, realigning its industrial structure towards modern services and advanced manufacturing, improving carbon productivity and phasing out or upgrading outdated capacity; c) build up ecological carbon sinks, taking advantage of the abundant natural vegetation in the hilly rural areas, as part of the national ecological construction program; the city has already invested 20 billion CNY. Since 2006, COD and SO2 emissions have been cumulatively reduced by 30% and 26% respectively, achieving 11th Five-year Plan targets ahead of schedule.

4. Advancing public transit: Over the last few years, Changzhou has been implementing preferential policies in public transit, including lowering ticket prices, increasing its public transit fleet and optimizing routes. Next steps will focus on increasing public transport density and stimulating the use of new energy road transportation vehicles.

5. Promoting green buildings: incentives and guidance towards green building development and construction will be stepped up, including demonstration projects for the integration of solar energy systems into buildings, solar heating, etc.

6. Accelerating the development of low carbon development enabling policies: Economic instruments such as green credit and resource area eco-compensation are already being implemented. Changzhou was the first city in Jiangsu Province to establish an emission rights trading service center. Next policy steps will involve a comprehensive utilization of taxation, pricing, economic compensation, funds and market transaction tools to develop policies with respect to low carbon energy, low carbon technology, industry and consumption, in order to introduce market mechanisms, encourage energy conservation by enterprises and stimulate low carbon industry, consumption, production and lifestyles.

7. Promoting full stakeholder participation in the construction of low carbon Changzhou: active public participation from all sides is being encouraged, including business, industrial associations, consulting companies, investment corporations, research organizations, the media and civil society. Changzhou presently boasts 36 environmental NGOs with 4500 members and more than 2200 volunteer organizations boasting a total of 270 000 members.
**Responding comments**

The single most important global challenge facing the relatively new concept of low carbon development is the issue of scaling up experiments and pilot innovations to broader-based systemic approaches.

Presently, no single city in China or elsewhere, can pretend to the title of low-carbon city. Cities are still experimenting, including cities in China. Urban development needs to be transformed, from the past model of high consumption, high emission and high pollution towards a resource-conserving and environmental-friendly model – the low-carbon development path. Efforts need to be made, first towards the development of low carbon indicators, in order to set targets and provide guidance for urban development, including assessment standards for low-carbon cities. Urban planning requires specific quantitative indicators to complement qualitative indicators such as those proposed by the UN and WWF. Stakeholders from China’s central, local and municipal governments are presently involved in this development. Secondly, further efforts are required to pursue China’s two-fold on-going experiments and practices towards low carbon urban development: the construction of new eco-cities (Tianjin’s Eco-city and Tangshan’s Caofeidian International Eco-city, for example) and the ecological transformation of existing cities. In the first case, low carbon principles are first defined and a set of planning standards and techniques are then applied, with the support of new policies. A much larger number of Chinese cities are engaged in the second type of endeavour. The coal city of Huainan, for one, has been experimenting with the distribution of coal gas to homes and is addressing the remediation of sunken areas which have appeared as a consequence of coal extraction. Other cases can be mentioned: buildings in Northern China account for only 10% of the country’s total building stock but consume 60% of the sector’s energy, mainly because of winter heating and the absence of metering. The central government is presently refurbishing the whole system.

As cities move towards low carbon development, they should consider the role of building materials in reducing energy consumption and promoting healthy indoor environments, since the quality of life in indoor areas can also impact energy consumption. When developing new cities, energy supply must be taken into consideration and in particular the role of distributed generation using new tri-generation technologies, which can substantially reduce energy consumption. Energy consumption per square meter in new buildings should be introduced as a reference for energy consumption reductions in relationship with building materials and energy supply technology.

Achieving low carbon mainly implies, first, decarbonizing energy production, mainly by developing new alternative energy forms and ensuring energy supply without increasing carbon emissions and, secondly, decreasing energy production, through better energy use or, in other words, by improving energy conservation and energy efficiency in the building, transportation, production and consumption sectors.

In international meetings on the environment, low carbon seems to have become the new panacea, the solution to all problems. In fact, low carbon should be more precisely defined, specifically as concerns its positioning and relevance in terms of offering appropriate solutions suited to China’s context. In the UK and Europe, the major environmental challenge is climate change, whereas China faces both the climate change challenge and a persistent, continually deteriorating environmental situation in terms of air and water pollution, for example. Therefore, it will prove difficult to explore China’s future development path if the concepts of clean production, pollutant emission reduction, improvements in resource use and circular economy are all to be simplistically summed up under the single framework of “low carbon”.

The farther China travels along the green development path, challenges and difficulties will only grow to greater proportions. Low carbon or eco-city targets will not be met unless cross-organizational collaboration becomes a reality. Government, business, the public and NGOs need to come together and jointly develop and implement solutions. Within government, the discourse about environmental issues should not be the monopoly of environmental protection agencies; similarly, urban development should not be monopolized by the Ministry of Construction. A research team must be established across different government agencies. In relation to the complex and systemic issues raised by low-carbon urban transformation and eco-city transformation, comprehensive pilots and solutions should be explored, from policy and
standards development, implementation, financing channels to monitoring mechanisms. Such an action-oriented low carbon urban approach would no longer be an empty political slogan or the flavour of the month.

The relationship between the different concepts of low-carbon, circular and green economy must be clarified, in order to ensure successful policy development and implementation. Green economy appears to be the integrative concept which encompasses both low carbon and circular economy, low carbon economy being more closely related to energy issues, whereas circular economy is more closely focused on resource issues.

Compact urban design was suggested as a guideline for China’s future development. Compact design should not be overemphasized only because of low-density and urban sprawl issues in the US. China is a huge country with a large population, in which compact design might create unanticipated problems. A cluster design approach might be more closely tailored to China’s situation: developing large cities with their surrounding communities and suburbs.

The economy is measured by GDP and low carbon economy could be best measured by carbon emissions, as was suggested by one speaker. Ecological footprint could similarly be used to measure the greenness of the economy, ecological footprint being the human impact on nature, including in terms of providing food, water, shelter and assimilating waste; the above needs are translated into a land area needed to support human life, which is the footprint. Ecological footprint captures how resources are extracted, used and disposed of by persons, institutions, countries or cities.

Low-carbon economy can be viewed as a major component of circular economy. In fact, economic activity can involve either resources or energy. In this respect, low-carbon economy relates to energy activities and low carbon efforts focus on conserving energy, raising energy efficiency and renewing energy. The circular economy model can be used to develop low carbon economy in all aspects of production, consumption and daily life.
Session summary by Mr. Björn Stigson

This morning’s presentations and discussion have clearly shown that the future world will be urbanized, that cities are major users of resources and that urban infrastructures therefore need to be more resource-conserving and less polluting. There is a lot of work on-going, in terms of exploring new models for cities: policies are being tried out, scenarios are being developed and numerous pilot projects are being carried out.

We basically know what to do; the challenge is how to do it – implementation. Our first common challenge is how to accelerate implementation, since the world is going to build during a very short period of time as much infrastructure as was built up to now in human history. If we delay implementing the new necessary solutions for the future, massive inefficient urban infrastructure lock-in will occur and persist for the next forty years to come. In this context, one dimension of this challenge is to rapidly create and foster the talent, skills and capability necessary to implement innovative urban solutions, capability in terms of the architects, urban planners, builders, installers and suppliers who will actually deliver these new solutions.

The second challenge is that systems solutions are needed, not just putting up one good building or finding optimized individual pieces: cities as a system need to be optimized. The Roundtable should remain focused on the question of how to make it happen. We know what to do, but don’t know how to make it happen.

Session summary by Mr. Hao Jiming

This morning, Mr. Xia Guang and Mr. Shen Guofang reported respectively on China’s macro-strategic study and CCICED’s policy recommendations provided last year to China’s central government. These two reports actually reflect China’s thinking on the exploration of a new path for environmental protection, as well as on how to address resource, environment and climate challenges. Strategic in nature, this reflection also provides a workable, concrete action scenario. My suggestion would be to publicize and disseminate on a much larger scale these forward-thinking documents, particularly the research results of the Macro-strategic Study, which were achieved under the joint leadership of China’s Academy of Engineering and MEP, with the participation of more than one hundred experts over more than two years. The Macro-strategic Study could be very instrumental in exploring a new path for environmental protection in China.

Energy issues play a key role in terms of low carbon transformation and green development. Energy issues should be tackled at two priority levels: first, conserving energy and improving energy efficiency, two areas in which China has a great potential; second, developing new forms of energy, in order to address long-term challenges. Efforts towards low-carbon transformation and green development should focus on energy conservation, energy efficiency improvements and new energy development.

China is presently going through a very special period of unprecedented rapid economic growth and urbanization. Many developing countries are also facing similar challenges, which must be addressed through concerted international cooperation and efforts. An appropriate path can only be found through the concerted efforts of the international family, a path that will be suitable to different countries and adapted to their specific contexts.
Session 2

Energy Efficiency and Environmental Challenges for Urban Development

Chaired by Ms. Laurence Tubiana, CCICED Member and
Director of the Institute of Sustainable Development and International Relations, France

Opening statements by Ms. Tubiana

This afternoon’s discussion should focus on practicalities, on the implementation of this movement towards low-carbon economy that was discussed earlier today. It will answer the question raised this morning about the definition of low-carbon economy and transformation. Discussion of practical steps is very important in the present context: for those who have been involved in the negotiations leading to the Copenhagen Conference last year, one assessment is that at the end of two years of negotiations, the case could not be made, globally, for low-carbon economy as a realistic model. In the Copenhagen Accord and in the proposals that countries have issued at the beginning of this year, nations actually formulate actions that they wish to implement, but in no country, including in Europe, is there a real belief that low-carbon economy is on the way and on track. The real problem that was encountered during the climate negotiations is that governments could not trust that this was really the new development model for years to come; there was acknowledgement of intentions, innovations and attempts, but there was not a common vision that this is the form of development that will be generalized, widely spread in the years to come.

The major question presently facing individual countries is to try to implement innovation and demonstrate that low-carbon economy is the future. A circle like ours is by and large convinced that this is the way to go; but we have to recognize that this is not a widely shared vision. For this reason, as many have said this morning, it is crucial that countries like China and other countries demonstrate that low carbon development is a worthwhile experiment. In this respect, energy efficiency is one of the best cases to demonstrate: not only is it possible, but it is a very practical means of gaining energy security, of being efficient and of saving precious resources at the national and global levels. This afternoon’s practical discussion will give more momentum to the discussion that was not really achieved at the global level.

First session speaker: Professor Jiang Yi, Tsinghua University Building Energy Research Center and CAE Academician:

Energy uses performance in urban consumption sector and approaches to energy saving

Prof. Jiang summarized the research findings of CCICED’s Task Force on Energy Efficiency and Urban Development in the Building and Transport Sector.

Unlike energy consumed in the production process (iron and steel, for example), energy use related to the daily activities of urban residents, or daily-life consumption (residential buildings, public buildings, leisure, transport) has no direct relation with GDP and rather aims at providing a service and enhancing quality of life. Approaches to energy saving must therefore take into account the basic differences and characteristics of these two types of energy use: efficiency issues must be targeted in the production sector, whereas two aspects must be addressed for daily-life energy consumption: enhancing energy efficiency through technological innovation, but at least equally importantly by appropriately reducing the volume of service provision and modifying service patterns.

