

China's Pollution Revolution

Could Beijing's Coal Addiction Be Its Downfall?

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Any of us have nostalgic memories of waking up on winter mornings to welcome news of a snow day, allowing us to skip school or stay under the blanket for a few more precious hours. As temperatures drop in the Chinese mainland, schoolchildren there have become acquainted with their own version of a snow day: The smog day, which occurs when schools and workplaces shut down due to hazardous levels of pollution and heavy haze. But you can't make smog angels. Indeed, citizen discontent at China's off-the-charts environmental degradation is quickly growing into a potential menace to the ruling Communist regime. Issues like unmet demand for political rights are no longer the party's only existential threat.

In one symptom of China's growing environmental menace, city-wide shutdowns are becoming the new normal. In January, a thick blanket of soot descended on Beijing, bringing life to a near halt. In October, the level of pollution in Harbin, a city of 10 million in northeast China, exceeded the level acceptable to the World Health Organization by a factor of 40; schools, roads, and airports were forced to close. In early December, an entire swath of central and eastern China – Jiangsu, Zhejiang, Anhui, and Henan provinces – suffered a bout of heavy and dangerous pollution. In Nanjing, a city of 8 million, schools, ferries, highways, and airports shut down. And in Shanghai, China's financial hub, visibility was reduced to a several feet for much of early December, as many covered their faces with masks and authorities issued warnings for children and the elderly to stay indoors until the air cleared. Even in Hong Kong, a special administrative region with different laws and much higher living standards than the mainland, pollution reached a "very dangerous" level on Dec. 10.

The all-engulfing environmental crisis China faces is not about melting ice and rising temperatures – in fact, it is the unusually cold winter that is driving up energy use and hence pollution. (In China, coal is king, which is why winters are particularly polluted times.) Rather, Chinese citizens are angry about much more pressing and existential needs: to breathe clean air, for example, and to escape cancer and other pollution-related afflictions. Lung cancer rates in China are skyrocketing, and not only due to smoking. Skin cancer, on the other hand, is much less widespread. U.S. rates are over 50 times China's – melanoma grows far less frequently where the sun is blocked by tiny airborne particles.

None of this is really new. What is different is the degree to which the problem has entered Chinese public dialogue. Chinese are more aware than ever of the poor quality of their air and are growing increasingly irate with their government's failure to demonstratively address the problem. Prosperity has sent millions of Chinese to sunny foreign destinations, where tourists have discovered that the sky is actually blue and, hence, that their country's air quality is abnormal. News reports about pollution have been appearing frequently in China's state media, air purifiers and pollution readers have become popular household gadgets, and citizens can tune in to the color-coded alert system of the China Meteorological Center, the country's weather service. PM 2.5, a measure of pollution describing particles smaller than 2.5 micrometers which

can penetrate the bronchial tubes of the lungs, was a term until recently known only to environmental professionals. Now, it has become part of Chinese slang.

No one should doubt the sincerity of Chinese leaders' desire to address the problem – they are aware that deteriorating air quality could be a chronic source of social discontent. During December's Smoggeddon, a journalist from China Central Television, the country's main TV network, tried to put a positive spin on the situation, claiming that it unifies the Chinese people, and that it makes people "funnier" and more knowledgeable. Another article -- you can't make this up -- claimed smog could contribute to national security by reducing the effectiveness of enemy missiles and surveillance systems. Some Chinese responded furiously on microblogs, venting their anger at the regime's apathy. But a close read of the statements coming out of the party's Third Plenum, a high-level meeting to discuss China's political and economic future which took place in November, reveals that the leadership is deeply worried about the new menace. They know that their response can no longer be limited to symbolic measures like cracking down on outdoor barbecue stalls, anti-smoking campaigns, restricting car use, or even throwing money at the problem.

But what – if anything – can be done? China will not be able to address its pollution problem without substantial reduction in the air pollution resulting from electricity generation. China now uses roughly as much coal as the rest of the world combined, and the commodity occupies 65 percent of China's electricity mix, with fully half of the country's rail traffic dedicated to transporting it. Rejiggering this massive imbalance would entail either replacing China's current fleet of coal plants with super clean, yet expensive, technology like Integrated Gasification Combined Cycle (IGCC), which turns coal into gas while removing impurities before combustion, or the slow shift in power generation away from coal and toward natural gas, nuclear power, and renewables.

Each alternative to coal presents its own complications. Natural gas use could be vastly expanded if China cracked the secrets to exploiting its shale gas reserves, the largest in the world. But this is no simple task: China's shale deposits lie twice as deep as those in the United States, and the country lacks ample supplies of water, a resource necessary for fracking. Hydroelectricity is more promising, but that too poses environmental and power transmission problems, not to mention political issues with downstream countries that share these rivers. China is trying to expand that sector in the regions where water is abundant -- about 100 dams are being built or planned on the Yangtze River alone. And despite trepidation following the March 2011 Fukushima accident in Japan, China is ploughing forward with nuclear power, which currently accounts for only 1 percent of the country's electricity supply. Thirty nuclear plants currently under construction, with dozens more on the drawing board, will help increase the percentage of clean energy in China.

But no energy alternatives will be able to dethrone coal any time soon. China has over 300 proposed coal-fired power plants waiting in the pipeline, compared to roughly 650 in operation, and Chinese officials project that by 2020, coal use will have increased 36 percent over 2012 levels. The International Energy Agency's doesn't see China's coal demand plateauing until at least 2025.

Meanwhile, the oil-dominated transportation sector, a major contributor to air pollution, will also take many years to clean up. While local authorities are getting serious about capping the number of new vehicles allowed on the road, China's automobile market – the largest in the world – is still growing at a blistering pace: the most recent numbers, for November, show 14.9 percent year-on-year growth. Many provinces are experimenting with deploying vehicles fueled by natural gas or methanol, which in China is made from coal in a clean process. But the air quality gains accomplished by the shift to alternative fuels are not even close to offsetting the vast increase in emissions driven by China's growing demand for cars.

Making matters worse, China's energy prices are heavily subsidized, meaning they are far too cheap to incentivize energy efficiency. The price of a kilowatt-hour of electricity in China is 8 cents. In the United States, where cheap natural gas and coal are abundant, the average is 12 cents; in Japan the average is 26 cents; and in northern Europe, it's over 30 cents. Due to price caps, gasoline prices are also relatively low for a country that just became the world's largest oil importer: 30 percent cheaper than in Japan, and just over half the average price across Europe. Allowing energy prices to rise to market levels by eliminating subsidies and price controls could curb energy demand while making clean coal combustion technologies more competitive. But a policy of de-subsidization would come at a cost: It would drive manufacturing capacity out of China, slow economic growth, breed social discontent, and hinder the very same reforms aimed at bringing President Xi Jinping's so-called Chinese Dream to the masses.

This is the hard truth with which China's leadership – not to mention the rest of the world – is starting to contend. China is caught between the desire to grow and the need to breathe. Ten percent annual increases in industrial output may elicit cheers from financial markets, but such a growth rate may come at a cost of national suffocation.