Negative Effects of Beijing's Air Pollution Caused by Urbanization on Residents' Health *

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Abstract. In 2013, the frequent haze weather has caused widespread concern. Accompanied by the fast urbanization in 1990s, air pollution appeared in Beijing soon, and the air pollution has threatened the residents' health in Beijing. Through learning from London's experience, this article will combine London's tragedy with Chinese situation and analyze the deep reasons that Chinese are facing now.

Introduction

At the beginning of 2013, Beijing has suffered serious air pollution: fog and haze happened frequently. The Xinhua news report showed that Beijing's air quality standards in January were not up to the standard only except for 4days[1]. During the January of 2013, the worst air period, many people have felt physical discomfort obviously, such as cough, hard breathing etc. According to the Beijing Municipal Center for Disease Control's data, from January 14th to 20, more than 770 thousand of urgent cases happened in scale two and above medical institutions in Beijing, half of them are respiratory disease cases[2]. The incident remind people that five of the "Eight nuisance events" are relevant to air pollution, like The Belgian Maas Valley Industrial Zone events, Nora events in Pennsylvania, Los Angeles photochemical smog event, London smog event and Yokkaichi asthma events in Japan.

The development of Beijing urbanization and the urban air pollution

A. The expansion of population in city and the prominence of urban problem

In the process of the development of the urbanization, the scale of the city expands constantly and then population expansion, traffic congestion, environmental pollution and other urban diseases gradually appear. In recent twenty years in Beijing City, in order to accelerate the process of urbanization, Beijing has called for more and more extraneous population. According to the Beijing Bureau of statistics, in 2012 the total population of Beijing is 19,720,000, and the number is growing at the rate of 600,000 per year[3].

A large number of city populations have to consume a lot of resources, which means atmospheric pollutants will be produced during the daily energy consumption. The main energy that Beijing city consumes include: coal, gas, electricity and natural gas. Burning of coal gas could generate serious air pollution. The main components of coal gas are hydrogen, methane and carbon monoxide. The worse

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is that incompletely gas purification will bring hydrogen sulfide into burning, which will produce the main air pollutants: carbon dioxide, sulfur dioxide.

In addition, the increasing of population has brought the increasing of Beijing's automobile amount. Although Beijing government has adopted a series of policies to control the growth rate in Beijing City since 2011, the Beijing existing automobile population has reached a an enormous scale that in 2012 the quantity of locomotive Beijing has reached 5,017,000 units[4]. Some experts' statistics show that at the beginning of twenty-first Century, automobile exhaust emissions accounted for 30 ~ 60% of atmospheric pollution[5].

B. The expansion of city size, agricultural land being occupied

Since 1990s, along with the process of integrating urban and rural areas of Beijing speeding up, the city area has been expanded constantly that the rural-urban fringe zone has been extended to Six Ring. Meanwhile, agricultural land in Beijing are reducing sharply. In 2007, the area of cultivated land in Haidian District is 2787.9 hectares, less than in 1978 12,559.2 hectares[6]. A large number of agricultural lands have been used as commercial, industrial and residential land. Agriculture plays a key role in water and soil conservation, air purification, and sand-fixing. Obviously, the agricultural areas surrounding the city constitute a natural green "shield" for the city, without which, Beijing is particularly vulnerable to sand and wind.

C. Air pollutants from industrial emissions

In 2001, Beijing successfully applied to the 2008 Olympic Games.Beijing adopted a series of measures to guarantee the air quality during the Beijing Olympics, including arranging the industrial structure in Beijing. The Beijing coking plant shutdown and moved to Tangshan in 2007, Shougang has relocated in Estern Hebei separately since 2005[7].

However, immediately when the Olympic Games was over, industries surrounding Beijing was restored to full working order. In March 30th, the "Wall Street Journal", quoting a report the United States National Bureau of economic research, pointed out that the Chinese government improved Beijing city's air quality by 30% successfully during the Beijing Olympics, but 60% improvement results disappeared several years later.

Jiang Kejuan, NDRC Energy Research Institute expert, said "Beijing is reducing the consumption of coal, while the surrounding area is still increasing. those surrounding areas should take the zone-defense measures just as Beijing is doing"[8]. Data shows that in the 4th quarter, 2012, industrial production surrounding Beijing was accelerating. In addition, Beijing is located in the southeast side of Inner Mongolia and the east side of Shanxi province, both of which are major coal-producing province. Because of the flowing air, the industrial pollutants around Beijing, especially the atmospheric pollutants in coal chemical industry focus areas of Shanxi and Inner Mongolia.

