Cutting China's redundant coal power capacity would provide water for 27 million people

Despite a decline in China's coal consumption since 2014, the country's coal power capacity continues to increase, including in areas of high water stress. By 2020, nearly half of China's coal-fired power plants will be located in areas of high water stress. Tackling coal power overcapacity in these areas could save enough water to meet the basic annual needs of 27 million people.

Coal plants guzzle huge quantities of water, exacerbating China's already severe water shortage. As water scarcity intensifies, the problem has become too big to ignore. In 2015, China's per capita water resources amounted to one third of the global average[1].

Greenpeace East Asia urges that provinces prioritise the retirement of coal power plants in high water stress areas and halt the planning and construction of new coal-fired power plants. On a larger scale, continuing China's transition from coal to renewable energy is needed to alleviate water stress, to cut climate warming emissions and to ensure that blue skies become the norm.

Coal power capacity continues to increase in areas of high water stress

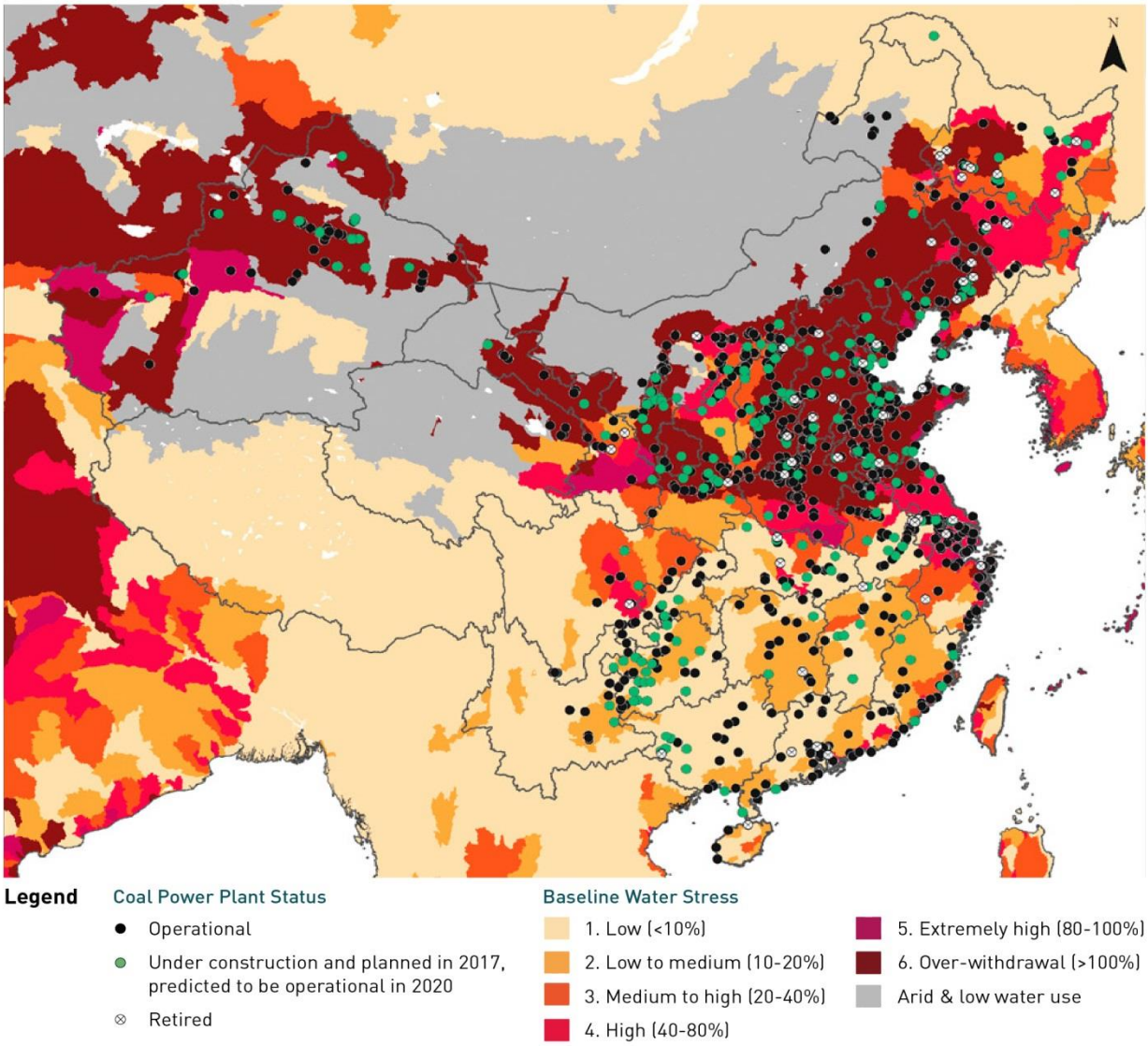
- Coal power capacity[2] in water scarce areas is projected to increase from 437 GW in 2016 to 527 GW in 2020.
- In 2020, the coal power industry is projected to consume more than 3.5 billion m3 of water -- enough to meet the basic needs of over 190 million people.
- In 2020, more than 60% of water consumption from coal-fired power plants is projected to occur in areas of high water stress. In 2020, 17 provinces will experience both high water stress and overcapacity.

