

Greening China's Growth

Some costs of China's rapid development have fallen on the environment, and these costs are substantial – around 26 percent of deaths in China are estimated to be linked to illnesses associated with pollution and other environmental health risks. The cost of environmental degradation has been estimated to be around nine percent of GDP. The environmental problems take many forms, but the three main acute threats discussed here are air, water and soil pollution, although there are also significant issues related to solid waste, forest management, fisheries, land degradation, and natural disasters.¹ One of President Xi Jinping's three priorities announced at the 19th Party Congress in October 2017 is the reduction of environmental degradation.

Air pollution

China's energy sector has developed rapidly since 1979 and China is now the world's largest energy consumer and the largest greenhouse gas emitter. Energy consumption increased five-fold to fuel an economy that increased 18-fold and satisfy the need of an urban population that more than doubled. China now provides electricity to nearly all its population. Air pollution is the primary environmental concern in cities. In 2016, only 8 of 74 cities met national standards for air quality. Coal is a dominant source of air pollution, representing 53 percent of primary emissions nationwide. Emissions from road transport are rising, particularly in large metropolitan areas. A disproportionate share of pollution comes from large trucks, despite them being a relatively small segment of the vehicle fleet.

Water pollution

China's per capita water availability is just 25 percent of the world's average, which makes water pollution a pressing issue. Surface water quality has improved over the past decade, but pollution remains a serious problem. In 2016, nearly 30 percent of water sampled in the country's major river basins was unfit for human use; about 9 percent was so severely polluted it was unfit for any use. Groundwater quality is declining and it is an important source of drinking water in some cities and rural and peri-urban areas. In 2016, over 60 percent of monitored groundwater sites were of poor quality.

Soil pollution

Soil pollutants contaminate the food chain, and pollute groundwater as well as surface waters. Over a third of points tested in and around industrial legacy sites and highly-polluting enterprise sites do not meet standards. Inorganic pollutants – most notably cadmium, mercury, arsenic, copper, lead, chromium, zinc and nickel – are the main threats. About 20 percent of soil tested in agricultural areas also did not meet standards, posing a risk to food safety as well as the health of those who work the land. Because of

¹ This is a summary policy note that draws from the following publications and details and references can be found in them.

The World Bank (2018) *China: Towards a More Inclusive and Sustainable Development*, <http://documents.worldbank.org/curated/en/147231519162198351/China-Systematic-Country-Diagnostic-towards-a-more-inclusive-and-sustainable-development>;

The World Bank (2018), *Reducing Pollution in China* <http://www.worldbank.org/en/topic/environment/brief/pollution>;

The World Bank (2018) *China: Air, Land and Water* <http://siteresources.worldbank.org/INTEAPREGTOPENVIRONMENT/Resources/china-environment1.pdf>

water scarcity, China began using sewage water for irrigation in the 1950s, and farmland irrigated with wastewater jumped from 100 km² in 1957 to above 30,000 km². The State Council's 2013 ban of sewage water for irrigation has proven difficult to enforce.

Greening China

Pollution's most immediate threat stems from its toll on public health, and these costs are large and growing. Welfare losses associated with mortality from pollution during 1995-2015 were 3 percent of GDP. Deaths from air pollution represent the largest share of damage. By some estimates, the health costs of urban air pollution rose by more than 400 percent in real terms between 1975 and 2015, despite measurable reductions in pollutants.

Pollution is harming China's economy through lost days at work, depressed real estate prices, pollution-induced water shortages, and farmers' overspending on fertilizers. Over the longer term, pollution degrades productive assets, including natural assets such as forests, farmland, and wetlands. Heavy metal contamination takes fertile lands out of production.

The scale and complexity of environmental problems require a new approach to growth policy. "Green growth" is a model of growth that seeks to further economic development while ensuring sustainability of resources and environmental services that will improve well-being in the future.

It relies on a broad mix of policy instruments, including environmental standards and policies to change behavior as well as consumption patterns, effected through market-based incentives. The 13th Five Year Plan (2016-2020) is a turning point toward green development, laying out ambitious targets for a healthier environment as well as economy over the next 10 to 20 years. In order for the longer-term policy vision of a greener China to be credible, the country has to turn the tide of rising environmental costs in its next Five-Year Plan. Here are some of our recommendations.