The one billion people living in developed countries use 32% of the world’s consumption-related energy, whereas the 5.7 billion people in developing countries consume only 18% of that total; per capita (daily life) consumption in developed
countries is ten times that of developing countries. If the 6 billion people on Earth all consumed at developed country levels, two Earths would be needed to meet daily-life consumption energy needs. Of course, production energy needs also have to be factored in: supposing that daily-life consumption energy use is maintained under 40% of total energy, total global per capita energy use could only reach 20% of per capita levels in developed countries. From this perspective, China only has enough room to double its present consumption and cannot go higher; in fact, if China’s urban-rural divide were bridged, per capita urban energy consumption would already have reached the ceiling.

Extensive research supported by sampling surveys demonstrates that urban daily life energy consumption has no direct relationship with either GDP or income, but is rather closely related to lifestyle, culture and behaviour, for all daily life consumption sub-sectors including residential buildings, public buildings (workplace), leisure and transport:

- **Concerning residential buildings**, within a multi-family building in Beijing where all 26 households had individual air conditioning (AC) units, a factor 10 gap was found between the lowest and highest AC energy consumers, a gap unrelated to income but closely linked to differences in lifestyle and equipment use. A comparison between five multi-family residential buildings in Beijing recorded an annual average consumption of 2 kWh/m² for buildings equipped with individual AC, as compared with 20 kWh/m² for buildings with central AC, individual units clearly allowing consumer lifestyle to impact energy consumption. In a random sampling survey of 1000 households in five Chinese cities, the highest consuming decile (the 100 highest consuming respondents) was found to use 10 times more energy than the lowest consuming decile.

- The same trends appear in **office buildings**: an annual energy consumption gap of 34 to 356 kWh/m² was observed in a study of Chinese and foreign office buildings having similar functions and service levels. In a comparison between five Chinese cities, Korea, Japan and the US, even though the average consumption of Chinese cities was much lower than that of the three foreign countries, China’s highest consuming decile (the top 10% of the sample which had the highest consumption) actually exceeded Korea and Japan’s average consumption and is approaching the American average level. This high-end consumption is bound to grow if not checked properly.

- The same gap was observed between the highest and lowest deciles in a survey of energy use during leisure activities in five Chinese cities.

- **Private transport** related energy consumption shows the same ten-fold gap between the highest and lowest consuming deciles. In Shanghai, the heaviest consuming decile was actually higher than US average consumption.

A comparison of total daily life related energy consumption in five Chinese cities indicates that average Chinese consumption is far lower than in Korea or Japan, but that China’s highest energy consuming urban residents (10% of the sample) have surpassed US levels. Once again, these observations are not directly related to income levels.

Different lifestyles obviously require different technologies. A residence can be equipped with year-round temperature and humidity controls, while a neighbour will opt for natural ventilation and an individual AC unit to be used only under extreme climatic conditions. The two residences reflect different lifestyles, accompanied by different technological solutions. Technology choices are driven by lifestyle choices with respect to housing or buildings, transport and leisure. No single technological solution should be promoted in the daily life energy consumption sector.

In view of the above situation, the following approaches to saving energy in the consumption sector are recommended: attaching due importance to present energy use data in the consumption sector; limiting urban size and total building stock volume, through the urgent implementation of a property tax (building construction should not drive GDP growth); enabling technology and infrastructure to support green lifestyles; establishing an energy saving management system for buildings based on energy consumption data, including for public buildings; encouraging green lifestyle, particularly among younger people.

The level of service enjoyed in developed countries, obtained through massive energy consumption, is much higher than in China. China cannot follow the same road; it should as much as possible maintain or only slightly raise its current consumption level and improve service quality. Developed countries, on the other hand, should drastically cut their energy consumption, possibly lower service quality and transform their lifestyle. Both developed and developing countries, coming from different directions, would then meet and achieve low carbon lifestyles.
The 20 million permanent residents of Shanghai have enjoyed continuous and substantial economic, social and environmental progress over the last ten years since the reform and opening up of Pudong area. With scarce natural resources and limited environmental capacity, the city is feeling the increasing pressures of urbanization and industrialization. Shanghai’s GDP has reached 1.5 trillion RMB, but energy consumption has topped 100 million tons of metric coal and per capita CO2 emissions are catching up with developed country levels. Overall environmental quality has improved, but the city still faces severe challenges related to ozone, fine particulates and greenhouse gases, which have become regional, if not global, in nature.

1. **Low carbon and green development at World Expo.** World Expo has adopted three approaches to low carbon: the implementation of low carbon practices on site, the presentation of low carbon achievements and the dissemination of low carbon concepts.

   **Low carbon practices:** The Expo site, which spans the two banks of the Huangpu River, used to be Shanghai’s old downtown industrial zone; its 270 enterprises have been closed, moved or upgraded. A number of old buildings have been preserved, occupying 1/6th of the Expo Park area, thus saving precious resources. Post-Expo use of the buildings has been planned and the whole site has been extensively greened.

   Expo Park has also made ample use of low carbon and environmental technologies: 4.7 MW of photovoltaic-cell solar panels; 70-80% of total lighting is LED lighting; zero and low-emission transportation (using super capacitor buses, cell-capacitor electric buses, new fuel cell vehicles); permeable road surfaces; water-source heat pumps; water conservation, etc.

   **Presentation of low carbon achievements:** Expo 2010 is the first world expo to have created a Best Urban Practices Area where Chinese and foreign cities will be showcasing in a central area their best green development and low carbon practices: for example, the Shanghai Eco-home, the old power plant transformed into the Energy Center and many foreign experiences from London, Hamburg, Italy, etc.

   **Dissemination of low carbon and green concepts** is being carried out through joint efforts from government, business, civil society and the media. Jointly published with UNEP, Green guidelines for Expo Visitors have been made available. Shanghai and US-based Environmental Defense Fund have jointly launched the Green Commuting Project to encourage people to choose greener means of transportation to World Expo, involving 16 cities within the Yangtze River Delta. Over the last ten years, Shanghai has been calling on all citizens to plant at least one tree annually; such campaigns have raised public awareness of low carbon concepts.

2. **Major low carbon developments in Shanghai** include:

   **Industrial restructuring:** the services sector has been developed to the point where it now accounts for 59% of the economy; through the optimization of high-tech industries and the transformation of traditional manufacturing industries, coal consumption has been brought down to 53%, compared to 65% only 10 years ago.

   **Major improvements in energy efficiency:** through power saving, water saving and material saving initiatives, comprehensive energy consumption decreased by 17% between 2005 and 2009. During the same period, in terms of pollution abatement, SO2 and COD emissions respectively dropped by 26% and 20%.

   **Renewable energy development and clean energy use:** the use of clean energies such a natural gas is developing rapidly in Shanghai, while renewable energies – solar and wind – have made substantial inroads, with 27.3 megawatts of installed wind power capacity and 600 000 square meters of urban area covered by solar energy. The Shanghai East China Sea Bridge Wind Power Farm – the largest offshore wind power farm in Asia – was recently commissioned, with an installed capacity of 102 megawatts. Shanghai has also been one of the first Chinese cities to implement green power mechanisms.
Promoting greenery and ecological construction: over the last ten years, per capita green space increased from 3.62 to 12.5 square meters, while forest coverage grew from 3.17% to 11.63% during the same period. Wetland nature reserves covering almost 1000 square kilometers were also established: Chongming Island Dongtan Nature Reserve, Pudong Jiuduansha Wetland Nature Reserve, Yangtse River Estuary Chinese Sturgeon Nature Reserve, etc.

3. Shanghai’s future low carbon development strategy

Shanghai is presently developing a substantive strategic roadmap, taking low carbon and green development requirements as the key to further restructuring and transforming its growth model. Main aspects include industrial restructuring and up-grading; energy efficiency improvements in manufacturing, transportation and buildings; and specific measures and indicators related to the promotion of green and low carbon lifestyles. CO2 emission intensity is to be integrated in the next Five-year Plan. Specific low carbon standards and indicators are being developed for each sector. Pilot low carbon districts are also being promoted.

Third session speaker: Dr. Dirk Messner, CCICED Member and Director, German Development Institute:

*Global urbanization trends – low carbon perspectives*

Climate change and urbanization are accelerating in parallel, urbanization being currently a driver of climate change. There is an urgent need to de-link these trends. In order to stay within the 2°C Celsius corridor decided upon at Copenhagen, global emissions need to peak in 2020 or 2030 at the very latest. In order to peak by year 2020, emissions need to be reduced annually by 9%, which is technologically, economically, institutionally and politically impossible – emissions therefore have to peak earlier, around 2015. The International Energy Agency argues that 90—95% of growing emissions until 2030 will be coming from non-OECD countries and that in order to remain within the 2°C Celsius scenario, OECD countries need to reduce by 40 to 50% towards 2030 and non-OECD countries by 20%. This urgent challenge is imposed by the present rapid urbanization process.

In fact, rural population will stagnate between 2010 and 2030, while the urban population will be growing rapidly, requiring the massive construction of new cities and new housing for 1.5 to 2 billion additional people. Therein lies the very high and immediate risk of path dependency through further massive investment in high-carbon urbanization, because colossal building needs have to be satisfied very rapidly, during the next twenty years, at a time when low carbon city concept are still very much at an embryonic stage. Efforts towards low-carbon city building urgently need to be sped and scaled up.

Global trends show that urbanization will be incremental in the EU and the US (their share of global urban population dropping from 50% in 1950 to 20% in 2030), while it is and will be increasing radically in Asia (its share of world urban population growing from 30% in 1950 to 50% in 2030) and, to a lesser degree, in Africa (experiencing a 5% to 15% growth during the same period). Now within each region, urban population in the US and Europe is stagnating, but in Asia, the number of urban residents will double during the next two decades (growing from 16% in 1950 to 54% in 2030), along with the necessary housing stock and growing cities. Challenges are different in different regions: having to manage rapid urbanization in China and Africa towards low carbon development and leapfrogging radically to low carbon cities, in contrast to transforming existing cities into low carbon cities in the OECD world. Will this radical Asian urbanization be done in a low-carbon or a “business as usual” manner, with the resulting impacts on climate change?

Cities currently consume 67% of the world’s energy and contribute more than 70% of global energy related CO2 emissions; by 2030, these figures would respectively increase to 73-80% and 76-80%. Urban emissions in OECD countries are more or less stagnating and need to be radically declining, while the growth in emissions is coming from non-OECD countries, China being an important driver of this process, along with India. The message is clear: cities are the real issue, because dangerous climate change will not be mitigated if cities are not radically transformed.
Low-carbon urban transformation implies a number of dimensions: a) \textbf{density} – cities with a similar size actually consume energy very differently, Houston, Phoenix and Detroit, for example, have low-density but high energy consumption, while Tokyo and Hong Kong were planned the other way around; b) \textbf{building energy efficiency} – Prof. Jiang Yi from Tsinghua University demonstrated that even with existing materials and concepts, there is a factor 10 in terms of energy efficiency; c) \textbf{energy-plus buildings} – a revolutionary development holding the promise that buildings, which presently account for 40% of global GHG emissions, could in the not too distant future not only not consume energy, but become net producers of energy, houses and office buildings becoming decentralized power stations; d) \textbf{supergrids} to boost renewable energies; this is again a systemic issue, which requires large scale investments; e) \textbf{systemic issues} such as housing, transport, working, waste management, leisure, culture, consumption patterns and lifestyle patterns; f) \textbf{capacity building} needs strong investment in knowledge-based development, in the development of expertise, to nurture the next generation of much-needed low-carbon-oriented architects, urban development planners, low carbon logistics experts, waste managers, etc.