The coal power overcapacity bubble is only getting bigger

As demand for coal-fired generation stagnates, China's coal plants have seen historically low utilisation rates. Yet more plants are under construction.

- In 2016, 12.5% of national coal power installed capacity could have been immediately eliminated with no risk of interruption to grid operations (114 GW). By 2020 this figure is projected to reach 19% of national installed capacity (213 GW).
- Utilisation is projected to drop from 4165 hours per year (48%) in 2016 to 3319 hours per year (38%) in 2020.
- According to the 13th Five-Year Plan on Energy, national coal power capacity is set to increase to "1100 GW or less" by 2020. The current 940 GW fleet already suffers from historically low and still declining operating hours.

[1] http://data.stats.gov.cn/easyquery.htm?cn=C01, http://data.worldbank.org/indicator/ER.H2O.INTR.PC
[2] We exclude plants that use seawater or brackish water.



Predicted Distribution of Coal Power Plants in 2020 in Mainland China with Baseline Water Stress of the Mapped Region[3]

Background

The end to coal power generation growth, with the implementation of a decentralised permitting process, have created an unprecedented coal overcapacity bubble. Following a two-decade increase in coal-fired power generation, China's coal consumption began to drop in 2014.[4] In 2015, thermal power [5] utilization fell below 50% for the first time on record. In 2016, thermal

[3] Baseline water stress data as per World Resources Institute, http://www.wri.org/our-work/project/aqueduct/ , coal plant data based on http://coalswarm.org/ . Our research of coal power plants is limited to mainland China

[4] http://energydesk.greenpeace.org/2017/02/28/china-carbon-co2-emissions-coal-oil-energy-2016/

[5] Coal power capacity accounts for 90% of thermal power capacity in China. By the end of 2016, China's coal power capacity amounted to 942GW and thermal power capacity amounted to 1050GW. The

power utilization continued to fall to 4165 hours per year. While the first half of 2017 saw a small increase in thermal power utilisation hours, the China Electricity Council projects that operating hours will decline overall 2017[6].

Starting in 2014, authority to issue permits for coal-fired power plants was transferred from the central government to provincial governments.[7] Permitted capacity skyrocketed as governments pursued short term gains while longer-term economic and environmental concerns were overlooked.

China's government has released a series of policies over the past two years to tackle the expanding coal power overcapacity bubble. China's 13th Five Year Plan for Power Sector, announced Nov. 7, 2016, stipulates a coal power capacity target of 1,100 GW or less by 2020[8]. In January 2017 the National Energy Administration sent letters to 13 provinces to enforce the suspension of over 100 planned and under construction plants, totalling more than 120 GW of capacity[9].

Solutions

Greenpeace urges that China reduce unneeded coal power capacity in high water stress areas by 179 GW before 2021[10]. Small, water-cooled plants are the least water efficient and should be phased out first. The operating hours of remaining water-cooled plants in areas of high water stress should be reduced.

Reducing coal power overcapacity in high water stress areas can save as much as 500 million m3 of water in 2020. This is enough to meet the basic annual water needs of 27 million people.

On a larger scale, China must continue its transition away from coal power toward renewable energy. Not only does coal pose a major threat to water supplies, but it is the No. 1 source of air pollution nationwide. Ensuring a sustainable future requires leaving coal behind.

