

Environment

The Story So Far

China's rapid economic rise has come at a heavy environmental cost, and its population is increasingly demanding an "ecological civilization" that addresses health-threatening air pollution, heavily polluted rivers and groundwater, and contaminated land. Studies estimate premature deaths from air pollution at 1 to 2 million per year, while the World Bank puts the overall cost of China's water pollution crisis at 2.3% of GDP. Policymakers are aware of these threats: the 2013 Third Plenum set environmental reform and sustainable development as some of the government's main responsibilities. Aided by structural transition away from polluting heavy industries, initial reform efforts are making a difference. Yet much more is required to put a sustainable future within reach, let alone to raise China's air and water quality to international standards.

- In 2013, officials released the first "Air Pollution Prevention" plan, requiring major Chinese regions to meet air pollution reduction targets within four years. Beijing was required to reduce air pollution by 33%, prompting it to shutter coal-fired power stations and curtail coal-burning heaters. A 2018 "Blue Sky" action plan built on the original 2013 plan by setting out further reduction targets of at least 18% for large cities and regions that lagged 2013 goals.
- Premier Li Keqiang announced a "war on pollution" in 2014, outlining plans to reduce particulate air pollution, cut production in overcapacity industries like steel and aluminum, shift away from coal power, and develop renewable energy and resources. While previous policy efforts suffered from a lack of concrete action, a revised Environmental Pollution Law reinforced the war on pollution by increasing penalties for polluters and integrating environmental performance into local officials' performance and promotion metrics.
- The winter of 2017–2018 featured an aggressive campaign against air pollution, including a strict coal-heating ban in northern cities. However, natural gas supply shortages and preemptive coal furnace removals prompted a heating crisis in some regions and forced officials to allow some flexibility at the local level. January 2018 revisions to the tax code also implemented sliding pollution tax rates; increased penalties; and initiated new rewards for firms that cut air, water, noise, and solid waste pollution. Importantly, the law put local governments at the forefront of enforcement, enticing them with 100% of pollution tax revenue.

- The State Council created a new Ministry of Ecology and Environment (MEE) in March 2018, consolidating scattered pollution enforcement and environmental powers from seven agencies. The previous Ministry of Environmental Protection had been sharply criticized even by domestic observers for feeble policy and perceived collusion with provincial interests. The MEE was meant to streamline governance and invigorate enforcement and local inspections.

Methodology

For the air pollution index, a range of factors drives seasonal concentrations of PM 2.5; one of the largest is the domestic use of coal for heating and cooking. We source monthly average PM 2.5 data from the China National Environmental Monitoring Center (CNEMC) for 74 Chinese cities. From these data, we remove some of these seasonal effects using a decomposition analysis. We then average the data across the 74 cities to produce our index. Previously, we utilized daily U.S. State Department air quality data from five environmental monitoring stations at U.S. consulates in China. Due to both the retirement of the U.S. State Department's air quality feeds and increased reliability of China's own air quality data, we implemented a switch to CNEMC data for our analysis starting in 3Q2019.

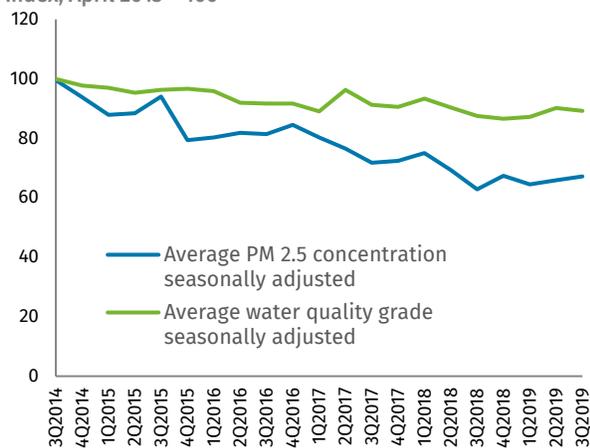
For the water quality index, we use data from the Ministry of Environment and Ecology (MEE). Specifically, we track the average water quality for the Yangtze, Yellow, Pearl, Songhua, Huai, Hai, Liao, and Zhejiang-Fujian river basins. The average water quality from these basins is aggregated into a national indicator. The MEE publishes water quality data on a monthly basis derived from several hundred monitoring stations across the country in key watersheds. Based on 21 indicators, including total nitrogen, pH, dissolved oxygen, heavy metals, chemical oxygen demand, and others (all based on Surface Water Environmental Quality Standard: GB3838-22), these surface water bodies are put into categories ranging from I (excellent, drinking quality) to V+ (high pollution, not suitable for any use). By tracking the changes in these categories over time, our water quality index can provide an idea of the overall health of Chinese surface water supplies. As seasonal effects can change water quality, we seasonally adjust this index as well. In January 2017, the Ministry of Environmental Protection (MEP, now MEE) started issuing weekly quality reports. We rely on these data for December 2016 through June 2018.

We rebase the air quality data to November 2014 as the benchmark to track quarter-on-quarter changes. Water pollution data only go back to October 2012. We also

adjusted the World Health Organization standards to provide a comparable context.

