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Innovative Policies on Air Pollution Control in China - A Case Study of the Relationship between Environmental Changes and Health Conditions in China

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Abstract

China has seen the fastest rate of growth and development in recent times. Despite this reality, there has been a disconnect between the development of the economy and the welfare of the citizenry, and while we saw policies in place aimed at driving economic growth and development, a comprehensive policy aimed at protecting environmental health was either non-existent or poorly implemented.

The importance of the environment cannot be overemphasized especially with respect to China and the many changes it has encountered over the past couple of decades.

China has seen a great deal of development happen rapidly, numerous policy changes over a short period of time and most importantly, a direct impact on the health and welfare of the citizens.

This study aims to look at the policies driving innovation and development, the extent of implementation of said policies as well as the effect on the everyday Chinese and what measures are in place to curtail the negative effect of such changes and the extent of implementation of said measures.

We strive to establish an imbalance in the rate of development across all sectors of the economy leading to a negative effect, especially on health and welfare as well as life expectancy, quality of life and death toll.

Keywords: *Air pollution; Innovative policies; China; Health.*

In this part, state the purpose of the study. The following should be stated clearly:

- Problem to be solved?
- Any existing solutions for the problems?
- Which is the Best one?
- Limitations?
- Achievements?

Air pollution is the introduction of particulates, biological molecules, or other harmful materials into earth's atmosphere, causing diseases, allergies, death to humans, damage to other living organisms such as animals and food crops. It is typically separated into two categories: Outdoor air pollution and indoor air pollution.

Outdoor air pollution involves exposures that take place outside of the built environment. Examples include: fine particles produced by the burning of fossil fuels (i.e. the coal and petroleum used in traffic and energy production); noxious gases (sulfur dioxide, nitrogen oxides, carbon monoxide, chemical vapors etc.); ground – level ozone (a reactive form of oxygen and a primary component of urban smog); tobacco smoke.

Indoor air pollution refers to the pollutants found in indoors. The main cause of indoor air pollution is inefficient fuel combustion from rudimentary technologies used for coking, heating and lighting. There are also natural indoor air pollutants, like radon, and chemical pollutants from building materials and cleaning products that also impact the health.

An air pollutant is a substance in the air that can have adverse effects on humans and the ecosystem. These substances can be solid particles, liquid droplets, or gases. A pollutant can be of natural origin or man-made. Pollutants are classified as primary or secondary.

Primary pollutants are usually produced from a process, such as ash from a volcanic eruption. Other examples include carbon monoxide gas from motor vehicle exhaust, or sulfur dioxide released from factories.

Secondary pollutants are not emitted directly. Rather, they form in the air when primary pollutants react or interact. Ground level ozone is a prominent example of a secondary pollutant. Some pollutants may be both primary and secondary: they are both emitted directly and formed from other primary pollutants.

The various activities that release these pollutants into the atmosphere can be divided into two major categories.

They could be from smoke stacks of power plants, manufacturing factories, waste incinerators, as well as furnaces and other types of fuel-burning devices. Other sources result from motor vehicles, marine vessels and aircrafts, fumes from paint, hair spray, aerosol sprays and other solvents.

Examples are carbon monoxide gas from motor vehicle exhaust, sulfur dioxide from factories; nitrogen oxides from electric discharges, volatile organic compounds; ammonia NH_3, odors from garbage, sewage and industrial processes; radioactive pollutants; and chlorofluorocarbons.

An understanding of the link between energy consumption ad technologies, air pollution and related environmental impacts is necessary to evaluate the different air pollution control options lacking in China's current policy decision making.

Relationship between environmental changes and health conditions in china

With a booming economy and ever-increasing demand for energy, China has built new coal-fired power plants at an astonishing rate. Today, coal provides over 60% of China's electricity and the lion's share of its air pollutants, from soot to sulphur dioxide.

While cars and trucks also contribute to air pollution in cities, it will be impossible to improve air quality in China without moving away from coal.