Low carbon urban development needs to be viewed as a future-oriented business model, requiring investment and creating wealth. Firms, experts and networks that can develop effective strategies and solutions to address low carbon city breakthroughs will be at the forefront of green development and international investment. The future belongs to the creators of knowledge and prototypes, to social networks bringing together architects, banks, urban mobility experts, urban renewable energy pioneers, R&D laboratories, etc. With its phenomenal growth, China could obviously pioneer this trend.

On the other hand, there is a risk of path dependency for decades to come if urban low carbon transformation were not to happen rapidly on a large scale; for example, how China decides to build the 50000 new skyscrapers that are planned during the next two decades will generate dependencies for the next 40 years or even more. China’s urbanization strategy decisions over the next five to ten years will clearly have major global impacts.

Local governance in cities is key to making global progress towards climate change mitigation. Even though the climate negotiations in Copenhagen have generated some frustration, it is heartening to see that on the ground, cities can make a difference and play a substantial role in terms of mitigation. Local governance towards low-carbon cities is a key challenge in order to mitigate climate change globally. In this respect, there is a huge potential for cooperation and joint learning processes between cities around the world.

\section*{Responding comments}

China’s rapid urbanization process will presumably continue for decades to come; urban energy consumption is expected to grow importantly until 2050. In this perspective, when exploring energy efficiency improvements in buildings, in particular for multi-family housing which takes up a large share of China’s building stock, it is very important that initial discussions not focus on the need to develop new and exotic technology or to completely change urban architecture. Initial efforts should actually target very simple measures, such as setting an appropriate price for energy; installing meters for heat and electricity, so that residents do not pay a fixed charge but for their exact consumption; and enforcing the building codes, since much of the present building stock in China is not energy efficient and does not seem to respect building codes. The implementation of the above measures could generate energy savings in the order of 50% by 2050.

Shanghai sits at the core of the Yangtse River Delta and is, if not the, perhaps one of the most important locomotives for Chinese economic growth. As forward looking as the city is in terms of its environmental plans and investments, Shanghai cannot solve all of its problems alone; no city can. Shanghai has made solid progress, for example, in controlling SO2 from sources within its jurisdiction. But the same may not be equally true for acid rain or ozone and nitrous oxides, for which regional control is needed, covering the wider Yangtse River Delta; regional coordination is actually key to improving urban air quality in major cities like Shanghai.
In the Yangtse River Delta, SO2 emissions and PM 10 – the conventional targets – have dropped noticeably, by 30% in the case of SO2 last year alone in Jiangsu province and Shanghai. The acid rain issue involves the larger region; even though desulphurization in the region was carried out very rapidly, denitrification began only recently, therefore the acid rain situation in Shanghai has not improved as rapidly or noticeably as that of SO2. Shanghai has only very recently begun to tackle the ozone issue: in the 12th Five-year Plan, PM2.5, ozone and its precursors – volatile organic compounds and nitrous oxides – will be listed as key pollutants for monitoring and control.

In many parts of China, regional environmental problems are on the rise, such as poor air quality and regional smog in the major urban clusters (the Beijing—Tianjin—Hebei area; the Yangtse River Delta including Shanghai, Jiangsu Province and Zhejiang Province; the Pearl River Delta, with Guangzhou and Hong Kong). Regional issues also appear in the seven major watersheds. Strong programs have been implemented to combat these problems, for example in the Taihu Lake region: since 2007, Shanghai, Jiangsu and Zhejiang have been working together on a very forceful remediation project; the quality of the water flowing through Shanghai has improved. Secondly, joint regional prevention and control of air pollution was initiated for Shanghai Expo and will be continued afterwards: 350 monitoring stations in the Delta have been integrated and carry out joint monitoring, prevention and control of air pollution. This is work in progress.

It is important that national governments develop national-level policy frameworks in order to enable local authorities to take dynamic action.

As local governments and communities go after the low-hanging fruit that were discussed by previous speakers, it is also important to recognize the bigger opportunities that we should also be moving on, one of them being the potential for buildings not only to be more efficient, but to become producers of energy. For this to happen, super-grids are crucial; they are also very important to all the dimensions of electric power use in cities. Super-smart grids make it possible to rely on distributed power production and to rely more heavily on renewable energies generally, because when the sun is not shining on the solar collectors in Shanghai, wind power from the Western provinces can be made available. Such grids open whole new horizons in terms of more efficiently managing demand (allowing lower energy delivery to some customers when it peaks with other customers) and in terms of managing demand and supply much more dynamically over time. As we look at all of the present challenges, a lot that has to be done at the local level, but one of the things that has to be done at a regional and national level is to build this essential part of infrastructure, that makes all of these things much more powerful.
Debate and discussion

Moderated by Mr. Zou Deci, CCICED Member, Professor at the China Academy of Urban Planning and Design and Academician of CAE

Leading comments by Dr. Sarah Liao, CCICED Member and Former Secretary of the Environment, Transport and Works, Hong Kong SAR:
Energy Efficiency & Environmental Challenge for Urban Development

The following observations and questions are put forward in the hope of stimulating later discussion.

During this session, energy efficiency in buildings emerged as the low-hanging fruit, an area in which much progress can be achieved in a short time, with the appropriate methodology and the will to go ahead.

Energy Consumption Observations: Prof. Jiang Yi made two observations that call for rapid action and that should inform incentive policies towards energy savings: a) the energy consumption level of the highest 10% of Chinese consumers is comparable to the average of developed countries and is, in certain instances, even surpassed Korean and Japanese averages (this highly intensive stratum must not be allowed to grow further in China; practical and workable measures must be developed); b) the weak correlation between GDP growth and energy consumption and a decoupling of energy consumption from income. This observation should also inform energy saving policies.

Another dimension, observed during other activities in China, is that Chinese per capita urban energy consumption is only 20% of US consumption; on the other hand, China’s energy consumption per unit GDP is 5 times higher than in the US. A two-pronged strategy for China can be quickly outlined: China should not follow the US in terms of per capita consumption, but on the other hand should learn from American approaches to industrial processes and material production, as referred to by Prof. Jiang. There is no shortage of applicable technologies and management systems that improve productivity per unit energy consumed.

One last energy consumption observation relates to China’s oil consumption for transport, which is 15% that of Japan and Korea, 10% of EU and 4% of US consumption levels. Here also, findings can better inform transport strategy and policy.

Energy Efficiency in Buildings: Are there retrofit programs in OCED countries for existing old buildings? OECD countries cannot be spared by saying the building stock is in place and that’s that. China also has very old buildings that very often consume very little energy, owing to local culture and habits: built-in natural ventilation in Southern China provides cooling during the hot summer months, as can be observed in Guangdong. This existing Chinese building stock should not be retrofitted to become air-tight buildings requiring mechanical ventilation. Specific local conditions and needs must be researched before the most adapted solution can be identified.

Are there presently mandatory per square meter energy consumption standards for new buildings in China? Are there guidelines as to optimum levels, in order to have consumers follow suit? The establishment of such standards would make implementation much more practicable.

Are there incentive schemes or penalty systems for users? In the US, electricity consumption over a known benchmark entails a surcharge for large consumption, so that consumers are encouraged not to consume energy excessively. Unfortunately, in Hong Kong there is a package per building and within that package one can consume at will, without being penalized; asking large corporations to cut down on their energy use proves very difficult.

How are minimum temperature levels set for AC in the summer? In China, government offices have set a temperature level of 27 degrees for AC during the summer; Japan went all the way to 29 degrees at one stage, but with humidity control. In Hong Kong, summer temperature levels are typically set it to 19 or 20 degrees – an awful waste of energy. But what about China? In general, can China set mandatory standards here?

Is there monitoring or auditing for quality assurance? The is the eternal problem: the best set of rules will mean nothing without enforcement.

District heating systems are being promoted as being more efficient; should district cooling systems be promoted as efficient in the summer? An ever growing number of buildings come or are equipped with AC for summer months.
**Going Forward in Energy Efficiency**: energy efficiency efforts should focus on good planning, building design, maintenance and management, industrial processes, urban waste management (also often a major contributor to GHGs, 10% in the case of Hong Kong, since the disposal methodology is landfill) and water resource management.

**Commuting transport**: is a major component of the urban issue. In Hong Kong, a developed city with a population of 7.5 million, very good public transport infrastructure and a total of 500 000 vehicles (including trucks, vans and taxis), can achieve daily public passenger transport rates of 90.5%: the vast majority travel by public transport every day. There is still a good quality of life, as would appreciate most visitors to Hong Kong. Most cities still have a lot of room for the improvement of public transportation.

The use of energy efficient cars is encouraged, through tax exemptions or subsidies; the use of hybrid and electric cars will also be encourages, when they are ready.

There is support for incentives for the use of clean energy, including incentives to replace diesel vehicles with LPG or natural gas. This has been done in many cities, such as Los Angeles and Hong Kong. Quick programs can be rapidly implemented, with the support of the users.

**Environmental Challenges**: it was good to hear from Director General Zhang that PM 2.5 and ozone will become regularly monitored parameters in the coming Five-year Plan. It is very important to know the situation in order to be able to control it in the future.

Megacities are different. Huge megacities are taking shape in Brazil, Russia, India and China, posing severe challenges to environmental management and health services in particular: without proper attention, optimal health aspirations might have to settle for simply not getting sick.

Finally, urban design: according to Dr. Messner’s presentation, Hong Kong ranks lowest in terms of emissions per square meter. This achievement comes at the expense of living in a highly congested city, with poor air circulation, wind-tunnel effects, totally wrong aerodynamics and rising temperatures associated with the heat island effect; slums are also a problem – all this to show that there are limits to compact urban design.

**Top-down approach**: what implementation strategy will the government adopt? Of course everyone wants to promote technological progress, with the caveat that the need is for mature technology and technology supported by sound infrastructure: smart grids for example, in order to enable the deployment of renewable energies for buildings. User buy-in is key and sometimes problematic, as is the case for electric vehicles: sincere efforts are being made to encourage consumers to drive vehicles that can only run at 50 km/h, with a limited range of 50 km. Energy saving technology needs to be readily and efficiently applicable and truly satisfy people’s aspirations. The principle of energy saving is straightforward and is related to coefficient of performance (COP), an indicator showing how much of the electricity can actually be converted into heat, cooling or a driving force. Government should very seriously consider adopting this measure and be aggressive in measuring whether the COP of self-proclaimed new technology is actually as claimed – an effective means for government to control “new” technology flying around without actually being usable.

**Setting Carbon Reduction Targets**: to echo Dr. Messner’s point, the Copenhagen Accord is not really an accord and even though each country is doing its own thing, it remains important to have a target. There is a need for specific targets for each country, region, industrial sector or city, so that leaders at all levels can run with the ball and deliver. Without specific targets, even the best efforts will go nowhere.