Quarterly Assessment and Outlook

Primary Indicator: Water and Air Quality Trends Index, April 2013 = 100



Source: Ministry of Ecology and Environment, US Department of State, Rhodium Group.

- We slightly downgrade our assessment to below neutral as most indicators showed environmental conditions in China deteriorated this quarter.
- Air and water quality worsened, even though economic activity growth slowed to decade lows.
- China moved to boost nuclear power generation but simultaneously increased coal-fired power plant construction (both domestically and abroad), undermining its emission reduction goals.

This Quarter's Numbers

Note: Due to a disruption in data availability from U.S. State Department Air Quality Monitoring (AQM) stations in China, starting in 3Q2019 we are utilizing data from the China National Environmental Monitoring Center (CNEMC). Our new dataset provides readings for 74 cities across China, up from five AQM stations utilized previously. The use of new data also requires us to rebase our pollution indicators from April 2013 to November 2014.

China's air and water pollution got slightly worse in 3Q2019, even though slower economic growth typically reduces high-polluting industrial activities and overall energy demand. Our **air quality index** modestly decreased, representing a small increase in air pollution. Pollution levels increased by at least 1 microgram per cubic meter of air in 40 out of 74 localities we track, including more than half the sampled cities in strong coastal provinces like

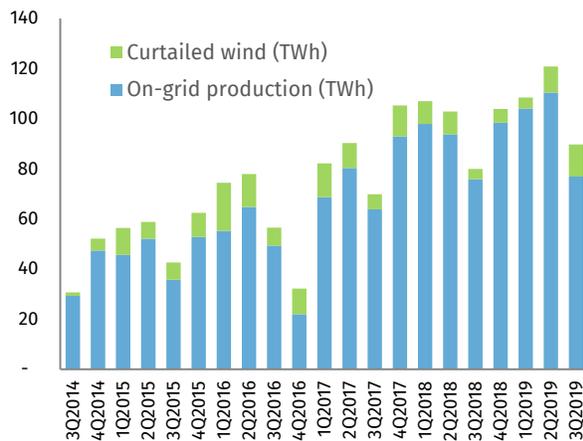
Zhejiang, Jiangsu, and Guangdong, where economic activity is likely less impacted by the aggregate slowdown. This indicator may slightly understate pollution in 3Q2019 due to several outliers; for example, Xingtai in Hebei province recorded a 13-point drop in its monthly PM 2.5 measure from 2Q2019 to 3Q2019, which makes national average pollution levels appear lower.

Water quality declined in three of the eight river systems that we track, with the Huang river system seeing the biggest drop (5% year-on-year). While authorities recently announced several measures to improve water quality in the Yangtze river system, our **water quality index** did not show improvement there in 3Q2019.

New energy vehicles (NEVs) are crucial to China's long-term pollution and environmental plans, but NEV sales declined sharply in 3Q2019, falling nearly 45% year-on-year (see **Sales of New Energy Vehicles**). This marks only the second quarter since 2013 that NEV sales have contracted, this time the result of canceled government subsidies for NEVs aimed at consolidating the industry. If policies prove too blunt, NEV manufacturers could face poorer conditions that result in missed targets for NEV sales. Policymakers must balance policies that support industry growth to meet ambitious NEV adoption goals (25% of all auto sales by 2025) with ensuring the industry is competitive enough to survive in the long term.

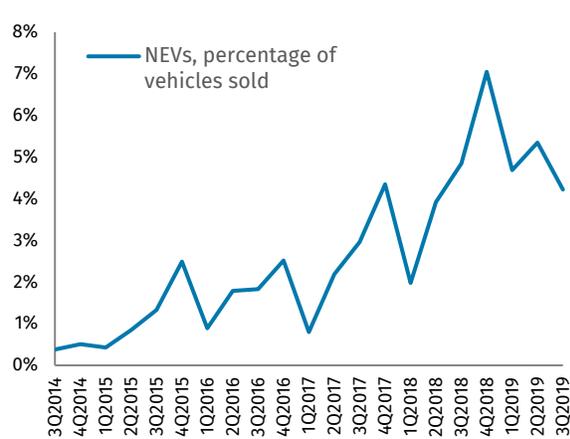
China is utilizing more renewable energy but is not doing so efficiently. The proportion of **spilled wind** –the amount of wind electricity that is wasted because it cannot be transmitted to the grid – increased to 14% of wind power generated. This marks the highest quarterly value since 2017 and is likely a consequence of China's increased wind energy capacity under a major push for renewable energy. At the same time, tighter economic conditions have dampened electricity demand. The resulting mismatch requires more wind farms to curtail generation to avoid overwhelming the grid, suggesting that regulators must improve grid management and interconnection policies. Even though wind and other non-fossil electricity generation moderately increased in 3Q2019, on a seasonally adjusted basis, energy production from fossil fuels rose even more (see **Non-Fossil Generation**). Although China's renewable production capacity continues to increase, this shows how renewables supplement, rather than replace, coal and other thermal power sources.

