

Heading towards a Low-carbon Economy: The Way Forward to Tackle Global Warming

China Business Center, the Polytechnic University of Hong Kong
Hong Kong People's Council for Sustainable Development
The Professional Commons

Disastrous Effects of Global Warming

1. The situation of global warming is increasingly alarming. It is highly that the livelihood of tens of millions of the people will be adversely affected if no resolute action has been taken to halt the unhealthy trend of temperature increase. According to the estimation of Sir Nicolas Stern, the former World Bank chief economist, the average global temperatures will rise by 2 to 3 °C by 2050, resulting in glaciers melting, massive crop failure and famine, widespread of infectious diseases such as dengue fever and malaria, and possible extinction of 15 to 40% of species. If most of the countries do not take immediate, decisive and effective actions, the global economy might collapse and even a world war might happen in the future.
2. The main cause of the global warming is excessive emissions of anthropogenic green house gases (GHG) (mainly carbon dioxide). The United Nations Intergovernmental Panel on Climate Change (IPCC) pointed out that, in order to prevent the catastrophic climate change, carbon dioxide concentration should be maintained below the level of 450 ppm by 2030, so that the global temperature will not be higher than the level of pre-industrial revolution by 2°C. To this end, International Energy Agency estimates that it would require US\$50 billion globally each year for the reduction of GHG emissions. Sir Stern also suggested the investment should be equivalent to 1 to 2 percent of the gross domestic product (GDP) worldwide.
3. Emission reduction must be taken decisively and promptly. It is because new high-carbon investments used to have 14-year “lock in effect”, that is, the new high-carbon facilities will keep emit CO₂ for the next one to two decades, Hence, a postponement in emission reduction measures for ten years will lose the chance to reduce 180 million tons of GHG per year. And in 2030 the total global carbon emissions will increase by 69% as compared with the level of

2000, and China's share of the total emissions will increase from 13% to 17%, the atmospheric carbon dioxide concentration would definitely be more than 550ppm.

Exploitation on Earth Resource

4. The earth's resources are in danger of exhaustion due to rapid economic development and excessive consumption. Our exploitation on natural resources has already exceeded the planet's regeneration capacity by about 30%.¹ If the current living and consumption patterns remain unchanged, the resources required to meet the daily consumption of the mankind might be equivalent to four times of the biocapacity of the Earth in 2100. At present, the per capita consumption of resources in Hong Kong is equivalent to the biocapacity of 4.3 hectares of land, which is much higher than the global average of 2.2 hectares.
5. Not only the consumption behaviour in modern society exploits natural resources in an unsustainable way, it creates serious equity problems worldwide. Carbon emissions among countries also reflect the serious problem of regional imbalance. In 2005, annual per capita carbon emissions is up to 10 to 20 tons in developed countries, while the figures of developing countries are mostly only a single digit. For instance, China and India's per capita emissions were 5.8 and 1.6 tons respectively. More importantly, significant level of industrial production, accompanied by carbon emissions, has shifted from developed countries to developing countries through the process of globalization. In 2004, it is estimated that a quarter of carbon emissions in China were connected with export-oriented production.

Climate Change Summit in Copenhagen—Road to the Low Carbon Economy?

6. There has been growing concern on the issue of climate change. Many people who care about the well-being of the planet impose high expectations on the United Nations Climate Change Conference in Copenhagen, December 2009. Whether a comprehensive climate change deal could be reached at this conference or not would definitely affect the availability of time in controlling GHG emissions. However, the continued divide between developed and developing countries on the issue cannot be underestimated. Many developed

¹ WWF, *Living Planet Report 2008*

countries demand developing countries to assume greater responsibilities in emission reduction, whereas the latter believe that the former should respect their development needs. It would be difficult for the two camps to narrow down or even compromise on their difference. Premier Wen Jiabao, during the visit to Europe earlier this year, stated that although China, as a developing country, had already had a plan to address the climate change issue, she would not commit any quantitative targets at the Copenhagen conference. Against this background, the crux of success of the conference is how to fairly implement the principle of "common but differentiated responsibility" which was initiated in the United Nations Framework Convention on Climate Change.