National Energy Administration's power statistics usually only include thermal power data, so researchers based their calculations on thermal power data instead of coal power data. See: http://www.nea.gov.cn/2016-01/29/c_135056890.htm, http://www.nea.gov.cn/2017-01/26/c_136014619.htm

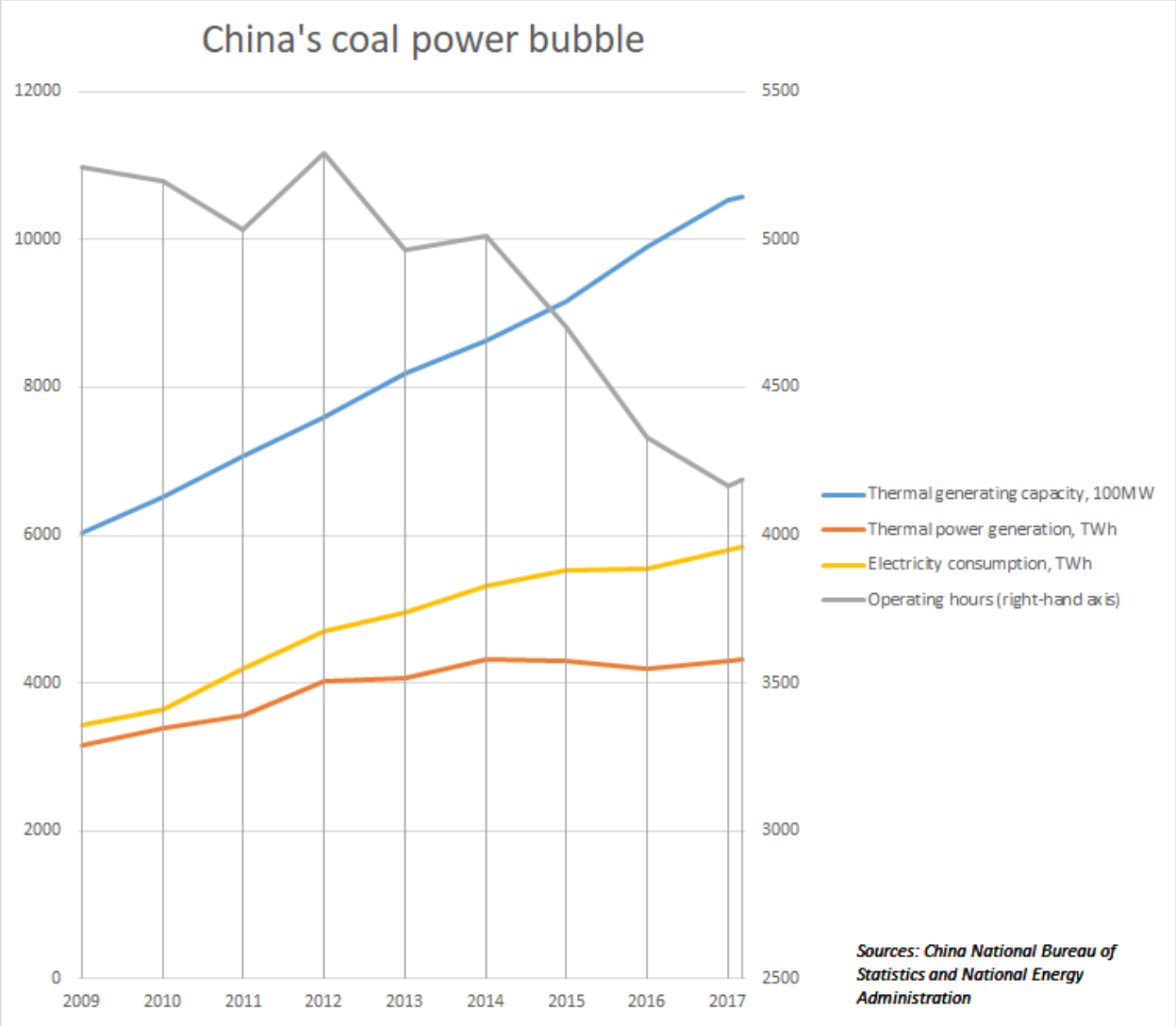
[6] http://www.cec.org.cn/yaowenkuaidi/2017-01-25/164285.html

[7] http://www.nea.gov.cn/2014-01/30/c_133085359.htm; http://finance.sina.com.cn/china/20141118/102520848806.shtml http://www.gov.cn/zhengce/content/2014-11/18/content_9219.htm; http://news.xinhuanet.com/politics/2015-03/19/c_1114698435.htm

[8] http://www.ndrc.gov.cn/zcfb/zcfbghwb/201612/P020161222570036010274.pdf

[9] http://news.bjx.com.cn/html/20170116/803648-4.shtml, http://energydesk.greenpeace.org/2017/01/16/china-coal-power-overcapacity-crackdown/

[10] Data in this briefing are based on a 30% utilisation scenario of Ultra High Voltage (UHV) power transmission lines. Please see full report for details.