Supplemental 1: Wind Energy Curtailment
Terawatt hours (TWh)



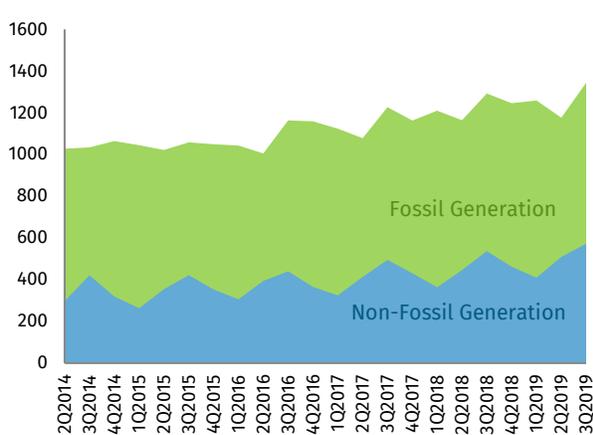
Source: China Electricity Council, Rhodium Group.

Supplemental 2: Sale of New Energy Vehicles
Percent



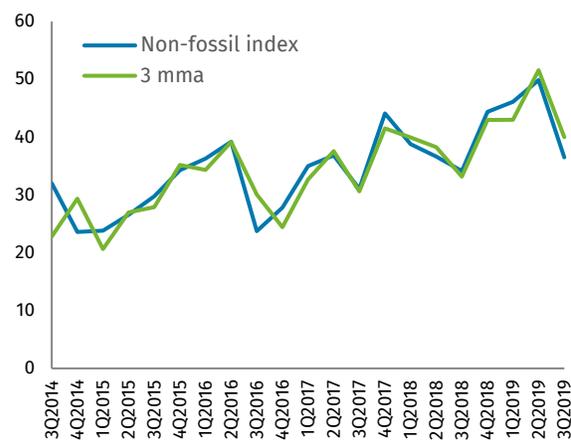
Source: China Association of Automobile Manufacturers, Rhodium Group.

Supplemental 3: Overall Electricity Generation
Billion Kilowatt-Hours



Source: National Bureau of Statistics, China Electricity Council, Rhodium Group.

Supplemental 4: Non-Fossil Electricity Generation
Index



Source: National Bureau of Statistics, China Electricity Council, Rhodium Group.

Policy Analysis

Policy efforts this quarter continued to focus on expanding China’s alternative energy production capacity. On July 25, the National Energy Administration (NEA) announced approval of the first new nuclear power plant construction applications in three years. (China’s nuclear industry has been under a de facto ban on new plant construction since the 2011 Fukushima Daichi disaster in Japan.) Together, China’s new nuclear plants will make it the world’s second-largest nuclear power producer by 2022, reducing its emissions on the margins by increasing the non-coal power supply. However, nuclear is unlikely to be a panacea. First, new coal capacity is also expanding (see below), meaning new nuclear plants are not substituting but rather supplementing coal. Second, the rapid decline in the price of renewable energy sources like solar and wind makes nuclear less cost-competitive.

Even as non-fossil energy generation is expanding, fossil generation is not being phased out as officials have simultaneously ramped up coal consumption and new coal plant approvals. In a meeting of the National Energy Committee in October, Premier Li Keqiang argued that coal and “green” mining – utilizing more environmentally responsible coal-mining practices, including waste reduction and control measures – should be expanded to preserve energy security and winter heating capacity. Media reports claimed that China’s new planned domestic coal assets in 2019 would be equivalent to the coal capacity of the entire European Union. Although renewable energy has rapidly expanded in China and per-unit costs have declined, some policymakers still perceive it as unreliable. They want to ensure China has enough energy capacity to support renewed economic activity in the five-year period ahead – be it fossil or renewable.

China is also backsliding on its environmental pledges internationally. Though China officially promotes a climate-friendly “Green” Belt and Road, including through a 2017 implementing opinion from the Ministry of Ecology and Environment (MEE), Chinese firms are increasingly building new coal plants abroad. One widely cited report from energy nonprofit Institute for Energy Economics and Financial Analysis (IEEFA) found that Chinese financing was responsible for 26% of all new planned and committed coal plants outside the country in 2019. Although China ratified the Paris climate accords and pledged to reach peak emissions by 2030, it has also refrained from making new commitments to cut greenhouse emissions and has reiterated its position that developed countries should provide financing to developing countries to help reduce emissions. This is driven by Beijing’s desire to support its flagship Belt and Road Initiative, domestic employment, and activity in the industrial sector. On September 24, State Councilor Wang Yi declined to commit China to new emissions targets in 2020, a key goal of the 2015 United Nations Climate Change Conference (COP). Wang clarified that China will stick to its existing commitments, which are insufficient to prevent a global temperature rise of 2 degrees Celsius, according to experts. This presaged China’s actions at the COP 25 conference in December 2019, where it successfully pushed to scrap language calling on countries to upgrade their emissions pledges in 2020.