Strengthening environmental institutions

The revised Environmental Protection Law strengthens the enforcement powers of local Environmental Protection Bureaus, and incorporates environmental targets into performance evaluations for local officials. Possible reforms to further strengthen environmental agencies would include granting local Environmental Protection Bureaus greater autonomy or higher rank. This will make them less dependent on local governments, and empower them via clearer enforcement powers over SOEs in their jurisdictions.

Regional institutions for managing air and water pollution must be endowed with greater authority. Air and water pollution travel downstream as well as downwind, crossing administrative boundaries. Solutions can only be cost-effective when dealt with in co-operation beyond the individual jurisdictions of local governments. Energy policy should be directed toward reviving stalled reforms to foster competitive and sustainable energy markets. In the power sector, the State Council's Decree No. 9 has begun reforms with more market-determined pricing, a two-part tariff separating transmission pricing from generation and gradually reducing quotas that have hindered the dispatch of renewable energy.

Better environmental information

Improving the environment will require better data on the sources, impacts and costs of pollution. National networks for monitoring air, water and soil quality will need to be expanded and integrated. This will mean investing in the capacity of city and county offices to gather — and publicly report — accurate energy and water use statistics as well as data on industrial discharge.

Transportation and energy

China should rapidly phase out the most polluting cars and trucks by measures that penalize high-emissions vehicles or by offering incentives for their early retirement. Coal is the most harmful fuel used today, and its use should be reduced to a level aligned with the environment's absorptive capacity. In both urban and rural households there is excessive reliance on solid fuels. These should be phased out and replaced by modern forms of energy such as LPG and electricity.

Air pollution

China can reduce the costs of meeting its air quality objectives by an estimated 60 percent and reduce local air pollution by an even greater margin if it integrates investments in energy efficiency, co-generation, renewable power generation, and other GHG-reducing measures into local Active Quality Management programs. The main tasks facing cities include expanding clean energy supply, limiting direct coal use, eliminating inefficient boilers, as well as encouraging the cogeneration of heat and electricity. Industrial energy efficiency can be improved by rebalancing administrative measures with more market-based approaches, in order to motivate enterprises to implement energy efficiency measures as a part of their operations. This may include the flexibility to fulfill mandated energy savings targets by trading certificates denominated in carbon or energy.

Soil pollution

Preventing and remediating soil contamination will require a comprehensive set of actions. These include improvements in the legal framework, raising awareness on the cost of pollution, as well as the promotion of integrated environmental management systems in the industrial, agricultural, and mining sectors. These also include assistance for compliance, strengthening the government's enforcement capacity, actively learning from international experience, and adopting best practices in the proactive management of soil contamination risks. The establishment of an environmental monitoring and warning system for soil contamination, plus the development and application of GIS-based pollution data processing and mapping tools will also be helpful.

Land Use

Market forces can improve the efficiency of land conversion and relieve pressures on natural spaces and ecosystems. Creating a national system for the unified registration of real estate would improve the efficiency of administration, offer better registration quality, and protect the rights and interests of rural farmers and all other land owners. In addition, improving the right to use rural collective land and protecting the rights and interests of farmers will lead to a better allocation of income and wealth. Rural

and urban land use could be further improved by allocating rural land in a more market-driven way, pricing land competitively and strengthening local government finances.

Reform priorities

There are three basic themes to the proposed reforms, and they can be pursued simultaneously:

Relieving institutional bottlenecks by (i) adopting regional approaches to air and water pollution; (ii) allowing customized quality targets for the most polluted cities in line with their needs and abilities; (iii) reviving energy reforms to build competitive energy markets; and (iv) changing the management as well as financing sources of environmental services such as waste collection and disposal.

“Smart” Technologies as A Promising Tool

As seen with *Made in China 2025* policies that seek to capitalize on the economic growth potential associated with greener production and consumption, a key element in the intersection of environmental goals and growth is China’s pursuit of smart cities.ⁱ ICT can be an effective solution for institutional bottlenecks. Smart cities focus on utilizing information technology to improve the overall management of a city and raise its quality and livability.ⁱⁱ This includes a variety of eco-friendly policies, ranging from green transportation and energy efficient buildings, to better management of natural resources like energy and water. Estimates for the global smart city market segments like energy, transport, healthcare, and infrastructure are about USD1.5 trillion.ⁱⁱⁱ