Coal burning is the biggest contributor of air pollution in Beijing and surrounding area, according to a University of Leeds study sponsored by Greenpeace East Asia. Previous studies have linked outdoor air pollution to premature deaths and child asthma in the industry-intensive region which arguably has the worst air quality in China.

China simply cannot afford to allow air pollution to continue taking such a heavy toll. The country's rapid growth in coal consumption has been brought on by extensive industrial expansion, which in turn, has increased pressure on the environment and public health conditions. In order to turn around the deteriorating air conditions, China must fundamentally change its development model, starting with a significant reduction in coal consumption.

After over 30 years of sustained rapid development since the reform and opening up, China has achieved a stunning and eye-catching economic growth, enabling it to become the world's largest developing country with a huge population, with output of the staple industrial and agricultural products ranking top worldwide. China's international status is also rising by the day. From the "Clay-footed Giant" and "Sleeping Lion in the East" in the 18th Century to the "Soaring Dragon" in the 21st Century, China has traveled a long road of economic development.

Nowadays, environmental problem has become one of the most severe problems confronted by human beings, which cannot be avoided wherever you are. Protect the earth as well as our sharing living space has been the consensus of the whole human society. Since the 20th century, human beings have created unprecedented material civilization by virtue of the advance of science and technology and the largely increase of social productive forces. But at the same time, resources, environment pollution, ecological damage and other problem are becoming increasingly outstanding, which are threatening the survival and development of human beings. People have realized that, we must change the consciousness of "challenging the nature" and the traditional development mode "pollution first and treating later," and try

to seek a sustainable development road in which people, economy, society, environment and resource coordinate with each other.

Owing to its large population and relatively low standard of economic development, China has to face the problems of how to protect its environment and ecology throughout the development process. China has a vast expense of territory and complex natural conditions such as climate and topography. At present, China is in the stage of accelerated industrialization and urbanization, a period in which the conflict between economic growth and environmental protection is quite salient. From 1980s, a series of ecological deterioration phenomena, such as water and soil erosion, grassland degradation, desertification, disappearance of biological diversity and so on, appears due to the growth of population, over exploitation and use, techno, environment pollution and ecological deterioration are serious in some ranges of China: the emissions of major pollutants surpass the environmental carrying capacity; pollutions such as water, land, and soil are severe, solid waste, vehicle exhaust, and persistent organic pollutants are increasing.

Through a series of important strategic measures, China strengthens environmental protection and construction, curbs the deterioration of the environment and protects the earth together with governments and people from other countries. In present global context, the environment and development problems in any country and region will become problems for all human beings. Solving the environmental problems in china not only conforms to the development goals of china, but also greatly embodies the common benefits of all human beings.

Air pollution poses the biggest threat to the environment in China. After nearly 40 years of development, China better understands these problems. Energy-saving and emission-reduction was one of the important targets of "the 11th Five Year Plan," and reductions of energy consumption and total emissions of major pollutants have become the major binding index.

China's "11th Five Year Plan," points out, until 2010, the two binding indexes of pollution emission reduction, i.e. chemical oxygen demand (COD) and sulfur dioxide (SO_2) emission, will be reduced by 10% compared with 2005, that is to say, the national COD will be reduced from 14.142 million tons in 2005 to 12.728 million tons, and SO_2 emission will be decreased from 25.494 million tons to 22.944 million tons.

Through the implementation of desulphurization in electric power plant and the construction of urban sewage disposal plant, the total emission of SO_2 and COD in China were both reduced for the first time in 2007. These two indexes still kept a good reduction trend in 2008, in which, SO_2 emission was 23.212 million tons, reduced by 5.95% compared with 2007 and 8.95% with 2005. This also means that the air quality in first tier cities is better in general and is improved compared with 2007. However, it cannot be denied that pollution in some cities in China is still a very serious problem and the acid rain pollution is quite severe.

