Economics Analysis on Haze Weather and Urban Development in China

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Abstract. In the second half of the 20th century, the amount of fossil energy consumed on city traffic, construction, manufacturing, and consumption areas was soaring with the speeding up urbanization in developed centuries all over the world. Increased Greenhouse gas emissions and intensified urban heat island effects lead to global warming and extreme climate disasters. Haze weather has been a threat to the survival of mankind and further human development. None of the countries can get away from it when a global weather disaster comes. As a developing country, China is still in the middle of urbanization. It is facing an inevitable dilemma of high-carbon eco-environment, especially with the weak anti-disaster capability. Many countries are all reducing greenhouse gas emissions, trying to make urban development transformation work by paying equal attentions to economic development and the environmental protection. The goals of China changing the urban development path and building clean cities will not only boost the economic but also protect urban development safety. This article deeply analyzes Chinese urban development and transformation un.

Economic Theory of Haze

Fog is the product of vapor condensation from the ground layer of the air, consisting of plenty of tiny ice crystals and water droplets suspended in the atmosphere. Haze is composed of particles such as dust, nitric acid, sulfuric acid, organic hydrocarbon and other particles in the air. It blurs vision and leads to visibility deterioration. To generate fog, high water vapor saturation factors are required. Haze is formed when contaminants in the neighbor cannot be diffused in time and accumulated on the surface. These contaminants can easily cause photochemical reactions under low humidity and strong sunlight, and then generate haze. Haze mainly comes from vehicle exhaust. Thus, haze weather is easier to happen in districts with large vehicle volume, and the visibility is usually lower than other places.

Some reasons for haze weather are natural factors; some others are social economic factors. Natural factors mainly include bad climate conditions that cause contaminants accumulating continuously. With lower air pressure and slower wind in cities, particles in the ground layer of the atmosphere keep accumulating. Besides, high humidity makes fogdrop and the particles combine into bigger mixed particles. In addition, too close building layouts lead contaminants and the mixed particles between cities passing through, resulting in the spread of pollutions. As for social economic factors, mainly include unreasonable energy consumption structure, industrial waste gas emissions, and construction dust created during urbanization.

While productivity grows gradually, industries and businesses are making real progresses. Cities are no longer just a consumption center, but also a place that people make trades with spare agricultural and animal products. Residence, the emphasis of

urban functions is shifting to trade functions, which have become a symbol of a city and brought huge potentials and unprecedented opportunities. More and more businesses keep flowing into the cities, resulting in urban rapid expansion, which enhances the trade functions and retreats the role of residence even further. Thus, the evolution makes urban development and urbanization a sign of abundant wealth and modern civilization.

However, under the direction of "productivism", GDP is a core issue of development. Policy makers and economic entities have tried whatever it takes to build a dynamic model to increase GDP. They ignore the main purpose of economic growth is the freedom and fairness for the whole mankind and the Eco-system. People ruin the environment and waste resources to gain wealth. They increase GDP with the price of high pollutions and emissions. Natural resources are extremely wasted; eco-environment is damaged awfully; and people's health gets poor. The price of economic development is way too high. Polluted environment, wasted resources, great loss of bad products, and man-made accidents apparently become too heavy burdens for economic growth to bear. The development mainly focuses on the driving forces of economic growth, but barely on the consequences, prospects, and persistence of it. Therefore lousy economic growth quality and fragile moral foundations of the environment are formed. This shows that negative effects of deterioration environment and the loss of humanity have become a force to change the city development way.

In order to prevent excessively taking natural resources and minimizing negative impacts on the environment, people started to realize the necessity to change the old extensive way to gain wealth, abandon the old "resources-products-wastes" linear growth pattern, and finally to reduce pollutions and wasted natural supplies. Meanwhile, people rebuild a harmonious connection between human and the environment, make sure economic and ecological benefits bonded together, and lower the costs of economic growth. Consequently humankind gradually transforms the development methods from concept to practice, and starts to pay attention to the value and the persistence of the economic development.

Eco-city is a city development pattern to achieve ecological civilization, which surely will go through the whole process of eco-city construction. Besides, with the development of modern society, the meaning of ecological civilization deep inside will also be improved and enriched; and yet there has been no real eco-city really existed in the world so far, neither a precise definition nor indicators for it. Eco-city construction is a very big project, the main theory include circulation economic, ecological economic, sustainable development, and urban ecology. There is still a long way to go.

Through energy structure optimization and lower energy consumption rates, human may live harmoniously with the environment. People's material requirements for life and ecological demands could be met if the consumption structure on both sides balances well. We also need to make achievements on low-carbon urban management, reasonable urban structure layouts, and urban productivity distribution optimization. Therefore cities will be better places to live in, and citizen satisfaction will be significantly enhanced.

