

EXPLORING CHINA'S COAL-WATER NEXUS

Given that China is the world's largest coal producer and consumer—accounting for more than half of the planet's coal consumption—it is worth exploring that country's specific water–energy risks in greater depth. China's total installed coal-fired power generation capacity at the end of 2012 was 758 GW, more than 66 percent of the nation's total power generation capacity.

However, China is also quite dry. Its average water resources are only 1730 m³/yr per capita, barely above the United Nations' water scarcity marker. Eight provinces have fewer than 500 m³/yr per capita of total available surface water, which is on par with Middle Eastern countries such as Jordan or Syria.

More importantly, there's a geographical mismatch between the country's water resources and its coal reserves. While water is generally much more abundant in southern China, two-thirds of China's coal mines are located in the water-stressed north.

According to a recent Wood Mackenzie report, 58 percent of China's existing coal-fired power generation capacity is located in high to extremely high water-stress areas, where local water demands are high and water resources face strong competition among users in the industrial, agricultural, and domestic sectors.

WRI's study found that, as of July 2012, the Chinese government had planned another 363 coal-fired power plants for construction across China. Those plants' combined generating capacity would exceed 557 GW. This amounts to an almost 75 percent increase in the nation's total power-generating capacity, 50 percent of which is located in areas with high to extremely high water stress. More than 60 percent of the proposed generating capacity is slated for six northern provinces, which account for only 5 percent of China's total water resources.

If China builds all the plants now in the planning stages, China's coal industry—including mining, chemical production, and power generation (not including the water withdrawal for once-through cooling systems)—could withdraw as much as 10 billion m³ of water annually by 2015. That's more than one-quarter of the water available for withdrawal every year from the Yellow River. We believe water withdrawal is as important as water consumption because, while water that is withdrawn does return to the ecosystem, it is still not always available for all other users. These water withdrawal and consumption estimates assume no policy changes or technology improvements, so actual usage rates could be lower.

The power plant sites were selected because they are located next to coal mines, a proximity which would reduce coal transportation costs. The proposed sites would, however, exacerbate the industry's environmental impacts on already stressed water resources.

The Chinese government recognizes the need to balance its water and energy consumption. The Ministry of Water Resources recently announced a new policy document called the "Water Allocation Plan for the Development of Coal Bases," aimed at protecting water resources in large coal bases. The plan specifies water use efficiency and discharge requirements for existing coal bases and requires all new coal mines to submit a water resources planning study.

These new rules proved a step in the right direction, since proposed power plants in major coal bases facing water scarcity must apply air cooling technology. Air cooling uses far less water than other cooling systems, so it dramatically reduces coal-fired power plants' overall water usage. The Water Allocation Plan is important, considering most of the bases are already under high water stress. Still, without expanding water recycling and wastewater treatment, additional water withdrawal activities would only make things worse.

A broader policy vision acknowledges and responds to this reality. China's State Council created three national goals for water, called the "Three Red Lines".

The plan aims to cap annual maximum water use nationwide at 700 billion m³, improve industrial water use efficiency to an internationally advanced level, and protect water quality to maximize sustainable development.

In the face of highly stressed water resources, coal mining and power generation industries in China could see increased production costs in the short term as it could be more expensive to access alternative water supplies, address ongoing regulatory changes, and guard against potential disruptions. To mitigate these risks, China should pair water risk management at its power plants with consistent, carefully crafted legislation like the Water Allocation Plan. Such measures may require up-front investment, but any such expenditure will support sustainable water management and long-term business continuity.

Source: <http://endcoal.org/resources/identifying-the-global-coal-industrys-water-risks/?ref=water>