With efforts to tackle the air pollution problems in China, on March 5, 2014, China's Premier Li Keqiang pledged that the country would take stronger measures over the coming year to reduce the control air, water and soil pollution, speaking in his annual address at the opening of the National People's Congress NPC meetings in Beijing. Li said that China would "declare war" on pollution and would raise energy efficiency, reduce vehicle emissions and prevent and monitor airborne dust. He also said that around 50,000 smaller coals – fired furnaces would be shut down and that China would increase the use of de-nitrification and de-sulfurization technology in larger coal-fired power plants. China will continue the policy goal of having China IV diesel provided nationwide, and removing around 6 million older vehicles from the roadways, by the end of the year, Li said March 5.

A separate report released by the National Development and Reform Commission NDRC before Li's speech outlined goals for reducing energy intensity per unit of gross domestic product GDP by 3.9 percent, and reducing carbon intensity per unit of GDP by 4 percent by the end of the year, compared with the year before.

Outlining goals for key pollutants targeted for reduction in the "12th Five – Year Plan" (2011 – 2015), the NDRC said the aim is to reduce sulfur dioxide emissions by 2 percent and nitrogen oxide emissions by 5 percent, compared with the year before. Both discharge levels of chemical oxygen and ammonia nitrogen have 2 percent reduction targets.

State – run China Daily newspaper on February 28, 2014 quoted that the officials from the Beijing Environmental Protection Bureau added more severe punishments to the revisions of the capital's own air pollution action plan, which officially took effect on March 1.

China's national action plan on air pollution

In the eleventh five year plan for economic development in china, the government put forward a master plan with the environment as one of its major issues. This master plan was designed to among other things, guarantee public health; promote ecological civilization construction; combine governmental control and market regulation, overall promotion and key area demonstration, cross-area cooperation and local management, as well as quantitative reduction and qualitative improvement.

In order to do so, the government sought to reduce dependence on fossil fuel as a source of energy; Increase the supply of clean energy; Improve Legislation System and Regulations, and Implement Strict Supervision and Management According to Laws. The policy was also designed to improve the innovative capacity of the country as well as accelerate technological transformation in a constantly changing world.

Strengthen comprehensive control and decreasing pollutant emissions

Optimizing industrial structure and promoting industrial restructuring and upgrading

Accelerating technological transformation in enterprises, and improving innovation capacity

Accelerating energy structure adjustment and increasing supply of clean energy

Conducting entrance control for energy saving and environmental protection concerns, and optimizing industrial layout

1. Strengthen comprehensive control and decreasing pollutant emissions: To remedy small coal – fired boilers, promoting construction of centralized heating, "coal to gas" and "coal to electricity" projects; to accelerate construction projects of desulfurization, de-nitrification and dust control; to promote pollution control facilities for coal – fired power plants.
    a. Deepening non-point source pollution control: to conduct comprehensive control over urban dust; to carry out oil and smog pollution control on restaurants.
    b. Strengthening mobile source pollution control: to strengthen urban transportation management; to improve fuel quality, to accelerate elimination of yellow-labeled and older vehicles; to improve environmental management of motor vehicles; to accelerate upgrading of low-speed vehicles; to promote new energy vehicles.
2. Optimizing Industrial Structure and Promoting Industrial Restructuring and Upgrading
    a. Conducting strict control over production capability increase in "two-intensive" industries (energy-intensive and pollution-intensive).
    b. Accelerating elimination of backward production: to follow the guidance of " Guiding catalog for elimination of backward technologies, devices and products in some industrial sectors (2010)" and "Guiding catalog for adjusting industrial structure (2011) (revised)"; to conduct comprehensive investigation over scattered small-scale industrial enterprises of backward devices and poor devices for environmental protection.
    c. Reducing excessive production capacity: to increase enforcing and punishing intensity concerning environmental protection and energy consumption; to formulate fiscal, land and financial policies to promote exit of "two-intensive" enterprises; incremental production project in production-excessive industries will not be approved.

   d. Suspending illegal projects under construction in industries of extremely excessive production capacity. Here, local government should strengthen organizational leadership and supervision to play its role.