**International benchmarking for buildings**: there are many benchmarking systems internationally, including LEED. Some Indian cities are saying that LEED is not adapted to their local conditions, as some aspects of LEED do have cultural and traditional dimensions. We need to develop our own rigorous assessment system backed by thorough methodology: material supply, life-cycle analysis – not superficial building assessment. There are many such benchmarking systems to work from, as a basis.

Dr. Liao also commented on financial support mechanisms to support energy efficiency models (subsidies may not encourage technology deployment), corporate social responsibility and social capital.
Leading comments by Mr. Zhou Wei, CCICED Member, President, Highway Research Institute, Ministry of Transport

Prior to exploring carbon transformation and green urban development issues, parties to the discussion need to agree on a basic pre-condition or baseline, which is that achieving low carbon development is about ensuring a better quality of life for the people. Energy conservation and emission reduction should not be about suppressing legitimate needs or reducing the people’s well-being, but rather, ultimately, about more efficiently satisfying the people’s aspirations for a better life and promoting economic development – and nothing else. This is the baseline from which should we measured and assessed the level of attainment of low carbon or green development goals. Because they are at different development stages, different countries will have specific challenges and priorities; their responsibilities will also be different, including their international responsibilities.

Energy conservation and emission reduction can only be achieved through technology and technological progress, as the people’s needs are being constantly further satisfied and as the economy continues to develop. Car emissions are presently an acute problem, but solutions are in sight, with, for example, technological advances such as the zero-emission vehicles showcased at Shanghai Expo: such vehicles, while satisfying mobility needs, do not generate negative impact. Sustainable development can only be achieved through continuous technological advances and the emergence of alternative solutions.

The parallel processes of urbanization, industrialization and motorization appear irreversible from China’s perspective – a developing country moving towards xiaokang (relatively well-off) society. While shouldering its responsibilities, China should reflect on its priorities. Relatively speaking, China’s per capita emissions are not high and China has the right to develop. On the other hand, China’s energy efficiency is much lower than that of developed countries and its per unit GDP consumption and emissions are much higher than in developed countries. China must better tie its development goals to green development and low carbon transformation. In the transportation sector, per unit GDP consumption and emissions translate as consumption and emissions per person/vehicle/kilometre; much work remains to be done in this respect. Owing to China’s present stage of development, total emissions will continue to grow for some time; in this context, efforts should be made to control the speed and scope of this growth.

A previous speaker mentioned that global urban population – 50% of world population – is presently consuming 70% of the world’s energy and generating 75% of global emissions. The population in OECD countries is basically urbanized, whereas the bulk of non-urban residents are found in Asia and Africa. It seems that we are talking apples and oranges here and that regional comparisons are not appropriate, because China’s rural population has a very low quality of life, by no means comparable to that of urban dwellers and that if the quality of life of China’s rural population were brought up to urban standards, in a non-urbanization context, then energy and resource use would by far surpass those of urbanization.

Energy conservation and carbon reductions in urban transportation, particularly in urban passenger traffic, can be achieved through the following four avenues: first, effective planning is needed, in order to avoid unnecessary or redundant demands on transport. Planning traps have to be avoided, such as low density development or artificially separating living areas from working areas and business areas – a development model which can only generate unnecessarily huge transportation demand. Urban planning must champion high-density, multi-functional and hybrid models for cities, enabling people to live, work and consume within small areas, thus creating relatively concentrated passenger traffic conducive to efficient public transport.

Secondly: optimization of the urban passenger traffic mix, including public transport, bicycles, taxis and private cars. The characteristics of this transportation structure depend on passenger traffic needs, which in turn are impacted by local land use. It is therefore artificial to declare what percentage of transportation should be public. In low-density cities like Los Angeles, public transit is limited; efforts to further develop public transit in such a context would only lead to higher per passenger energy consumption than are presently generated by private cars, because of low passenger occupancy rate in public vehicles.

Thirdly: efficient management of traffic congestion, which energy consumption and emissions linked to urban congestion are very significant.
Fourth: technological advances are needed in terms of fuel efficiency, including the development of clean and new energy and electric vehicles. The Ministry of Transportation is presently developing fuel standards, which are already implemented along highways. In terms of macro-control, the government is formulating innovative economic, taxation and subsidy policies and establishing standards, with a view to controlling market entry and exit. Green lifestyle needs to be further promoted through public education and awareness building.

Leading comments by Mr. Lin Haw Kuang, CCICED Member; Executive Chairman, Shell (China)

CCICED should bring this Roundtable to the Western part of China, and consider inviting representatives from the heavy industry, construction, mining, oil and gas and power industries, to have a similar discussion and debate, maybe focusing more on the dilemma, and the “How to make this happen”?, as expressed by Bjorn, relating to energy efficiency and low carbon economy.

According to forecasts, the world in 2050 will require twice the amount of energy used today, consequently subjecting the world’s ecological and environmental systems to severe burden or stress. The case for energy efficiency clearly makes a lot of sense, if between 5% or 10% of a 200% increase in energy consumption can be saved. Many speakers argued that much of energy efficiency has to do with “low-hanging fruit”. If that is the case, then why is progress coming so slowly?

In present day China, property prices are a hot topic. Even though energy consumption is a major factor in the urban construction sector, conversations between sellers and buyers invariably focus on price per square meter; the energy efficiency component is only very rarely factored in the pricing mechanism, either from a seller’s or a buyer’s perspective. Many factors may be contributing to the slow progress in terms of energy efficiency: consumer behaviour, investor behaviour or governmental regulations or policies and then the broader issues relating to the role of technology and R&D.

One very successful Shell joint venture in China applied a lot of advanced technology and, as a result, was able to save a lot of energy. The problem here is that there are very few similar examples to be found within the organization or anywhere else in China, because of the investor’s dilemma.

Once a building, an apartment complex, a refinery or any gigantic infrastructure is built, it is there for the next 20 to 50 years, along with the energy efficiency designed with it. There are two approaches to improving energy efficiency: first, investing a lot in the design, before the start of construction; second, improving on already built buildings and optimizing its energy efficiency. Both options involve hard work and require substantial investments. The businessman’s dilemma is that there is only this pot of money to invest; priorities have to be set as to how limited amounts will be spent. Energy efficiency concerns are competing with other requirements – outward appearance or location, for example, in the case of a house. After construction, capital expenditures and operating expenditures will compete with one another: investments can be made either in energy efficiency improvements or in measures to improve plant operations and manufacture more products. With respect to energy efficiency, the issue is priority setting.

As part of the solution, it is noted that shareholders can force a government, a company or management to take action. One can set targets in terms of energy efficiency measures, in a measurable way; budgetary planning can include energy efficiency provisions. In China, there are large numbers of State-owned enterprises, in which the government is a shareholder; therefore, a lot can be done.
**Responding comments**

Between 1997 and 2003, China implemented a number of energy conservation standards, which now cover all types of buildings in both Northern and Southern China. Earlier weak enforcement was gradually improved and in 2008 the rate of compliance with standards surpassed 90%, Northern China doing better than Southern China. Since a large block of Northern China’s energy consumption is related to heating, insulation standards were well tailored to local conditions, unlike Southern regions such as Shanghai or Guangdong, where insulation is not the major driver of energy efficiency (over a certain level of insulation, additional efforts generate only minimal improvements); other measures such as natural ventilation and sunshades prove more energy-efficient in the South. Clearly, standards will be relevant and well implemented only if they are well suited to local conditions.

Since buildings are extremely complex systems, energy conservation efforts relying simply on codes, assessment and energy-saving technologies will often generate an increase, not a decrease, in energy consumption. The optimal energy efficiency approach is to focus on the total energy consumption of different types of buildings, under different local conditions. Convergent efforts are presently being made, at all government levels in China, towards producing per square meter benchmark levels of energy consumption, for different building types and functions, under different climatic conditions. The annual benchmark energy consumption level for office buildings, for example, should be 70 kWh per square meter. On that basis, energy quota management systems can be introduced, imposing surcharges for above-quota consumption, etc. Management systems based on actual energy consumption data will prove far superior to past and current approaches that are focusing on energy saving technologies used in buildings. Furthermore, after a detailed study of numerous district cooling projects in India, Japan and the US, no district cooling project has been found to generate lower energy consumption; district cooling should not be promoted in Southern China.

To be holding meetings on the environment in rooms that use incandescent lighting rather than energy-saving light bulbs can be viewed as an intangible incentive for such practices. In the future, the Council should hold energy-efficient meetings, look at the ecological footprint of its meetings and emulate the Beijing Olympics and Shanghai Expo approaches.

There are two conflicting approaches to meeting lighting, heating and cooling needs, the first one being to rely on machines to keep interiors well lit, heated or cooled. Should we not rather make the fullest possible use of natural conditions to satisfy the above needs and only utilize artificial and mechanical means as a last resort, under extremely difficult climatic conditions? Since the industrial revolution, more and more mechanical controls have been imposed on the environment and on buildings. With hindsight, this evolution does not seem appropriate, in particular as relates to windows. In the Shanghai region, which enjoys very comfortable weather for the better part of the year, the best way to control interior environments is to rely on natural ventilation, a simple measure that could generate substantial energy savings. But this approach is rarely adopted in building design, as was shown by a study of more than 100 office buildings in China and the US where energy consumption in buildings with unopenable windows was found to be three times that of buildings where windows can be opened. The first recommendation of international guidelines on building energy efficiency is still to make buildings as airtight as possible; they should rather say: have buildings make the fullest possible use of natural ventilation.

The Council’s international members have the responsibility to bring to China some of the many good international case stories. The Council’s LCE Task Force visited Stockholm, a city of 1.5 million people which has installed a very efficient fossil-fuel free energy system and very advanced district heating and cooling systems. Bio-fuels are used for district heating, supported by heat pumps. Such technologies are available in China.

More business participants should be invited to Council meetings. Since businesses will have to implement many of the actions that are needed on the path to low carbon, their voice must be heard and the Council needs to know if companies are being assisted or hindered in making things work.
As they move towards low carbon development, China and the rest of the world, beyond the easy gains of low-hanging fruit, need to address a second layer of broader perspectives on standards and new infrastructures, through local and national policies, in order to make the easier options more easily attainable. A third strand of dynamics must also be addressed, in particular the systemic approaches needed to bring things together – buildings, transport and energy systems. Innovation is the key here, since there are still relatively few cities around the world which are moving rapidly towards low-carbon development (Stockholm is an interesting example; Masdar Pioneering City; Munich, which is pursuing a 0-emissions target by 2030). Innovation, application of technologies and policy packages are needed to move forward. Considering the acceleration of climate change, there is a pressing need to scale up and disseminate pilots and experiments and to translate them into mandatory low carbon urban roadmaps.

Many of the low-hanging fruit are in fact very difficult to pluck, because they often require forms of social organization, infrastructure or information that simply do not exist. One characteristic of the building stock is that it lasts for a long time, but that the individual owners and tenants of individual dwellings typically only live in them, in many economies, for 7 to 10 years. So getting the return on investments is difficult. It is critical that information is available to the consumer and that the consumer pays. Moving towards smart metering, time-interval metering and metering with visible visual indicators to the consumer are very important.