What is worse, Beijing is Low-lying northwest to Southeast, and is surrounded tightly by Taihang Mountain and Yanshan Mountain. The terrain of Beijing is easy to cause Heat Island Effect, and those pollutants that spread from surrounding areas and generated in local Beijing cannot diffuse out and finally deposit at the bottom of the "pot" terrain.

Air pollution and residents' health

Air pollution is the introduction into the atmosphere of chemicals, particulates, or biological materials that caused the concentration of pollutants and the secondary pollutants into some particular degree. During the urbanization and industrialization, human discharge various pollutants into the atmosphere until the air pollution is so serious that has threatened to the survival of mankind.

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The notorious London Smog Event occurred in 1952 is a famous accident that atmospheric pollution seriously harm to human health in history. At that time, households were burning a lot of coal to keep warm and there were many local thermal power stations working all day long. The smog, containing carbon dioxide, carbon monoxide, sulfur dioxide, dust, gas, are released into the atmosphere, and accumulated over the city for the effect of the inversion layer, and finally causing heavy fog weather for several days. According to Dr. Ulster William Jens, the director of Fog Pollution event, the death toll was increased to 2480 during the fog; Chronic deaths caused by Frog was up to 8000 people.

In January, 2013, the frequent fog and haze in Beijing reminded people of the 1952 London smog event. Since the Environmental Protection Department began to take PM2.5, ozone (8 hour concentration) into the air quality evaluation index, we got it that the value of PM2.5 in Beijing is frequently higher than normal. PM2.5, inhaling into the lungs for long can weaken the ventilation function, and damage the ventilation function of local bronchial bronchioles and alveolar. The PM 2.5, absorbing harmful gases, can lead to bronchitis, emphysema and bronchial asthma. What’s more, PM 2.5 will promote some chronic diseases, such as hypertension and diabetes.

Existing problems in supervision and management of environment

A. Lack of supervision and management on environment

Chinese government had taken actions to control environmen in the past ten years. The state has enacted the "Environmental Protection Law", "Water Pollution Prevention Law", "Air Pollution Prevention Law", "Environmental Impact Assessment Law" and other laws and regulations about environmental protection.

There is no doubt, China has made great achievements on enacting environmental regulations, setting standards of air pollution in recent years; however, for the lack of environmental supervision and management, these environmental laws and regulations had not been strictly implemented.Some local governments intervened in the environmental protection law enforcement, approved those industrial projects which can achieve short-term economic benefit but have high energy consumption and cause serious air pollution.By funding constraints, environmental monitoring agencies cannot carry out regular monitoring of pollution sources, which result in the operation efficiency of environmental protection facilities

B. The local environmental protection investment is not enough during the urbanization

In the past, environmental protection investment in China was focus on the field of industrial pollution control, and paid less attention to the city's environmental infrastructure construction, environmental management department construction, regional environmental comprehensive renovation, and the prevention and control of small and medium-sized enterprise. Environmental protection investment of city infrastructure construction in China has increased year by year, however, the increasing proportion is far apart when comparing to China's process of urbanization and the rapid expansion of city scale. At present, the environmental protection funds demand expanded rapidly, which has been beyond the current national investment ability.

Strong growth in China's environmental protection funds demand mainly depends on the following factors: (1) the difficulty of the pollution control is increasing. Those problems which can be solved with simple technology and less investment are becoming less. The difficulty of pollution control and the demand for capital has changed significantly, which increase the cost of environmental governance. (2) The nature of pollution changes. Pollution now is becoming regional, circulating, comprehensive and life-referring. These pollutions have gradually become the new problem, which need larger scale of investment to solve compared with the end-treatment of traditional industrial enterprises. (3) There are too much environmental investment loans in the past. China had always been on the "first development, second governance" develop style. Over the years, China's investment in the environmental pollution is far below the standard level.

Effective control measures

The London Smog Event, happened in 1952, paved the way for recognition the harm of air pollution on human health, enterprises and residents gradually changed their way of production and life style. The event even pushed the British environmental legislation.

The 2013 persistent haze weather in Beijing brought widespread concern. In order to clean the air, govern-ment has taken a series of measures. Beijing Environ-mental Protection Bureau issued a "2013 Clean Air Action Plan ". For the specific measures to mitigate the effect of air pollution on residents' health, we put them in the follows:

A. Increase clean energy transformation, using natural gas instead of coal as fuel for heating and cooking. And get rid of old motor vehicle with high emissions. By the end of April, 2013, Beijing has eliminated 88,000 old motor vehicle.

B. Environmental protection departments exercise their executive power independently, government departments shall not interferer arbitrarily.

C. Strengthen the dust pollution control. Punish dust-ing construction offences and construction violations of waste transport vehicle.

D. Development and environmental protection shoud be done simultaneously in the future urbanization, and the supervision of this principle shall be strengthened.

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