

Policy brief

Air pollution in China

Introduction

Air pollution is the main problem for the world that contributes to millions of premature deaths around the world each year. In China, the industry has wrought a significant level of air pollution that affects social, economic, and also political problems. China's leaders have responded with measures designed to improve air quality in the country, but it will cost a lot of funds and they have faced significant challenges in balancing economic growth with environmental and social welfare.

Causes of air pollution in China

The causes of widespread air pollution can be caused by several numbers of factors:

- **Indoor smoke from household**

Apart from outdoor air pollution, indoor air pollution is a serious health risk for some 2.6 billion people who cook and heat their houses with biomass fuels and coal.

- **Population Growth**

Population growth in China brings with it widespread pollution. Especially Beijing's population, which has increased from 11 to 16 million in only 7 years, and has doubled over the past century.

- **Increasing number of motorized vehicles**

Increasing number of motorized vehicles, especially in Beijing, on Beijing's roads has doubled to 3.3 million which increases 1,200 each day. As a result, emissions from motorized vehicles cause nearly 70% of Beijing's air pollution which have the most 4 dangerous pollutants that included: sulfur dioxide (SO₂), nitrogen dioxide (NO₂), carbon monoxide (CO), and particulate matter, like PM₁₀.

- **Factory and Manufacture**

China's industrial sector has been involved in causing air pollution. The overall country's energy consumption came from coal, which helps explain why China accounts for 28 percent of all global CO₂ emissions. However, China still continues to produce energy from coal. For instance, this causes a lot of emissions compared to other countries in the world combined.

- **Natural Reasons**

China's air pollution is also caused by natural reasons which include the city's surrounding topography, seasonal weather and climate change. The quality of air worsens in spring and summer when temperature and humidity levels rise.

Effects of air pollution in China

With the rapid growth of the economy, environmental pollution has become a serious issue in China. According to data from the Ministry of Environmental Protection, the average fine particulate matter (PM_{2.5}) concentration reached 72 µg/m³ in 2013. Therefore, 99% of China's population lived in areas exceeding the World Health Organization (WHO) Air Quality Guideline of 10 µg/m³ PM_{2.5}. China has become one of the countries with the highest environmental burden disease in the world. It affects many parts of well-being and people in China.

- **Environment**

As the largest developing country in the world, China has achieved rapid economic development, averaging an annual GDP growth rate of 10% over the past two decades. But this success comes at the cost of deterioration of the environment. China's environmental problems, including outdoor and indoor air pollution, water shortages and pollution, desertification and soil pollution. In Chinese cities, outdoor air pollution is the biggest environmental challenge for public health. Air pollution from some urban and industrial areas also affects local crops and vegetables. There have been acid rains in 102 cities.

- **Public health**

The levels of PM_{2.5} in the air are associated with the risk of deaths from all causes. The carrier of air pollutants such as PM_{2.5} has been linked to cardiovascular diseases, which increased mortality rates. PM_{2.5} can harm the respiratory system, the cardiovascular system, the nervous system and the immune system. Air pollution also has both acute and chronic effects on human health by affecting a number of different systems and organs.

- **Economic**

Air pollution and economic development are two intertwined topics, but the two tend to run in opposite directions. Air pollution is clearly very costly, though, to its \$11-trillion-plus economy. It dings China's GDP about 6.5 percent annually, according to RAND Corp. estimates. Those costs are mainly driven by lost productivity, since factories are shut down on bad air days to avoid the dangerous health effects of breathing the dense, toxic air.

China's policies for air pollution

In 2013, after Beijing's 'airpocalypse', China began to clean up the air quality among the cities in the nation. First, China replaced old power plants with new coal-fired power plants in large cities, such as Beijing, Tianjin, and Yangtze Delta. The government also started to restrict the amount of cars on the road and rather use electric buses to reduce carbon footprints. China also shut down its coal mines across the country.

China introduced new campaigns and programs to plant more than 35 billion trees in 12 provinces across the country. This made China's forest per hectare exceed the US and Europe. The government also implemented the Air Pollution Plan in 2013 as phase one to improve air quality in China. They started by reducing annual average PM2.5 levels by 35%. As for the second phase, in 2018, China implemented a three-year action plan for reducing PM2.5 levels by at least 18% in 2015. However, these plans only reduce the amount of PM2.5 levels but not focusing on the purity of the air from other factors that affect China's overall air quality. Some other policies will be mentioned in the next following paragraphs.

- **Reducing coal consumption**

The biggest cause of air pollutants and greenhouse emissions in China is coal . Wangping Power Company has installed two heat recovery units and a heat pipeline to Huairan County by using the financing from the program. These two heat recovery units and a heat pipeline are used to capture the waste heat from electrical production and reuse it to heat homes. So this program leads to a reduction of small polluting coal boilers that were used for heating, and reduction of the CO2 emission

by 420,000 tons, nitrogen oxide by over 6,330 tons, sulphur dioxide by over 13,100 tons every year.

- **Financing ultra-low-emission upgrades**

In several cases, like Yishui county of Shandong province, which has Qingyuan Food Company makes noodles, biscuits, corn starch and the other. While its power and heat plant still provides winter heating to local and steam to smaller enterprises for meeting its own needs. Therefore, the company decided to increase co-generation, production of power and heat, capacity and efficiency to provide heating to 300,000 people and 160 small enterprises and remove 35 small inefficient and polluting coal-fired boilers. Moreover, the company is also adopting the most advanced dust removal technology with efficiency up to 95%.

- **The innovative business model for distributed solar**

A highway-operating company has found a solution to the main difficulties of solar power including access to financing and rooftop space. The company has installed solar PV systems in the open space along highways, tunnel exits, on the rooftops of toll stations and rest areas. The electricity produced from solar PV systems is sold to the state power grid. In 2017 China built six solar PV stations and it generated over 11 million kilowatt-hours. This program led to a CO₂ reduction of over 11,000 tons.

- **Leveraging additional resources and scaling up green financing**

The program has financed 13 subprojects with an amount investment of \$660 million of which \$290 million come from the World Bank and Hua Xia Bank. Director said “these projects have achieved benefits from reducing coal consumption by 560,000 tons and large amounts of sulfur and nitrogen. The global environmental facility (GEF) provides a grant to support implementation of the program that focuses on improving the result measurement and verification system, building capacity, and developing innovative financial products. The path of Hua Xia Bank is to corporate business development strategy and hope to become one of the leading financial institutions. The scaled-up green finance investments under the program have leveraged 5 times to the World Bank loan. Furthermore, there are significant climate change benefits that reduce the CO₂ emissions by 1.5 million per year.

Our recommended policies for air pollution in China

Our group suggests policies that focus on the factors. First of all, industry because we think it is the largest factor causing the air pollution. Therefore, we will suggest clean technologies that reduce industrial emission or improved management of urban and agricultural waste. For example, capture of methane gas like use as biogas. Second, transportation is also a significant factor; we will suggest dropping the heavy-duty diesel vehicles and raising low-emissions vehicles and fuels.

Government can also impose higher tax fines which can be applied to the industrial sector, by setting the emission standard or limiting the pollution from a process that has been generated by each industry.

Furthermore, by doing a campaign which will persuade people to use more public transportation, changing from using the petrol car to electric vehicles. By providing more subsidies and convenient transportation facilities.