In many of the new world countries, urban development was typically based on the car, as it took place between the 1940s and the 1980s, when energy prices fell and vehicle efficiency increased; urban structures reflect the fact that, given the choice, people would usually rather have more private space and have the capacity and flexibility to travel privately in comfort. China is being asked to make a particularly challenging set of choices and to urbanize in a much smarter and difficult way, since new cities are now being developed at a time when new technologies have emerged.

With respect to low carbon development and energy efficiency, metering must be supported by the life-cycle concept; otherwise, the concept or slogan of achieving low-carbon buildings could actually translate into a high-carbon process. For example, libraries installing water recycling and reuse facilities may appear to be implementing resource conservation, but in fact libraries only utilize small amounts of water. Another example is automatic waste collection systems, which are being built in Tianjin Eco-city and the Shanghai Expo Park; Chinese cities should be extremely cautious before following suit. The capital and operational costs, plus the environmental performance of such systems over the years, all need to be calculated on a life-cycle basis: how much carbon emissions will they generate throughout the full life-cycle?

Work on emission reduction and energy conservation should start by changing production practices and lifestyle. Prof. Jiang’s presentation was truly instructive: the use of highly efficient appliances will not necessarily bring about decreases in energy consumption, appliance use being linked to living habits and lifestyle. Research over many years shows that centralized air conditioning systems do not necessarily provide energy savings.

Our discussions on energy efficiency and resource-saving and environmental-friendly society should not overlook local climatic conditions: insulation and district heating may be key in Northern China, whereas Southern China should focus on natural ventilation, sunshades, etc. Therefore, measures must be tailored to local conditions and technological solutions should be suitable, applicable solutions, not necessarily high-tech and high-cost solutions.

With respect to energy efficiency, baselines or benchmarks should be established for different types of needs in terms of energy consumption, namely subsistence-level needs, xiaokang-level (moderately well-off society) needs and luxurious lifestyle consumption needs. As indicated by Prof. Jiang, in some situations, there is no strong correlation between GDP and energy consumption. In other words, for example in developing countries, prices may not be a major factor, because subsistence needs have to be satisfied anyway and since the energy consumption needed to satisfy subsistence needs is subsidized. AC cooling in Southern China has more to do with xiaokang needs, which were unheard of only a few years ago when the country was still poor.
Concerning energy use mode, in the Beijing example presented earlier, one out of five buildings, equipped with individual air conditioners, had better energy efficiency, whereas the other four buildings had centralized AC and demonstrated poorer energy efficiency. Prof. Jiang’s conclusion was that there was a correlation between energy consumption and consumption patterns, whereas the correlation might possibly have more to do with energy use patterns or technological approach. For example, the building in which I live has adopted heating technology that has no direct relationship with my consumption patterns: before leaving the apartment, I would like to shut down the lights and the AC, but the central AC system does not allow this. With this in mind, the importance of caution in making appropriate technology choices for energy efficiency should be stressed. Of course, this does not exclude the fact that, all other conditions being equal, there is a correlation between consumer awareness of energy efficiency and energy consumption.

More than one hundred years ago, a heating energy-saving valve was invented in Denmark, but was not widely deployed for a very long time, for two main reasons: first, integrators showed little interest, since the adoption of this valve would have only had a very small impact on their profitability, whereas the manufacture of central AC systems could bring ample profit to a number of suppliers. Second, the guiding role of public policy was then rather weak and could not support the deployment of this technological advance.

A Director General from the NPC’s Environmental and Resources Committee had been wanting for years to have a solar water heating boiler installed in his apartment, without success. His luck might have turned in January 2010, when five Beijing government departments jointly issued “Administrative Measures on the utilization of solar heat and light in public buildings and government subsidized low-cost housing”, which require that, for the above building types, solar heating and lighting equipment be designed, installed, checked and accepted along with the other components of buildings. This is a clear policy message to designers, real estate developers and consumers.
Session summary by Ms. Laurence Tubiana

One structural dimension to the deployment of energy efficiency in urban environments is the path dependency imposed by decision-making in terms of infrastructure, for example. Urban design is absolutely key and in this respect China has the capacity to create new cities. However, urban planning is not always easy to implement, since it requires much inter-departmental cooperation and coordination between various ministries and authorities, including transport, urban planning, building and local authorities. Implementing the apparently simple idea of adequate urban planning actually requires both capacity building and strong institutional coordination mechanisms.

To have the capacity to create and modify behaviours, local authorities need policy space to provide incentives towards energy efficiency. There is no single solution to questions related to energy prices, metering and opting for collective or individual systems: answers are very much linked to the actual situation and specificity of the building, the district and available technological solutions. Energy pricing is always a very political issue in any country: in order to give the right incentive, besides individual systems, a transition is also needed from prices that have been subsidized for a long time to gradual price increases, which have to go hand in hand with improvements to the building. Electricity or heating prices cannot be increased, unless consumers are at the same time offered the possibility to save: building improvements (insulation, for example) and energy price adjustments have to be articulated and implemented in parallel. In China, it is more of a tax issue, since there is no free market for land: the property tax is a key issue linked to land price or access to land for property developers, all issues closely linked to urban planning. This mechanism has to be well controlled and incentives well adjusted, in order to avoid urban sprawl, which causes problems for a number of services.

As regards the low-hanging fruit, available technologies are not always deployed, nor are behaviours being changed. Obstacles can be partly removed through pricing and incentives. Furthermore, very importantly, new financial institutional arrangements and mechanisms need to be explored, allowing to bridge energy efficiency investments at a point in time and the actual returns obtained in the longer term from greater efficiency, from the insulation of existing buildings for example. These new mechanisms could also facilitate other infrastructure investments, both at the collective and individual levels.

Enormous institutional efforts must be made in terms of producing indicators and targets, so as to understand, measure and monitor the situation and define policies, otherwise low carbon economy is meaningless. Every country needs to build up the capacity to monitor and measure. Some indicators do exist, but there is a critical need to build capacity, to build monitoring systems within national and local governments, for both domestic and, very soon, international reasons. At one stage, China will want to have its efforts recognized, to make its contribution to global stabilization of climate recognized; numbers will then be needed, as well as the capacity to understand and monitor the situation.

Many cities all over the world, including Shanghai, are very much involved in the C40 discussion, in which major world urban centers are trying to combat climate change and reduce their carbon footprint, endeavouring to do something different and to engage more than their national government in some cases. In this respect, international cooperation can make a big difference in terms of exchanging on best practices, identifying institutional hurdles and, in a way, putting pressure on the international level to produce the right incentives at the global level.

Carbon markets, the clean development mechanism and border markets can help cities invest and create value around low-carbon economy. Many financial mechanisms need to be created, because even if net benefits can be measured, a transition is clearly needed to allow movement from the actual situation towards the better-off situation. That is often the problem: on one side cooperation and on the other side finance.
Session summary by Mr. Zou Deci

The Roundtable theme is very timely and relevant to China’s present challenges and situation. Having been involved in urban planning ever since my graduation from university more than fifty years ago, I have greatly benefitted from today’s presentations, even though, frankly speaking, many of the concepts put forward have actually been pursued by China for many years, not meaning to say by this that reality always allows aspirations to materialize easily. Transforming Chinese cities into low carbon emission, ecological and liveable cities, is a daunting and imperative task. No one is saying that economic development is not important, it remains the foundation, but at the same time social development is also a major issue for cities. The targets may not be reached during my lifetime, but certainly the low carbon transformation of Chinese cities and the cities of the world is the common goal for our global family.

Despite our full commitment to the rational planning of cities, a lot of difficulties remain in front of us. Many talked about low-lying fruit, but why is it that most of it still remains unpicked? Achieving the above goals is obviously not strictly a technical problem, but also involves concepts, institutions, policies and numerous measures. All agree on the objectives; it is now time to do whatever we can to promote this transformational process.

Low carbon transformation should not remain at the concept level; much more research must be done, in order to inform our policy development. I am afraid of slogans. During the last 20 to 30 years, China witnessed more than twenty urban development objectives, policies and slogans, including many which are related to low carbon: sustainable development and sustainable cities; eco-cities (which are not exactly low carbon cities, but still moving in the same direction); we have toyed with the “liveable cities” concept for a number of years; environmental-friendly cities, resource and energy efficient cities; China also put forward “conservation cities”, which included the conservation of resources, energy and land. All of those were excellent and point to the same direction. Now, in recent years, low carbon has become the hot topic and one of China’s major objectives – undoubtedly a correct objective. Now is the time to bring together these convergent objectives and implement them. Rural areas and small and medium-size cities should not be forgotten, if we are to build up a harmonious living environment, which is undoubtedly humanity’s ultimate goal. However, difficulties ahead will have to be tackled over a long period of time. Low carbon transformation must not be a mere slogan; all stakeholders should come together, put the shoulder to the wheel and get the work done. Urban planning needs to be further researched; the Ministry of Construction, which has done a lot of work in terms of green planning, should be further engaged, as well as other stakeholders, to take a deeper and longer view of Chinese and global urbanization.
Session 3

Environmental and Economic Policies for Green Development

Chaired by Mr. Feng Fei,
Director General, Development Research Center of the State Council

First session speaker: Dr. Ren Yong,
Deputy Director General, Ph.D, Senior Fellow, MEP; CCICED Chief Advisors Support Team Coordinator:

Green economy and economic motivation

Dr. Ren reviewed the numerous environment-related economic models put forward during recent years and then proposed economic incentives for green development.

The last few years have seen a booming of new economic models related to resources and environment, which decision-makers at all levels urgently need to correctly understand and integrate into their practice and strategies. The circular economy concept emerged at the end of 20th century, followed in 2003 by the low carbon economy concept and, in the wake of the financial crisis, by the green economy concept. To correctly interpret the above concepts and guide practice in the proper direction, one needs to examine their origin, namely our understanding of resource and environmental issues.

The 1972 Stockholm Conference sparked worldwide and large-scale action to control pollution. Later on came the realization that end-of-pipe control or applying strictly environmental solutions to environmental problems did not work. In the 1980s, with the publication of “Our Common Future”, the sustainable development concept was put forward, as a result of initial linkages between environment and economy and between environment and society. The 1992 Earth Summit in Rio marked a quantum leap in the recognition of these relationships, nations embracing sustainable development and building up approaches and experience in managing the environment-economy relationship, in the lead up to the 2002 Johannesburg Summit. In the words of the Club of Rome, environmental problems are now recognized as being part of a complex of world issues intertwined with political, economic and cultural dimensions. At the core of the present environment and economy relationship is the recognition that the prevalent brown or black economic model, from resource extraction to production and consumption, has generated massive pollution and GHG emissions, resulting in severe environmental damage and resource scarcity, as measured by the WWF’s human ecological footprint.