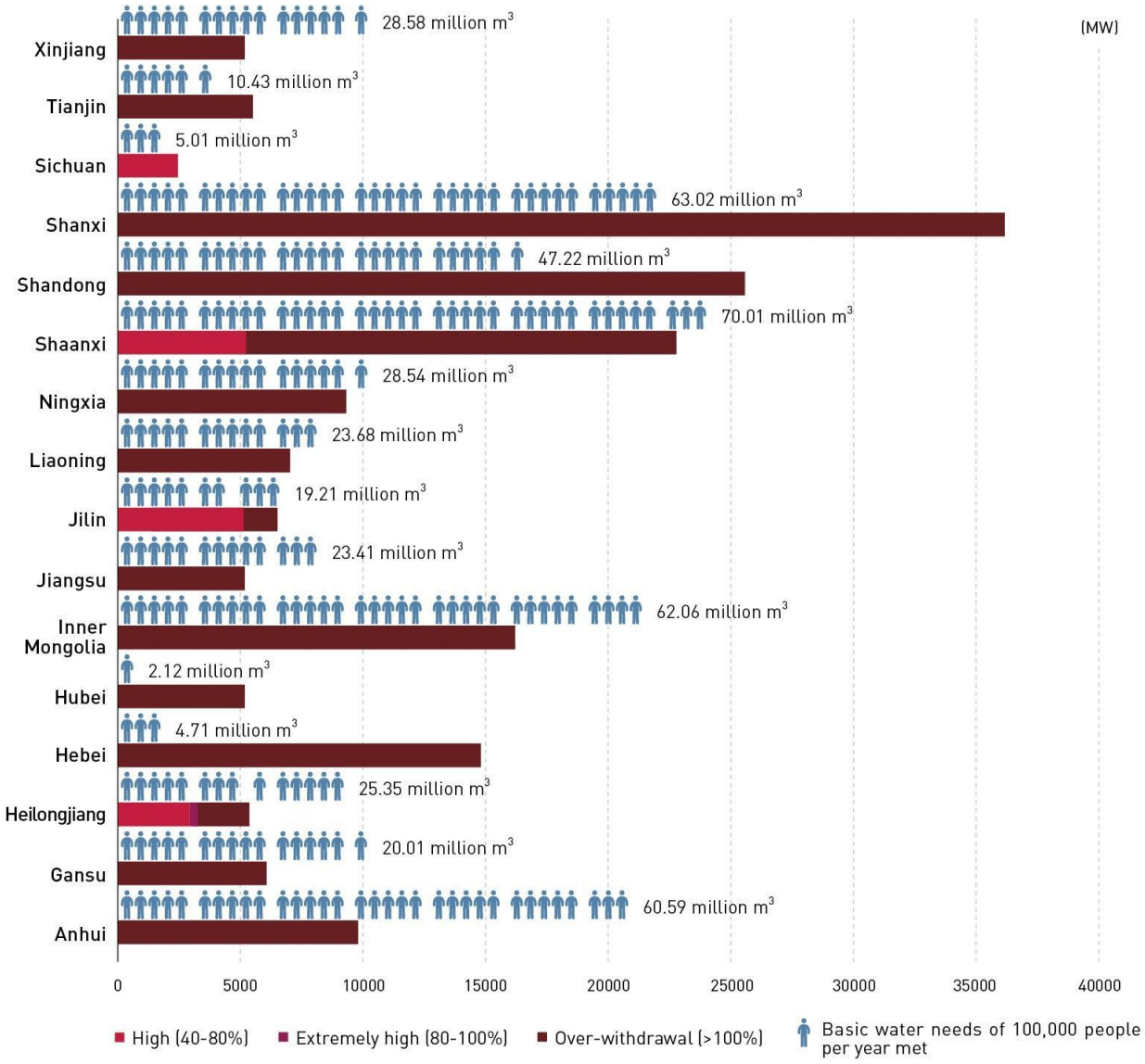


The utilization of China's coal-fired generating capacity started falling precipitously in 2011 as demand for power generation from coal levelled off but utilities kept adding new capacity at a rapid pace.
Source: China National Energy Administration and China Electricity Council, chart made by Greenpeace

Methods

Greenpeace determined the water consumption level and water stress category for each coal-fired power plant based on the World Resources Institute's baseline water stress data and Coal Swarm's global coal plant tracker database, among other resources. To establish the amount of redundant capacity, Greenpeace estimated the quantity of coal-fired capacity needed for reliable grid operation in each province, based on peak power demand and installed capacity.

Coal Power Capacity Reduction and Water Savings in Water Stressed Areas by Province



Note: According to World Health Organization (WHO), 50 to 100 litres of water is needed per person per day for the most basic needs. In this calculation, 50 litres per day per person is used to cover the basic water needs http://www.un.org/waterforlifedecade/