In 2016, the International Advisory Group for Green and Smart Urbanization, under the auspices of China’s State Council and the China Development Bank, issued guidelines for green and smart urban development directed at state agencies. They emphasized using smart technology to advance green objectives.^{iv}

Adopting cross-cutting solutions such as reducing coal consumption to further boost energy efficiency, phasing out high-pollution transportation, updating fuel quality, reforming residential gas markets to reach air pollution target, and preventing further soil contamination. To achieve these aims many governance changes are required. China needs to improve the legal framework by strengthening enforcement mechanisms, raise awareness about the cost of pollution, promote integrated environmental management systems in industrial, agricultural and mining sectors and establish environmental monitoring and early warning systems.

A Solution in Grid Connectivity and Ultra-High Voltage Transmission

The major problem of China’s green energy production is the state power grid’s inability to integrate this rapid expansion of green power sources. In 2016, many wind and solar power facilities were regularly shut down despite being able to generate power, as there were no avenues to transmit excess power into the state electricity grid. This resulted in wind power output being curtailed by 15 percent, and solar power by 9 percent. In contrast, curtailment rates in Europe were at only 1 percent and 2 percent, respectively. In the last two years, the directives from China’s National Energy Administration to power transmission companies to provide grid connectivity for all renewable power

generation,^v and the construction of a system of ultra-high-voltage (UHV) transmission lines have largely resolved the curtailment problem.

Using market-based instruments, including a national carbon emissions trading system and greater reliance on the market in the energy sector. China should also introduce payments for ecosystem services to confront the growing challenge of non-point sources of water pollution. China should improve the efficiency of land conversion by creating unified standards and procedures, as well as allowing market forces to play a greater role in adjusting prices for basic environmental services such as waste collection and disposal.

An Example in Emissions Trading System^{vi}

One significant policy in China's commitments to reducing air pollution and CO₂ emissions is its national carbon emissions trading system (ETS). The first nationwide phase of the ETS began in January 2018, after 7 years of experimentation and fine-tuning. In 2011, the government approved the launch of carbon trading in Beijing, Tianjin, Shenzhen, Shanghai, Chongqing, Guangdong, and Hubei, which accounted for 27 percent of China's GDP. Reported compliance rates were 100% for Shanghai and Shenzhen, while the other zones exceeded 95% during the first year.^{vii} The nation-wide ETS creates a single market with unified rules. China's carbon market is the largest in the world, and about twice the size of the next largest, which is the EU Emission Trading Scheme.^{viii}

Through policies such as *Made in China 2025*, the acceleration of green energy production, plus the pursuit of smarter, greener, more sustainable cities, the Chinese government is making a clear effort to integrate environmental goals into its growth strategy. The 13th Five Year Plan (2016-2020) articulates this convergence of economic and environmental objectives on one hand, with measures on the other hand to incorporate green technology as well as decouple emissions and environmental degradation from growth. While this road is long, the path forward is clear, and there is ample will to go the distance. The pace of travel, and the extent as well as duration of detours, is where the rubber meets the road.

ⁱ He, Huifeng. "China poised for leadership role in smart city technology as rural to urban migration continues." *South China Morning Post*. Nov. 18, 2015.

ⁱⁱ "Urban China: Toward Efficient, Inclusive, and Sustainable Urbanization." Pg. 526.

ⁱⁱⁱ He, Huifeng. "China poised for leadership role in smart city technology as rural to urban migration continues." *South China Morning Post*. Nov. 18, 2015.

^{iv} Huang, CC, and Edward Qu. "Six Smart Guidelines: CDBC'S Green and Smart Urban Development Guidelines." *China Development Bank Capital*. Oct. 2016.

^v Chen, Kathy, and David Stanway. "China pushes for mandatory integration of renewable power." *Reuters*. Mar. 28, 2016.

^{vi} Cunningham, Edward A. "China's New Plans for a Cap and Trade System Just Might Work." *Foreign Policy*. Oct. 6, 2015.

^{vii} Margolis, Josh, Daniel J. Dudek, and Anders Hove. "Stronger Markets, Cleaner Air: Carbon Emissions Trading – Rolling out a Successful Carbon Trading System." *The Paulson Institute*. 2017.

^{viii} Cunningham, Edward A. "China's New Plans for a Cap and Trade System Just Might Work." *Foreign Policy*. Oct. 6, 2015.

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