In reaction to the black model, the green economy concept – the need to green the economy for sustainability – first emerged in 1989 (D. Pearce, Blueprint for Green Economy) and 1992 (L. Brown, Launching an Environmental Revolution), but only gained wider global recognition in the wake of the recent financial crisis, when prevalent systems, weighted down by gross misallocation of capital, were no longer working. There rapidly emerged a new willingness to listen to innovative solutions, to restructure and transform the growth model, along the lines of UNEP’s Global Green New Deal. The G20 leaders quickly made political commitments to develop the green economy and make massive green investments as part of their economic stimulus packages. The Green New Deal highlighted green leadership, the leadership role of government in promoting the green economy. The seven major green investment sectors identified by UNEP hold great potential: in the building sector alone, which is responsible for 30-40% of energy consumption, moving towards more efficient buildings could bring consumption down by 80% and create 110 million jobs.

Green technologies and development are in all likelihood launching a new technological or industrial revolution for the 21st century. Green investments will continue well beyond the stimulus packages and job creation needed in the aftermath of the financial crisis, since they are in fact critical to both socio-economic sustainability in the post-crisis context and global economic competitiveness. Humanity cannot afford to repeat past mistakes.

What then is the relationship between green economy, circular economy and low carbon economy? Circular economy actually ties together both ends of the linear extraction-production-consumption-waste model, by applying the 3-Rs principle (reduce, reuse and recycle), in an effort to build up new resource use modes. Chinese practices presently focus on production and consumption; four main industries are being developed, including the resource reuse industry, which is one of the major sectors of green economy and green investments called for by UNEP. The focus of low carbon economy is
different, as it concentrates on reducing carbon emissions as much as possible or, in other words, on decarbonizing energy, through the development of new energies including renewable energies: low carbon production can be achieved through industrial restructuring and technical progress addressing improvements in energy efficiency and productivity, while low carbon consumption will be driven by lifestyle transformation; carbon capture, use and storage (CCUS) and increased carbon sinks will process remaining emissions. Otherwise, China has also been developing a low sulphur economy over the last 20 years, in efforts to control conventional pollutants — clearly a battle that has not yet been completely won, as new environmental challenges keep appearing.

The following conclusions can be drawn from this brief review: the whole process of economic activities has not changed; what has changed is our sustainability requirements in terms of resources and environment. In this respect, our expectations and overall objectives in pursuing growth model transformation are that the new model be resource-conserving and environmental-friendly. Achieving this objective means achieving resource decoupling and impact decoupling: decoupling economic growth from resource use and decoupling economic growth from environmental impact. Relative decoupling applies to developing countries (environmental impact being lower than economic growth), while developed countries are in a position to achieve absolute decoupling.

Green investments are being proposed to combat the financial crisis, bring about economic recovery, create jobs and ensure sustainable development in the post-crisis period, whereas circular economy was promoted in response to the linear use of resources; low carbon economy, finally, was proposed as a countermeasure to combat climate change. Clearly, the green economy concept can integrate all of the above new economy concepts and models that are conducive to resource conservation and environmental protection, namely circular economy, low carbon economy, green industries, etc. In all the above new economy models, technological choices and regional strategies may possibly differ, yet they all share common approaches (energy restructuring, industrial restructuring, technological progress) and indicators, in particular the common indicator of resource and energy efficiency and productivity.

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Turning to economic incentives for green development, different actors each have their role to play in driving green development – the government taking the lead, business being the main force, supported by public participation. More specifically, a market-driven mechanism based on comparative benefits should, in parallel, increase the costs for the traditional economic model, by internalizing environmental and resource-depletion costs into economic activity accounting (environmental costs becoming a major component of product and service pricing) and at the same time reduce the costs associated with green development models, through incentives and policy support. If the above two types of costs are well balanced, the mechanism will naturally enable a shift from the traditional growth model to a green model.

The price signal clearly plays a major role in growth model transformation, as is demonstrated by the fact that per capita energy consumption is consistently lower in countries where energy prices are high. Over the last century, there has been a huge increase in resource consumption, while resource prices have in fact dropped. In this perspective, an integrated environmental economic policy system has to be established, based on environmental economics, with the following features:

- a reformed resource taxation regime;
- environmental taxation covering the whole process and including polluting product tax, carbon tax and pollution tax; reforming the tax system from an environmental perspective;
- eco-compensation;
- green credit, not only to contain illegal pollution and hinder the development of heavily-polluting, energy-intensive resource-based industries, but more importantly to foster the development of new energies and green technology;
- green securities, environmental performance review policy for listed enterprises, environmental liability insurance, green trade policies (such as adjusting export tariffs for high risk, high cost and low profit enterprises), green procurement, preferential tax treatment for comprehensive resource use;
- pollution credits and carbon trading, as an important mean to reduce business costs.
Second session speaker: Dr. Daniel Dudek, CCICED Member, Chief Economist, Environmental Defense Fund, United States of America:

Evolving environmental policies for a ‘Better City, Better Life’

Dr. Dudek first focused on major environmental policy challenges before proposing a new governance approaches.

Environmental policies must currently address six major challenges: first, trans-boundary pollution, the most difficult challenge, in the Chinese context where environmental management is assigned to local jurisdictions (provinces and municipalities) and therefore political benefits and costs diverge at the jurisdictional boundaries, even though airsheds and watersheds know no such boundaries. In this respect, Shanghai, for example, has been able to successfully reduce SO2 emissions within its jurisdiction, but not for acid rain or ozone and its precursor nitrogen oxides, which are subject to transport, precisely because this pollution is coming from areas outside Shanghai’s jurisdiction. The challenge is to coordinate the actions and responses of provinces one to the other, when they share common airsheds and watersheds. It is preferable to use here the term green economy, rather than low-carbon economy, which focuses on the wrong target and does not really capture the integration, synergies and antagonisms between these particular problems.

Second challenge: integrating control systems in relation to both mobile and stationary sources: present controls focus much more heavily on stationary sources than on mobile sources, an issue probably related to the previous political challenge. In terms of ozone formation, the key relationship is the relative ratio of VOCs (volatile organic compounds), which come primarily from mobile sources, and NoxS, which come primarily from stationary sources. Importantly, total emissions control policies are needed and must be applied and geared to the underlying physical nature of the airshed and the atmospheric problem itself. Individual tail-pipe standards and discharge standards are not enough to solve the problem.

Third challenge: coordinating urban and rural areas: most major Chinese municipalities have rural areas within their jurisdictional boundaries. Rural people and rural needs also need to be taken into account in the urban development context. Different focuses apply to municipal urban and rural areas, the focus being on human health impacts in the former and on agriculture – the main livelihood of people – in the latter. Conventional pollutants as well as GHGs have a huge impact on productivity as well as on the robustness of agriculture. There are clearly very different impacts between these two areas. In the Yangtse River Delta, one of the big challenges is straw burning and particulate emissions that come from disposing agricultural waste; the region’s challenge is to integrate across extremely different economic styles.

Fourth challenge: co-managing conventional and GHG emissions. The importance of ozone as a GHG pollutant must not be overlooked. Here it is key to be thinking about the integration of conventional pollutant management as well as GHGs. The primary focus in this forum has been on GHGs and yet the task involved in conventional pollutants remains unfinished. As temperature increases, demand for energy will increase, causing emission increase and not only more conventional pollutants if controls are not made or the economy not transformed, but also more feedback in terms of increased warming from the increased GHGs. Similarly, in terms of black carbon, there are tremendous opportunities for heavy-duty vehicles control (for trucks, buses and construction equipment).

Fifth challenge: consistency of incentives, in order to avoid sending contradictory signals to enterprises. For example, the fact that non-compliance penalties for air pollution are capped at 200 000 RMB is sending to Chinese enterprises the signal that pollution control may not be that important. On the other hand, the subsidy structure or price incentives, such as green pricing for flue-gas desulphurization devices for example, often generate technology lock-in and are not conducive to innovation.

Sixth challenge: monitoring and reporting were abundantly discussed in the wake of the negotiations at Copenhagen. The fundamental point beyond those discussions is that in order to effectively implement policy, knowledge of the situation on the ground is crucial, particularly if market-based mechanisms (tax, emissions trading) are to be used.

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New governance approaches are needed in order to address the above challenges. In the first generation of governance approaches, government was seen as the force that would take care of and solve environmental problems for enterprises and society; environmental management systems including standards, penalties, monitoring and reporting, were not very cost-effective and pollutants were dealt with one by one, without any thought about business operations and incentive. Real governance is now being recognized as the process of getting all stakeholders – not only government but also industry and civil society – involved behind a mutual recognition of goal and approaches to solve problems.

A few years ago, Premier Wen, when reporting on the work of the government, said that the government cannot solve all of the nation’s problems and that China needed the broader engagement of business and civil society. New governance approaches need to address the major issues, including importantly the lack of consistency of incentives that enterprises and society face. A new focus on ends rather than means is also needed, with an encouragement for people to invent new means to get there. In order to achieve our ends, there has to be an exchange of flexibility for accountability, at the individual, the business and the provincial level. In terms of business performance, it is crucial to establish accountability and well documented responsibilities involving financial consequences, with associated flexibility and market rewards, taking into account the fact that business is the one that is making the bulk of investments in terms of determining our environmental future.

Another important dimension of new governance approaches is the importance of using regions as a construct, as a context for evolving the new green economy. The Yangtse River Delta region, for example, has been very successful in coordinating economic investment and becoming an economic powerhouse. This regional capacity should be mobilized similarly in the environmental arena, in order to address, in particular, emissions associated to transport, which will represent 80% of the emissions coming from Shanghai Expo.
Third session speaker: Ms. Shannon Watt,
Senior Policy Advisor on Environment, Federation of Canadian municipalities (FCM):

Environmental Considerations in Promoting Green Urban Development: The city’s role in a low carbon future

The Federation of Canadian Municipalities (FCM) is the national voice for Canadian municipalities. Its mission is to foster sustainable communities enjoying a high quality of life by promoting strong, effective and accountable municipal government. The FCM works with all orders of government to try and improve the situation for small governments.

Besides dealing with policing, emergency preparedness, affordable housing, poverty and immigration, the FCM plays an important role in promoting a low carbon future in Canadian communities and cities, by: a) engaging in national sustainable policy development, providing research and analysis of the impact of national policies and focusing, in terms of GHGs, on urban planning, integrated energy systems, solid waste management, drinking water and wastewater management and building standards; b) facilitating economic incentives: the federal Gas Tax Fund, which FCM was instrumental in establishing, for example, and the federal Green Municipal Fund, managed by FCM, which provides funding for long-term municipal sustainability initiatives; c) education and training through regional workshops, webinars, an annual Sustainable Communities Conference, Sustainable Communities Missions allowing local leaders to tour sustainability projects in Canada and abroad and through a Partners for climate protection program, delivered in partnership with ICLEI, on climate change (a network of local Canadian governments working to reduce carbon emissions, through a milestone process); d) holding national sustainable community recognition awards, for municipal projects demonstrating environmental responsibility and excellence.

Canadian cities are demonstrating that municipalities can achieve lower CO2 emissions and reduce the impacts on climate change, as long as there is strong municipal leadership and vision and when all orders of government are working together and bringing all stakeholders at the table, including business, citizens, land use planners and utilities. The cities of Victoria, Vancouver and Toronto are Canadian urban sustainability leaders.