The Traditional economic growth pattern brings urban development into a high input, high emissions, and low output dead end. Along with the shortage of natural resources and the deterioration of the global environment, all of these have become bottlenecks to urban sustainable development. The potential is very low no matter on individual growth or the city further development. Therefore low-carbon is the only way out. Sustainability is a concept that a city not only focuses on the current economic and

ecological benefits, but also those for the next generation. It is about making urban sustainable development possible by considering all the benefits of intergeneration. It is also the key to build up a low-carbon city. Sustainability can better deal with problems between fairness and efficiency of intergeneration, and balance economic and ecological benefits better. In order to do so, the low input, low consumption, low emissions, and high outcomes principle should always be abided by.

Urban multi-function provides people with life satisfaction and high level of comfort. It makes cities the symbol of civilization and modernization. However, under the traditional development concept, life satisfaction is not in sync with urban development. Wealth growth is almost the only reflection of the soaring development. Human nature is twisted during the process. Many kinds of urban diseases keep coming out; and urban comfort level is dropping to the ground. Hence, in the assumption of allowing sufficient personal development in cities, goals of eco-city construction are to get rid of urban diseases, optimize energy consumption structure, build up an efficient traffic system, conduct low-carbon production and consumption, reduce the burden on ecological system, and make it a better place for people to enjoy the comfort, convenience, and pleasure.

In general, the eco-city project was a little behind in China. Many cities just get started on the eco path. There are still very few related cases for further study.

Eco-city is not only a transformation for urban development, but also a trend in the future. People used to pay too much attention to fast urban growth; and they ignore to evaluate the development in other aspects. Since the reform and the opening-up policy, urbanization in China has been improving tremendously fast under the GDP oriented concept. Urban areas expanded very quickly. Buildings in cities were getting more incredible and more beautiful, and the population increased sharply. However, there are many flaws coming out alongside. In the 80s last century, one serious problem China was facing up to was initiatives and motivations to gain GDP as soon as possible. In that situation, efficiency became a primary factor to the problems. Afterwards a principle "efficiency come first, balance fairness" was come up to. It was aimed to focus on efficiency, but people ended up ignoring the fairness principle, which resulting in the debt to the environment in the end. They obtain economic growth at the expense of natural resources without considering the survival environment for the current and next generations. Urban bibles are created under the driving force. Economic and ecological benefits are not balanced well during the whole process; and people cannot get the benefits they deserved. Their life satisfaction levels are very low, which will break the harmony and stability in the communities. The old development pattern becomes a bottleneck for sustainable economic growth.

In addition, traditional urban evolution is basically under the control all by the government; they decide the size of the midtown, width of roads, height of buildings, institution locations and layouts, leading industries, and many other things. They barely consider the potential of market growth and real benefits for citizens. Consequently those cities are restricted for further development and market expansion. On the contrary, eco- city focuses on a system from the top. It emphasizes the macroeconomic management on the whole city operation from the government without denial of its functions from the past. Meanwhile, eco-city also relies on market force involvement. On one side, the government oversees the markets, conduct macroeconomic control when necessary, and ensure the correct sailing direction. On the other side, the market mechanism plays a positive role and restricts excessive interference from the government. Both of the two forces are essential and neither is superior to

the other; they are not in conflict but complementary. They are like “invisible hands” and “visible hands”. Both hands in the harmony with each other become a strong protection for the eco-city effective development.

Social Economic Effects from Haze

Haze weather has a significant influence on the economic in China. China loses 1.2% GDP because of air pollution. The haze weather takes away not just a huge fortune. As the blurred air and low visibility, the possibility of traffic accidents has increased a few times or even more than it used to be. City traffic is jammed frequently. Flights are delayed or even cancelled very often. Industries that related to traffic transportation are suffering huge loss. As for farmers, crops and plants grow slower because of the haze. The prices increase, and their profits are hurt. Besides, people’s health conditions are being threatened by the horrible living environment, morbidity of respiratory disease keeps going up, and the age to get chronic gets younger. Cancer patients are used to be old men in their 50s or 60s, now they are 15 to 20 years younger. Without those healthy young adults, social human resources costs will boost without doubts, burdens of economic operation will be heavier, and the lost will be extremely significant.