Invest in Low Carbon Economy

7. Low carbon economy is highly regarded as one of the most important means in combating the problem of climate change, such as enhancing energy efficiency, developing renewable energy, etc. At present, as many as 60% of global carbon dioxide emissions are derived from energy consumption. Hence, it is expected that the two measures mentioned above can significantly reduce the GHG emissions.
8. There are many ways to further improve energy efficiency, including the development of hybrid energy cars, energy-efficient building, energy recycling, effective control in production processes, smart grid system (that is, to reduce the energy loss during transmission) and so on. According to the McKinsey & Company, by 2030, these measures could reduce 1.4 billion tons of carbon emissions annually.
9. The development of low carbon or even zero carbon energy is also of strategic importance. Through enhancing the market share of clean energy (wind power, hydropower, solar power, nuclear energy, etc.) from 30% in 2005 to 70% in 2030, it is estimated that there would be a reduction of 1.2 billion tons of emission annually. In fact, there are a lot of clean energy technologies available in the market which are mature and ready for commercial applications. For instance, the cost of wind energy is really competitive as compared with fossil energy costs; geothermal energy is even cheaper than natural gas; solar power will be more cost-effectiveness in the next few years.
10. Conservation on land ecosystems is of equal importance because forest and soil

can help absorb carbon dioxide from the atmosphere. Through afforestation and the promotion of organic agriculture, it is estimated that another 1.2 billion tons of carbon emissions can be reduced each year. Given that up to 90% of the aforementioned ecological conservation works would be carried out in developing countries, it will be a great challenge for them to strike a balance between the dilemma of development or conversation.

11. Generally speaking, there would be enough funding to finance the development of low carbon economy. The setback at present is mainly attributed to political obstacles and short-term economic downturn which led to contraction of investment. Global investment in energy efficiency enhancement and renewable energy development (excluding nuclear power and large-scale investment in water and electricity) has increased from US\$34.1 billion in 2004 to US\$148.4 billion in 2007, but there was a slight downward adjustment to US\$142 billion in 2008.

Rapid Development Causes Serious Pollution in China

12. After the adoption of reform and opening-up policy, China has experienced a fast-paced socio-economic development which subsequently boosted up the demand for energy. The country's total energy consumption rose from 990 million tons of “standard coal” in 1990 to 2.65 billion tons in 2007. Moreover, the export dependency ratio of petroleum in China now stood at 46.6%. The demand on raw materials maintains an upward trend too. Despite the fact that the GDP of China accounts for merely 5.5% of the world’s total in 2006, its consumption on energy, steel and cement accounted for 15%, 30% and 54% of the world's total consumption respectively. It is estimated that there will be either a short term or severe shortage of 19 out of 45 kinds of mineral resources in China by 2020.
13. The upsurge on energy consumption in the Mainland is closely related with the low performance in energy efficiency. Although China has reduced energy intensity and the carbon intensity by 5.22 % and 0.26 % per annum in average respectively in the past 20 years, carbon emissions maintain a 4% growth each year due to high per capita GDP growth, which is 6.6 times of the world’s average. The level of energy intensity is 20 to 30% higher than that of developed countries.

14. High-speed growth in the Mainland has caused serious pollution problem. In 2004, only 31% of all Chinese cities could meet the environmental quality standards of the World Health Organization. Many current studies pointed out that the pollution damage might be amounted to 2 to 5% of China's GDP. China's policy of reform and opening up has led to a rapid economic growth for the last 30 years, but the society and environment as a whole also paid a high price for it.

Low Carbon Economy: The Right Choice for China

15. In recent years, the Mainland has invested more to achieve diversified sources of energy supply, especially on increasing the supply of renewable energy and improvement in energy efficiency. The goal of the Central Government is to reduce energy consumption per unit of GDP by 10% during the Eleventh Five-Year Plan, and replace coal-fired energy by nuclear energy, natural gas, hydropower, wind power and solar power, of which the development of wind-powered energy in recent years is the most fascinating one. The total installed capacity of wind-powered energy has reached 11GW as at the end of 2008, and the targeted capacity will be 120 GW by 2020. Comparatively speaking, the development of solar energy is much slower at the moment, but it is expected that the installed capacity will reach 100GW by 2030.
16. “West-East Electricity Transmission” is a large-scale carbon emission reduction project in the Mainland. Through the high-performance electricity network, clean energy from the southwest can be transmitted to Guangdong (70% of the total is hydro-powered electricity), replacing 14% of primary energy consumption in the province in 2006. The project significantly reduced carbon emissions, amounting to 129 to 219 million tons (depending on the method of calculation) in the period of 1993 to 2007. It is expected that, emission reduction will further increase to 738 to 886 million tons in the period of 2011 to 2020.
17. There is much room for clean energy investment in the mainland, such as the installation of energy recycling and reuse systems in steel mills and other energy-hungry industries, developing bio-energy, investing in energy-efficient lighting and heating systems, etc. Moreover, research spending on low carbon technologies in the Mainland is less than 1.5% of GDP, which is lower than the average level of 2% in developed countries.