Victoria: As an example, the forward-looking city authorities had decided that an industrial brownfield near downtown Victoria would be redeveloped with environmental and social standards. Insisting that these standards be raised even higher, a far-sighted developer finally took on the 15 acres project, which came to be known as Dockside Green. The project pursued an integrated approach to resource management, in terms of solid waste, wastewater and energy, including on-site sewage and stormwater treatment, the use of roof landscaping, natural vegetation, sun shading and construction material reutilization within the neighbourhood. LEED platinum for all buildings and carbon neutral, Dockside Green has proven to be extremely popular and marketable, residents cherishing the sense of belonging to a green community.

Vancouver: Vancouver is the lowest North American city and the third lowest city in the world, after Copenhagen and Stockholm, for per capita GHG emissions. More importantly, Vancouver reached Canada’s Kyoto target last year, which was 6% below 1990 levels. Over that same time, since 1990 until today, Vancouver has had an increase in population of 27% and a growth in employment of 18%; the city has thus managed to decouple population and employment increases from GHG emissions. A large part of these achievements had to do with municipal leadership, a foresight, a vision and a sustainability plan that had been put in place and kept to.

Toronto: the Mayor of Toronto is presently Chair of the C40, which promoted in Copenhagen the role of cities in adjusting climate change. Under the mayor’s leadership, Toronto has undergone numerous changes towards sustainability, new projects and initiatives, including the retrofitting of old apartments, increasing public transit and developing district cooling systems for 51 downtown office buildings and reducing air conditioning by 90%.

The numerous sister-city relationships between Canada and China could prove instrumental in further stimulating international exchanges and cooperation towards green urban development.
Responding comments

All cities, old and new, need to undergo transformative change, from a traditional to a new green development model. A consensus is emerging, to the effect that green economy is the larger concept and includes both low carbon and circular economy. It also includes what could be termed as bio-economy – environmental management activities, such as the reasonable exploitation and use of land and forest resources, from which economic benefits can be derived.

Before determining what actions must be undertaken, a clear definition of green economy is needed, possibly in the following terms: green economy is the greening of the economy or ensuring that economic activities do not have a negative impact on the environment and contribute to environmental protection; green economy must also generate economic benefits and contribute to economic development. After having clarified the green economy concept, the following action plan is then proposed: first, the present brown or black economic system needs to be greened, through technological innovation, industrial restructuring and comprehensive environmental management; secondly, green investments and green industries must be promoted, such as eco-tourism, eco-agriculture, organic foods, renewable energies, service industries, high-tech industries, reforestation and afforestation. Furthermore, policies to promote the greening of the economy and the development of green industries need to be developed and implemented, along with policies relating to raising environmental entry thresholds, strengthening environmental management and regulatory enforcement, establishing environmental accountability systems and environmental economics.

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Chinese cities might benefit from establishing an association or federation, as a common platform facilitating communication and exchanges as they explore low carbon development pathways. In the process of establishing such an association, the key is to ensure a sound governance structure, by ensuring that the association is directly accountable to its municipal government members and speaking on behalf of its members. The Federation of Canadian Municipalities is very much looking forward to assist in such a process and share its knowledge.
Debate and discussion

Moderated by Mr. Roger Beale, CCICED Member; Senior Associate, the Allen Consulting Group, Australia

Leading comments by Mr. Zhang Jianting, Vice-Mayor of Hangzhou, Zhejiang Province

As practitioners, municipal leaders fully agree with many viewpoints voiced by experts and scholars during the Roundtable discussion, and also agree that concepts must be put to the test of practice. In pursuing low carbon economy, low carbon lifestyle or green economy, action and efforts should be first concentrate on plucking the low-lying fruit, on our immediate surroundings and sectors where results can be rapidly achieved; there is also a need to focus on creating the conditions enabling early work on readily achievable goals. This is what Hangzhou has been acting on.

Hangzhou is a famous international tourist city, endowed with a rich culture, history and scenic beauty. Hangzhou was twice the capital of China. On the other hand, Hangzhou has no port resources, no mineral resources and does not enjoy preferential policies from the central government. Hangzhou can only rely on its environment and has therefore upheld a strategy centered on the environment and on greening the environment. In 2008, Hangzhou was the first Chinese city to set low carbon city targets.

Hangzhou’s low carbon practice covers different aspects: low carbon public transit, low carbon buildings, low carbon lifestyle, low carbon environment, including low carbon economy. Last year, Hangzhou shut down more than 600 heavily polluting enterprises and blocked over 200 polluting industrial projects even though these projects, if authorized, would have generated fiscal revenues in the order of more than 100 Billion CNY. Although Hangzhou chose to continue giving priority to environmental protection, its GDP still grew by 10% in 2009.

In its efforts to promote low carbon transport, Hangzhou has been implementing a 5-in-1 low carbon “0-transfer” public transit system which includes subway, buses, taxis, free bicycles and water shuttles. The impact of car emissions on air quality in Hangzhou was greatly reduced. Furthermore, 50 000 heavily polluting cars have been removed from the streets of the city.

The need to act rapidly on our immediate environment whenever rapid results appear feasible cannot be overemphasized; every action counts, however small. Of course, the State has to develop relevant laws, regulations and policies; under this framework, local governments, social organizations and the public at large can and should act quickly on their immediate surroundings.
Leading comments by Mr. Young-Woo Park, Regional Director of the Regional Office for Asia and the Pacific, UNEP

Many speakers have stressed the importance of reaching a common understanding of the terminology. Without a clear and common understanding of concepts, it will be difficult to move coherently towards the same targets and goals, actions will run parallel and will not converge.

Since 2007 and for the first time in history, more than half of the global population is living in cities. By 2015, 20 out of the 27 world megacities will be in Asia; 53% of the world population and 70% of the poor will be living in urban areas. This is creating and will continue to create many urban problems. So the question is: what policies should be developed in order to address these urban problems? Also, are megacities conducive to sustainable development? If so, we should continue to build megacities and focus on solving megacity issues; if not, alternative paths must be found, while continuing to address and minimize problems major urban centers. If ever-growing cities are not sustainable, alternative policies and solutions must be developed in order to curb the trend.

Pricing with compensation schemes could be the single most important policy measure to implement. Many countries, while knowing that such an option might be the solution, are reluctant to implement pricing systems such as environmental tax, carbon tax and so on, because of the associated high political risk. This issue should nevertheless still be seriously considered. At the same time, compensation schemes have to be developed for the low-income classes, who normally bear the brunt of such measures. China might be able to implement such pricing systems more successfully than other countries, because of its unique system, politically authoritarian yet practicing a market economy: once the National People’s Congress adopts legislation, the whole country follows suit.

The pricing principle is simple: the polluter pays and so does the user. When implementing pricing systems, targets have to be selected carefully: if wrong prices are imposed or imposed on the wrong people, the policy will bring about negative consequences. For example, with respect to solid waste – a huge problem in megacities, both producers and consumers have to be imposed, in order to alleviate the solid waste problem and also to encourage the consumption of more environmental-friendly, energy-friendly and climate-friendly products. Policies should not be one-fits-all; prudent policy analysis is needed to specify the most efficient and effective measures in order to achieve policy goals.

Financial, investment and insurance institutions should be utilized, in order to foster climate change friendly, resource-friendly and environment-friendly business practices. Businesses need the services of financial, investment and insurance institutions. If these institutions impose and integrate environmental, climate-friendly and sustainable development approaches into their loan policies, premium policies and so on, then the business sector will have to follow and adopt sustainable development practices.

The Ministry of Environment cannot go it alone; it needs the collaboration of the ministries of Finance and of the Economy. There is a great need for collaboration and coordination systems within government, as well as for an integrated, holistic national roadmap for sustainable, low carbon or green development. National coordination is needed and leadership is here very important; without leadership, collaboration among different ministries, institutions and countries will be impossible. Governance systems are needed within government, among different ministries and agencies; nationwide governance systems are also needed for national implementation, between the different stakeholders. The fact is that when new, innovative policies are being implemented, policies which people are not familiar with, all stakeholders need to be involved from the very beginning and reach a consensus. Coordination, while taking more time at the planning stage, will save time and costs during implementation and delivery.

Education is also crucially important. Little mention of the importance of education was made during our discussions. If people’s behaviours, mindset and paradigms are to be successfully transformed, sustainable development, low carbon economy, green economy, circular economy and climate change issues and concerns must be integrated into the formal education system, from elementary school to university.
Responding comments

Genuine progress is being made, both inside and outside China, but green development is still far from being the mainstream. We are facing, in China and abroad, a lock-in to bad practices or practices that will not get us on a pathway towards solutions. Future efforts need to focus on the following: a) integrating and coordinating among policies and actions, amongst architects, builders, etc; b) capacity development (local EPBs and municipal leaders fully understand the importance of this; it is exciting to hear that many cities are learning by doing, by building eco-cities); c) bringing investment strategies for green urban development down to the micro level, as exemplified by Victoria’s Dockside Green project (higher social and environmental standards increased construction costs, but approval time was minimized and advertising costs kept to a minimum, as consumers were readily attracted to the project; the investment proved to be profitable); d) developing convincing performance monitoring, unconventional metrics demonstrating the advantages of low carbon as compared to business-as-usual development.

We are going through a period of transition and are living two realities at the same time. On one hand, 85% of the global energy base is still fossil, when in fact need to have it the other way around by 2015; but on the other hand, we have these huge trends towards energy efficiency. Real progress is being made in some areas: a) low carbon experiments, energy efficiency experiments, pioneering activities, which are showing that low carbon development is feasible and possible (Copenhagen might have failed because many leaders felt that low carbon development was not feasible and too costly); b) concerning the numerous concepts being discussed (circular economy, green economy, low carbon economy, resource-conserving economy), there is a new emerging consensus that, from a long-term perspective, we have no alternative but to move towards green economy and that we now need to accelerate the race to green economy and scale up and efficiently spread experiments (this will require a better understanding of the lock-in effect and path dependencies).

The key dimension that we have to focus on is policy frameworks and policy packages. Our discussions are not yet mainstream policies, which are still very much fossil-based: according to the World Bank, worldwide fossil fuel production subsidies amounted to 500-800 B $ over the last two to three years. Four policy dimensions need to be put in place: a) incentives and low carbon resource efficiency policies (pricing, incentive schemes, emission trading); b) recognition of advanced experiences and awareness building; c) R&D and education; d) target systems, low carbon roadmaps and indicators.

There are already 660 major cities in China and over 600 million urban residents. This enormous urbanization momentum is going forward. How do we transform this momentum, change its direction and orient it towards green development? There is consensus on the need to change the momentum or alter its direction, but not on how to make this happen. What is going to trigger mayors, building developers, chief executives of construction companies to do something different tomorrow? How to convince them and put in the incentives needed to change behaviour? How do we build capacity to move this enormous mass of activity in the proper direction? If we are to bring about a green urban environment in the not too distant future, tremendous changes need to happen: there has been too little discussion about what strains of transformation and influence on the different actors are actually needed to make this happen, in the limited time available. This crucial question needs to be further researched by CCICED and the Chinese government.

After Copenhagen, many delegates returned home to Christmas, while in China, on December 26, a Saturday, China’s NPC delegates worked hard and adopted the following important amendments to the Renewable Energy Law: a policy package on the purchase of all renewable energies and the creation of a renewable energy development fund.

In the context of low carbon transformation, the analysis of market drivers for environmental-friendly and climate-friendly products such as electric vehicles should address the issues of constraints faced by conventional products, obstacles to the development of friendlier products and incentives to facilitate the dissemination of such products.