Dilemmas to Build up Eco-city

Recently, many cities have conducted scientific development perspectives and set up the plan to build up eco-cities. Cities such as Beijing, Chongqing, Guangzhou, Xiamen, and Dalian have been working on the project for years. Certain achievements have been made, and experience has been gained on urban ecology landscape, urban sanitation, environmental protection awareness on water resource and farm lands, and energy evolution. Yet urban operation is facing many obstacles on costs, market regulations, and supervision. The production model of traditional companies is high input, high emissions, high pollution, and low outcome, namely “three highs one low”. The carbon emissions alongside is very high. In the background of Eco-city construction, original systems and production processes in the companies are in the demand of a major transformation in order to reduce high-carbon emissions. However, costs of product design, raw material purchasing, manufacturing techniques upgrade, marketing, and recycling will significantly increase. Also advanced technology is required to support with this transformation. It takes a long time for companies to break even. In other words, it requires quite a big investment to renovate manufacturing processes, update equipment and techniques, and these investments will not pay off until new products are sold. Hence, carbon emissions cost is a disadvantage for a company to compete with others in the short period, which takes away their motivation and initiatives. But it will be different in the long term. In the coming ecological economy age, low-carbon products can bring good profits. The products will reach more markets, because they match the requirements in the low-carbon trend. Not only investment capital will finally pay off, but also appreciable profits can be made. Low-carbon manufacturing and products are environmentally friendly and good for human health, which are the reasons people support it. However, a few companies are taking advantages of the “environmental protection” name to scam customers and make a huge profit, leading many customers to having very bad impressions on this kind of products. Besides, ecological products cost much more on design, technology, installation, maintenance, and promotion expenses than regular products, so do the retail prices. Many customers just cannot afford them. For the moment, the high price is still the dominant factor that

influences consumers' choice. The current industry structure in China is very high-carbon. Although the third industry has low carbon emissions, the GDP weights very light. Plus, most of the first and the second industries are extremely high-carbon. In the composition of GDP in China in 2009, the first industry is 10.6%, the second one is 46.8%, and the third one 42.6%; while the sum of the first and second industry is usually 30% in developed countries, and the third one 70%. That is a huge difference. The third industry in China develops very slowly; the GDP it creates is much lower than that in developed countries. It takes time to solve the industry problems and raise the proportion. For example, there are many idle resources in the trading industry, because of oversize facility and lack of cooperation, resulting in high logistic costs and energy consumption.

Table 1 Fertilizer amount applied on farm lands in China Unit: (kg/ Chinese acre)

Year	1949-1965	1966-1970	1971-1975	1976-1980	1981-1985	1986-1990	1991-1995	1996-2000	2001-2005	2006-2010
Crop Yield	90	123	145	170	219	244	271	295	297	324
Amount of fertilizer applied	0	1.1	1.9	3.6	7	10	14	17	19	22

Data resource: Chinese statistics yearbook data sorting from 1949 to 2011

Agriculture in China basically depends on chemical fertilizer and pesticides. Since the reform and the opening-up policy period, people in China apply large amounts of fertilizer to gain more food from soil. The amount that fertilizer applied increases from 7kg in 1980 to 22kg per Chinese acre in 2010. This becomes another obstacle in the way of eco-city construction.

Conclusions and Suggestions

Change the high-input, high consumption, and high emissions economic growth pattern, and build a national economic system that fits sustainable development requirements to save resources and improve the utilization rate. Conduct clean manufacturing and provide assistance to environmental industry development. Get rid of high energy consumption companies that heavily polluting the environment. Plus, strictly control industrial gas and waste emissions, and reform traditional industry with advanced technology. Local government should monitor industrial gas, wastes, and construction dust in all areas, also establish regulations and comply with them. Coal has been the dominance of the energy system in China for a long period. It is surreal to change this layout in a short term. Based on the current energy situation, we should invent advanced technology to increase natural gas production and exploit other gas resources such as coal bed gas and shale gas, and then gradually decrease the percentage of fossil energy like coal and gasoline. The heavy chemical industry factories in China are basically located in the northeast, the north, and coastal regions, clustering together. Overcrowded industry layout makes limited resources difficult to be allocated well. It also posts environment threats to those regions. In this situation, optimize the layout in China can be a huge plus for cooperation between regions. Also, we need to enhance real-time coordination and complementary resources and advantages among the spots. In addition, build a benefit coordination system of industry division and relocation; lead factories in different areas to take full advantages of the local resources, and develop an industry chain with extraordinary competitive advantages. With those being done and

industrial structure upgraded, resources optimization can be achieved. Unnecessary resources will not be wasted. As the imperfection of urban public transportation system restricting the convenience of daily trips in the city, the number of automobiles is increasing very fast. To reduce the traffic in the city and ensure that the system runs smoothly, public transportation should be improved primarily. Necessary resources should be allocated to the transportation system; and problems are needed to be solved. Contaminants from vehicle gas emissions largely depend on fuel quality and combustion completeness. To reduce the pollution, advanced technology should be invented to improve the fuel quality and combustion efficiency; produce clean energy vehicles to control gas emissions. Besides, self-purification ability of cars fades away while mileage increases. Related departments should establish certain vehicle registration policy to take control of it.

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