18. According to the results from the research of Greenpeace and European Renewable Energy Council in 2008, China can reduce 40% of energy demand if it can greatly enhance the level of energy saving and efficiency. Greenpeace also estimated that by 2020 Guangdong alone is capable to install as much as 20 million kilowatts of wind power capacity, while its electricity generating capacity could reach 35 billion kilowatts, which is equivalent to the total electricity consumption of Hong Kong in 2003.
19. Energy-saving and emission reduction are strategic measures that meet the current needs of China. Dr. Zhuang Guiyang, Senior Research Fellow of the Research Center for Sustainable Development, Chinese Academy of Social Sciences, stated that "low carbon economy is the new economic mode evolving from a high level of human development and production power." In his opinion, low carbon development should cover the following areas: (1) improving energy efficiency, (2) optimizing the energy structure and (3) rationalizing consumers' behavior. In brief, the development of low carbon economy is composed of two goals: achieving low carbon emissions on one hand and high economic growth on the other hand.
20. In fact, excessive development and consumption are probably the sources of the problem. As mentioned above, excessive consumption in developed countries for the past few decades directly led to environmental disasters. It is obvious that the Mainland has been pursuing a high growth rate mode through expanding the production capacity, and currently shifted to boosting domestic consumption in order to maintain the economic momentum in the wake of financial tsunami. Such a development will certainly add enormous pressure on the earth's resources.
21. Economic restructuring might be another alternative for China in dealing with the problems of power shortage and climate change. At present, the economic power engine of the Mainland relies heavily on high-energy-consuming manufacturing industries, especially the export-oriented industries. A study pointed out that about 1.1 billion tons of emissions were derived from exports in 2004. If the dependence of the manufacturing industry and export-oriented economic structure remains unchanged, it would be difficult to realize the goal of emission reduction in the Mainland.

22. The strategy of China in carbon credit trading is another matter of concern. Under the "Clean Development Mechanism" (CDM), developed countries can invest in projects that help reduce emissions in developing countries in replacement of more expensive projects in their own countries. At present, China is the largest recipient of funding under the scheme. However, there is a view that China is selling the carbon credit to developed countries "cheaply". As those projects which were much easier to reduce emissions have been bought by the developed countries, the remaining ones might require heavier capital investment. China may bear much higher cost for future reduction projects once it is required to contribute on GHG reduction. In other words, developed countries could take advantage of developing countries through CDM. Thus, China should make a long-term and holistic plan on carbon credit trading and overall reduction.

Hong Kong: Not a World-class City in terms of Emission Reduction

23. As noted above, Hong Kong people consume more resources than the global average, which is largely related to our consumption pattern. Our consumption of "coral reef fish" appears to be a representative example out of many. Hong Kong people consume 60% of all coral reef fishes being caught in the world. As the traditional fishing methods in developing countries cannot catch up with the ever-growing demand, fishermen tend to use poison or explosives to obtain better catches. The ecology of coral in many places are then destroyed and in the long-term fishermen's livelihood become unsustainable too. The excessive consumption of Hong Kong people has destroyed the natural environment of many places in the world. It also triggers the problem of inequity in using natural resources.
24. On the other hand, some Hong Kong people have already adopted a forward-looking approach and changed their life style through undertaking measures to reduce carbon emissions in their daily lives. For instance, some concerned parties hosted a "low-carbon wedding" a few months ago, in which guests can purchase "carbon credit" according to their carbon footprint related to their distance of transportation taken to and from the venue. These carbon credits will then be used to support the emission reduction projects in developing countries. Hong Kong has been enjoying a very high living standard in the world. If there are greater number of people who understand how their living styles and consumption affect the environment and commit to take the

lead in reducing emissions, it will enhance the possibilities for Hong Kong to become a "carbon neutral" city.

25. Under the “United Nations Framework Convention on Climate Change”, Hong Kong is treated as developing region as it is part of China, disregard of our highly developed economy. Against this background, Hong Kong is not required to reduce emission mandatorily. In light of the HKSAR Government’s reluctance in bearing the responsibility as a developed area in international arena, its performance in emissions reduction is far from satisfactory too, not to say the promotion of low carbon economy.
26. Despite the latest Budget has suggested to promote a green economy in Hong Kong, and listed out Guangdong-Hong Kong cooperation on environmental protection, promotion of electric vehicles and environmentally friendly building as three major items in the promotion of green economy, the HKSAR Government (hereafter the Government) fails to restore people’s confidence on its commitments. Looking back at the past few years, there has been merely limited progress on legislation as well as the implementation of respective laws on environmental protection. For instance, the legislation on switching off idling engines is still pending, the effective date for plastic bag levy is a question of doubt, mandatory building carbon audit has not yet been put on the governmental agenda under the excuse of divided public opinions. As the Government fails to take a drastic move on emission reduction even in Hong Kong, how can we expect that it will genuinely pursue the goal of “Green Pearl River Delta Quality Living Circle”?