In the case of electric vehicles, constraints faced by conventional cars include resource scarcity, environmental capacity (as is clearly demonstrated by urban air quality degradation, a problem which electric vehicles, utilizing clean energy, can
help address) and oil constraints (spurring the search for alternative energy sources for vehicles, possibly liquefied coal or wind energy to recharge cells); policy constraints also exist (in the future, the State, through policies, standards and taxation, will promote policies conducive to alternate forms of energy); marketing constraints (the “dark green” consumer moving away from conventional cars and purchasing new energy vehicles).

Second, there are two major obstacles or barriers to the deployment of electric vehicles: production costs (consumers need to pay 80 000K to 100 000 RMB more than for a standard vehicle) and the recharging of electric vehicle batteries. In November 2009, Shenzhen City, in cooperation with South China Power, jointly built China’s two first charging stations, at a cost of 3 million RMB each. Real estate companies need to be engaged in the promotion of renewable energies: developers could include vehicle battery charging facilities in the original design of building parkings. The development of smart grids would greatly facilitate battery charging. Battery supply is also an issue. Actually, charged batteries could be sold in supermarkets, just like LPG or any other commodity; the supply chain would have to be developed, allowing for example wind power producers in Gansu to charge batteries locally and have them transported by rail to market.

Thirdly, the following incentive mechanisms could be explored, in order to further promote the development of electrical vehicles: green government procurement (Shenzhen municipality and local taxi companies were the first in China to purchase green electric vehicles); government subsidy to purchasers of hybrid car (Shenzhen municipality is considering a subsidy up to 50% of the value of the electric car); reserved parking space for electric cars, similar to reserved parking space for the disabled; reserved electric vehicle lanes, similar to reserved public transport lanes; giving electric cars immunity from even-odd license plate number restrictions, etc.

If order to shift the momentum overall, many policies have to be figured out and developed, one piece of that equation being the low-hanging fruit. The fruit is there, there are solutions that are already proven technology, that are already economical and in fact pay for themselves. They are also convergent, in that they help address the challenge of building a low-carbon city, and at the same time provide benefits in terms of reducing pollution and addressing other concerns.

For example, we know how to make efficiency in buildings happen. They are not happening now in many cases because of market failures, because the person or company investing in building efficiency will not reap the savings from his investment. But there are cities in China and around the world that have cracked these problems, cities that have found ways to seize or pick the low-hanging fruit; cities that have found ways to establish building codes and make them stick; cities that have found ways to provide information to the consumer about the life-time costs of appliances like air conditioners, refrigerators or housing; cities that have found ways, by installing metering, to ensure that people manage their energy use in a way to reduce costs or, in some cases, have mandated power companies and utilities to invest in energy efficiency in the buildings they supply energy to and then simply pay for those investments through the savings in energy cost over time. There are solutions: we know, from looking around the world and looking around this country, how to crack these challenges. This is a good place to start, because these are things that work, that pay for themselves and at least help us move on to the path to a low-carbon economy, as we take on the broader challenge of a comprehensive strategy for making that happen.
Session Summary by Mr. Roger Beale

All cities are complex and big cities are more complex yet. Megacities take those issues of complexity, interaction, governance and politics to a higher level. Asia and China are going to be the home of the growth of many very large megacities. The reason that cities have grown is that, for urban residents, cities generate income and reduce risk. The costs of providing services may increase beyond a certain point, but incomes very often increase more rapidly. Cities provide individual economic and social opportunities for workers, although with them also come risks of social disruption.

We know a lot about the technologies that are necessary to make our cities greener, particularly on the broader enabling incentive and control structures. But the key is to make this happen, to put them in to place and this is not happening, even though there are many successes, particularly where benefits can be captured at the local level. There are always competing interests in a community, city or region and between regions. Sometimes we are unwilling to act unless we think others will act too, or we see this as not really solving the problem. Part of the ability to create the forward momentum that is called for is creating opportunities to act, which we understand are going to be echoed by others in the community, so that the world actually improves. However, there will always be greater problems, as issues become more trans-boundary in nature, such as trans-boundary pollution – water pollution, conventional air pollutants and GHGs –, which cannot be solved at the community level, but only through collaboration with other communities that are producing the problem and not necessarily suffering all of the consequences. Therefore, generating the local political will in part involves generating national and global will as well, so that all are confident that everyone is working forward to tackle the problem. This is happening. Despite some of its stuttering steps, Copenhagen did acknowledge a particular role for the major polluters – the G20, who have otherwise learned to work together on financial issues. Equally positive is the fact that many countries, including China and the US, further underlined their commitments in February and acknowledged the importance of avoiding temperature increases above 2 degrees Celsius.

However, achieving this political will is going to take time and we do not have very much time. As the cities of China and the world carry forward the green development story, of which low carbon development is a critical part, the urgency of adaptation issues must not be underestimated, because the chances of actually holding global temperatures at a maximum increase of 2 degrees Celsius are slim. Cities moving towards low carbon must also transform into climate-resilient cities, in the face of what is an inevitably significant climate challenge.

Session Summary by Mr. Feng Fei

The differences and relationship between green economy, circular economy and low carbon economy appear to have been clarified: the consensus is emerging that green economy covers all other concepts. A comprehensive set of green economy indicators is then needed, in order to measure the greenness of the economy, to guide future development in the right direction and measure actual progress. Two principles should govern indicator development: first, the indicator system should approach economic development and environmental issues in a holistic manner, not only reflecting the “green” situation, but giving the whole picture; secondly, indicators must be practical, easily implementable, unlike some of the earlier green GDP indicators developed internationally, which proved difficult to implement. Resource productivity could be an appropriate indicator for circular economy, linking resource consumption and economic development, while carbon productivity could be the core indicator giving the full picture of decoupling and not only of carbon emissions.

In terms of environmental management, a consensus is emerging that China is shifting from a command-and-control approach to a more holistic approach mainly based on economic incentive. In this perspective, the new issue is now to examine how and to what extent the economy can internalize environmental externalities. What is the internalization bearing capacity of the economy at its present stage of development? New models are urgently needed, as well as a new analysis framework for environmental economics. This is a pressing, practical issue for the Chinese government, decision-makers and advisory bodies.

Developing countries, when exploring urbanization models, can actually opt to develop megacities or small and medium size cities. In China’s case, the compact megacity urbanization model is probably the only feasible option.
Closing Session of the Roundtable Meeting

Final comments by participants

A larger number of municipal leaders should be invited to future roundtables, representing a wider spectrum of local conditions, including cities experiencing difficulties and facing different kinds of challenges. Future Roundtables should also invite more business representatives, for example large-scale, forward-thinking real estate developers, who would cast a new light on deliberations, from a different perspective. The next Roundtable might possibly be held in the Western part of China, in order to further expand CCICED’s outreach.

Closing Remarks by Mr. Zhu Guangyao, Secretary General of CCICED

The outcomes of the present very successful Roundtable will be further analysed and summarized, before being communicated to the State Council, the Ministry of Environmental Protection and relevant departments. Main areas of consensus include the following findings:

First, low carbon transformation and green development are key means for China to transform its development model and to address global climate change.

Secondly, being relatively new, the low carbon concept needs to be deepened; low carbon development is not the new flavour of the month, a business card – low carbon transformation will require thorough and consistent work over a long period of time.

Thirdly, urban centers should play a leading role in low carbon development, which requires both strong local leadership and the full social mobilization. China’s political system and capacity to mobilize resources could prove to be a factor of success in this respect.

Fourthly, China’s limited environmental capacity and foreseeable urbanization and industrialization growth dictate that persistent efforts towards building up resource-conserving and environment-friendly cities be pursued.

Participants are warmly thanked for their active participation in the proceedings and invited to visit Shanghai Expo after the conclusion of the meeting.
Introduction of Shanghai 2010 World Expo by Prof. Xu Ding
Assistant Director, Comprehensive Planning Department, Bureau of Shanghai World Expo Coordination:

Concept and Practices of Low Carbon Expo

It was formally decided, in mid-October 2010, that Shanghai World Expo 2010 would showcase low carbon concepts and be the first ever Low Carbon Expo in the history of world expositions. There are four dimensions to Shanghai’s Low carbon Expo: the dissemination of low carbon concepts; institutional low carbon measures; extensive low carbon technology application; low carbon public and mass activities and programs (such as the Green Commuting Program).

In order to disseminate low carbon concepts, there will be one Summit and six topical forums, including a forum in June in Nanjing on environmental changes and municipal responsibility. A large number of public conferences and meetings are also being planned and organized outside of Expo Park by numerous NGOs and academic circles.

In terms of institutional work, Shanghai Expo produced a Green Participation Guide, requiring participants (governments and enterprises) to make the fullest possible use of green, environment-friendly building materials, green concepts and green design. Furthermore, an environmental impact assessment was done, as well as an assessment of soil remediation; a formal environmental report will be compiled at the end of Expo. Shanghai Expo is presently doing research and assessment on carbon, with a view to publishing a Low Carbon Report at the conclusion of Expo.

Shanghai Expo is making extensive use of low carbon technologies:
- for the first time in the history of World Exhibitions, a virtual (Internet) World Expo is available to people who wish to visit Shanghai Expo from the comfort of their homes;
- emission-free public transport, offered with the support of China’s Ministry of Science and Technology;
- LED lighting: participant buy-in is actually exceeding the expectations of Expo organizers;
- covering more than 500,000 m², Expo Park’s permanent structures (Expo Boulevard, Expo Center, Expo Performance Center, China Pavilion, Theme Pavilions and the Nanshi Power Plant housing the Urban Best Practices Area) all have photovoltaic assemblies that are integrated with the power grid and make up the largest urban solar photovoltaic power plant (4.8 megawatts);
- air conditioning in foreign national pavilions (which are temporary structures) will be reutilizing waste heat from fuel gas power plants on a total area of 500,000 m²;
- since seven major types of natural hazards frequently occur in Shanghai between June and October, Shanghai Expo has made broad preparations in terms of weather forecasting and early warning; the World Meteorological Organization and members of IPCC have been working with and are taking part in Shanghai Expo. Meteorological experts from many countries will also be bringing their expertise and equipments and participating in competitions.
- garbage disposal will be implemented on a wide scale;
- river-source and geothermal-source heat pumps;
- natural ventilation and lighting; sunshading; horizontal and vertical greening; rain water recycling.

A low carbon approach was implicit in the selection and preparation of the Expo site, where used to stand 272 old factories including large shipbuilding and steel-making enterprises, many of which were relocated and upgraded – a huge ecological footprint by any standard. The design of Expo Park emphasized the use of existing buildings, the renovation of the old Nanshi power plant being a case in point, as well as the extensive recycling of old factory buildings into exhibition facilities.

The Urban Best Practices Area is yet another first in world expo history: it will be showcasing the best green practice cases of more than 40 cities, after selection by an international screening committee.

Each of the six permanent buildings and structures integrate specific low carbon technology applications and national and local pavilions – a total of 138 pavilions are being built – will also provide vibrant illustrations of low carbon in action. The Shanghai Eco-home, for example, will promote a lifestyle of health and sustainability, with the application of 10 technologies.