3. Accelerating Technological Transformation in Enterprises, and Improving Innovation Capacity
   a. Strengthening technological research and promotion: to strengthen support for science and compounds control, diesel (vehicle) emissions purification, environmental monitoring, new energy vehicles, smart grid, etc. and their promotion; to increase international communication and cooperation on advanced technologies and management experiences.
   b. Promoting cleaner production comprehensively: to conduct cleaner production audits in key industries, including iron and steel, cement, chemical, petrochemical, non-ferrous metal smelting and so on; to promote product innovation of non-organic solvent-based paints and pesticides; to develop new varieties of slow-release fertilizers.
   c. Promoting circular economy: to encourage development of industry clusters and conduct circular improvement over the clusters; to promote synergistic waste disposal of industrial furnaces and blast furnace among cement and iron and steel industries; to promote re-production of electromechanical products.
   e. Fostering energy saving and environmental protection industries: to transfer political requirements to curb air pollution into market demands for the development of energy saving and environmental protection industries; to encourage foreign investment in these industries.
4. Accelerating Energy Structure Adjustment, and Increasing Supply of Clean Energy
   a. Controlling total amount of coal consumption: to formulate mid and long term targets for national coal consumption, and implement target-based and responsibility specific management; new construction projects in Jingjinji Area, Yangtze River Delta and Pearl River Delta should be prohibited to construct affiliated coal-fired power plants.
   b. Accelerating replacement to clean energy: to increase supply of natural gas, synthetic natural gas (SNG) and coal bed methane; to formulate SNG development plan, so as to promote the industrialization and scaling up of SNG, with the premise of meeting environmental requirements and water demands; to develop hydropower, geothermal power, wind power, solar power, biomass and nuclear power with the premise of guaranteeing safety issue; to accelerate replacement rate of natural gas facilities in Jingjinji Area, Yangtze River Delta and Pearl River Delta.
   c. Promoting cleaner utilization of coal: to increase proportion of coal washing; to prohibit import of low quality coal of high-ash, high-sulfur content; to constrain import of sulfur petroleum coke; to expand banning area of pollution-intensive fuel combustion in urban area, and spread to rural area gradually.
   d. Increasing efficiency of energy utilization: to strictly implement energy saving evaluation and audit system; to promote development of green building, by implementing green building standards first in public building and public housing invested by government; to promote heat metering reform; to accelerate construction and improvement of heat pipe network.

Limited use of cars – using the odd number/even number system. (limitation – people just buy two cars increasing the number of cars in use and by extension increasing the amount of emissions)

Publicity campaigns; putting out alerts on days when pollution is severe. Shutting down schools and public places to limit outdoor activities

Cutting down industrial activity by imposing maximum emission limits on companies cutting down fossil emissions.

Chinese anti-pollution law

Limitations

One year after the Chinese government enacted the new "Measures on Environmental Information Disclosure" laws, an investigation by Greenpeace China has found that 18 Chinese and multinational firms are failing to comply with the regulations.

The law, which went into effect in May 2008, requires companies to publish their pollution information within 30 days of being reported as breaking pollution standards by local environmental bureaus. One year later, many top corporations had violated the terms of the law.

The multinational firms on the list are: Shell, Samsung Electronics, Nestle, LG, Kraft, Motorola, Denso and Bridgestone. Another 10 Chinese firms were found to be evading the regulation's requirements.

Greenpeace undertook the investigation to compare the regulations required in China -- and companies' failure to abide by them -- with the regulations those same companies adhere to in other countries.

China's "Measures on Environmental Information Disclosure" law is seen as a step toward developing regulations similar to the Toxics Release Inventory in the United States, which has been credited as one of the most effective and low-cost tools for reducing industrial pollution in the U.S.

"Evidence shows that a strong information disclosure system helped reduce pollution in the United States by 61 percent in 20 years," said Tianjie Ma, Senior Campaigner for Greenpeace China. "The public has a right to know about what these corporations are discharging in the rivers and lakes around their communities and what risks they face."

This investigation shows how, just as China has become central to many firms' supply chains, it is also quickly becoming ground zero for environmental issues. With the country recently overtaking the United States as the world's biggest emitter of greenhouse gases, the need for swift progress on environmental issues of all types has moved to center stage.

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