Fundamental Issues in Developing Low Carbon Economy

27. Combating global warming and developing low carbon economy have been highly regarded as a common goal of for the wellbeing of mankind. Although the United Kingdom first proposed the concept of low carbon economy in 2003, there are diversified views on its coverage and definition among different countries. As the concept of low carbon economy is new to Hong Kong, we should pay greater efforts to grasp its meaning and scope, which is vital to the future development.
28. In sum, the development of low-carbon economy must address the following issues.

29. First, we should note that unrestrictive development and excessive consumption are not sustainable. On the other hand, the development of low carbon economy should not restrict to energy efficiency and energy diversification, otherwise it would add burden on the natural environment. In other words, fundamental changes have to be adopted on existing development and consumption patterns.
30. Second, we should revisit the interrelationship between low carbon economy and sustainable development. The negative impact of climate change has aroused people's awareness on the relation between human and nature, whereas the importance of social sustainability is being overlooked. The key point of international cooperation is whether we can strive for a fair share of responsibility among countries of different development stages. As most of the emissions come from the developed countries, it is logically for them to take greater responsibilities and even lower their pace of development. If not so, the chances for successfully developing low carbon economy and combating climate change look slim.
31. Third, both corporations and individuals should bear the responsibility for carbon reductions. Individual citizens, to some extent, can exert influence on the public policy making. Being a consumer, they can also choose their lifestyle and consumption patterns and therefore help shape the social and market development. It is very likely certain kinds of low carbon mechanism can boost the development of low carbon economy. For example, consumers can choose more energy-efficient electrical appliances if there are low carbon labels to feature a range of low carbon products. Greenpeace shared its experience that the power of the civil society and individual consumers are strong enough to influence and even shape the market, under which corporations are being encouraged to produce low carbon products. During the early 90's, Greenpeace and a German company jointly developed a green refrigerator adopting "natural refrigerants" to replace the traditional refrigerators using fluorinated greenhouse gas refrigerants, and successfully mobilized 70 000 people to buy green refrigerators.

The Way Forward: Hong Kong in the Midst of Economic Crisis and Climate Change

32. As “Asia's world city”, Hong Kong should and could not take advantage of the status of “developing region”. On the contrary, Hong Kong should take a more active role in addressing the issues of global climate change.
33. The financial tsunami shows that Hong Kong must not overly rely on the financial industries. Despite the fact that the Government has already acknowledged the potential of green economy, there is no concrete policies in place. Hence, the Government should demonstrate a clear vision on the development of low carbon economy in a bid to change the mindset of the technocrats as well as to pave the way for a smooth implementation in different policy areas.
34. As mentioned above, the pending enforcement on switching off idling engines and plastic bag levy have seriously undermined public confidence on the promotion of low carbon economy. Against this background, most of the local businessmen have adopted a “wait-and-see” attitude and refused to invest in the green industries. Therefore, the Government should put in place a holistic low carbon economic strategy, for instance, strengthening its own green procurement measures to support green industries; creating markets for the green industries, such as committing to use certain percentage of recycled rubble and green brick in public works projects; implementing producer responsibility scheme in order to promote recycling industry; etc.
35. The development of green economy can be a new power engine of our economy. The promotion of green building will create a large number of construction jobs, including architects, engineers and construction workers. As an international financial centre, Hong Kong has the potential to expedite the development of green finance, which will help expand the width and depth of local financial market. In 2000, Greenpeace and several organizations jointly run a program entitled the “Green Collar Community Recycling Scheme”. In light of this, they estimated that as many as 16 000 jobs will be created if the Government put in place a municipal solid waste recycling system.
36. The development of green economy is of particular importance to Hong Kong. It can at certain extent alleviate the polarization between rich and poor. In light of Hong Kong’s mature civil society, many non-governmental organizations are capable to play an active role in public education and implementation of pilot projects of green economy. They can also collaborate with private companies to

push forward emission reduction programmes. Such a move can help foster the social sustainability of green economy.

37. Given that the sustainable development and low carbon economy would be crucial to the future development of Hong Kong, it would be important to cultivate a strong partnership between the Government, enterprises and civil society. Moreover, the Government should proactively formulate and implement strategies for sustainable development; enterprises should attach greater importance to corporate social responsibilities; while the civil society should promote sustainable lifestyles across the community.
38. Postscript: Hong Kong People's Council for Sustainable Development, The Professional Commons and China Business Center, the Polytechnic University of Hong Kong had jointly held the "Towards Low Carbon Era" seminar on 14 February 2009. The speakers included: Dr. Zhuang Guiyang (Research Center for Sustainable Development, Chinese Academy of Social Sciences), Dr. Zhao Xikang (Centre for Environmental Economics and Policy Research, Guangdong Academy of Social Sciences), Mr. Plato Yip (Chairperson, Hong Kong People's Council for Sustainable Development), Mr. Albert Lai (Chairperson, The Professional Commons) and Ms. Gloria Cheung (Programme Officer, Greenpeace).

April 2009