

# Coal's steady retreat gets underway

China's shift toward cleaner energy consumption will be a role model for the rest of the world

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China has never disguised the fact that coal still dominates the country's electricity sector. But as ordinary people focus their attention on the quality of the air they breathe, and on the impact of climate change, the country is seeing a surge in renewable power generation.

As part of China's 13th Five-Year Plan, a total of 150 gigawatts of new coal capacity has been canceled or postponed until at least 2020.

Increasingly strict controls on total coal capacity and power plant emissions are expected to prompt the retirement of up to 20 GW of older plants and spur technological upgrades to China's remaining 1,000 GW of coal power, analysts say.

Coal, however, remains China's largest source of electricity. It accounted for more than 72 percent of the nation's electricity generation in 2015.

That is likely to change, though. Coal's share of China's power generation is expected to steadily decrease to nearly 50 percent by 2040, as renewables and nuclear increase, according to the International Energy Agency (IEA).

"Climate change is real," said Chen Ning, vice-president of Goldwind Australia, a wholly owned subsidiary of Xinjiang Goldwind Science & Technology Co, which is one of China's largest wind turbine manufacturers.

"Although I am not a scientist, we can see the impact of climate change all around us," Chen told *China Daily Asia Weekly* during a forum in Sydney on Oct 22.

He said renewables such as solar and wind power provide positive alternatives to coal, but added: "Coal still has its place in the energy mix, especially in China."

Chen said, "China has implemented strict policies on energy and what will be included in the energy mix."

Clean energy including non-fossil energy and natural gas will replace coal as the primary energy source by 2030 and account for more than half of China's energy mix by around 2045, according to the CNPC Research Institute of Economics and Technology, a leading economic think tank in China.

It said in its long-term energy outlook released on Aug 15 that by 2050, coal, non-fossil energy, and oil and gas, will each take up one-third of China's energy mix.

*China Daily* on Aug 17 quoted Yang Hua, planning director of China National Petroleum Corp, saying the global energy mix is shifting toward a high-efficiency, clean and low-carbon direction, driven by technological improvements and environmental concerns.

Considering China's significant role in global energy consumption, China's shift toward cleaner energy consumption will be a role model for the rest of the world, Yang said.

For years, the dominant energy narrative on China concentrated on the extraordinary pace of its development, the country's success in lifting hundreds of millions of its citizens out of poverty (including energy poverty), the scale of its industrialization and its demand for energy resources, most notably coal.

While elements of this narrative remain true, the country is quickly changing course in the direction of



Technicians work on an electricity transmission tower in Zhoushan, East China's Zhejiang province, on Sept 19. Although coal remains a mainstay of China's electricity, the country is seeing a surge in renewable power generation. IMAGINECHINA



**Chen Ning**, vice-president, Goldwind Australia.

a much more services-based economy and a much cleaner energy mix, according to the IEA's *World Energy Outlook* published in November 2017.

This new direction will have consequences that are no less significant for China and the world than its earlier period of energy-intensive development, the IEA said.

It said coal's share in total generation is likely to fall from two-thirds today to less than 40 percent in 2040, while installed low-carbon capacity, led by hydropower, wind and solar photovoltaics, will grow rapidly and make up 60 percent of total capacity by 2040.

Solar and wind generation have grown more rapidly than other electricity-generation sectors over the past several years, said the Institute

for Energy Economics and Financial Analysis, based in Cleveland, Ohio, which carries out research and analyses on financial and economic issues related to energy and the environment.

China recognizes that cutting energy consumption alone will not take it far enough in reducing its greenhouse gas emissions from coal, said Shanghai-based Nicolas Pechet, a partner in the Asia-focused corporate strategy consulting firm Solidiance.

"It also needs to generate more renewable energy," Pechet told *China Daily Asia Weekly*.

Since 2013, China has been the world's leading installer of solar photovoltaics — the process of converting sunlight directly into electricity.

In 2015, China became the world's largest producer of photovoltaic power, narrowly surpassing Germany. And Chinese solar panel manufacturers are estimated to have a 20 percent cost advantage over their US peers, owing to economies of scale and more advanced supply chain development, according to Pechet.

A large part of the solar power capacity installed in China is in the form of large solar photovoltaics power plants in the western part of the country, much less populated than the eastern part but with better solar resources and available land.

"Ironically, one way China is expanding its solar capacity is by building solar panels on abandoned coal mines," Pechet said. "One such

project in (North China's) Shanxi province covers 160 hectares and can produce enough electricity to power 30,000 homes," he said.

The National Energy Administration set the wind power grid connected capacity target at 210 GW and the wind power generation target at 420 terawatt-hours by the end of 2020 in the 13th Five-Year Plan for Wind Power published in November 2016.

China became the largest wind energy provider worldwide in 2010, with installed wind power capacity reaching 41.8 GW at the end of that year.

However, about one-fourth of this capacity was not connected to the grid, Pechet said.

According to Pechet, transmission capacity of the grid has not kept up with the growth of China's wind farms. In 2009, 8.94 GW, or 72 percent of China's total wind power capacity, was connected to the grid. In 2014, 96.37 GW was connected to the grid, out of a total capacity of 114.6 GW, he said.

Wind and solar energy will account for about 50 percent of the total power produced in the world by 2050, aided largely by lower production costs, with China leading the revolution, a report from Bloomberg New Energy Finance said in August.

China will be at the forefront of the increased generation of clean energy, while power storage will benefit from the rapid advances in battery technologies, the report said.

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The Nature Conservancy's Bedford said China's economic growth has been remarkable, but with that comes increased CO2 emissions and China now leads the world in total emissions.

"Rising sea levels and more extreme weather events like Typhoon Mangkhut also put its heavily populated coast at risk. And there's public

concern on broader environmental issues such as urban air, water quality and soil pollution," he said.

Climate change will put pressure on water sources and increase the risk of droughts in China, which in turn will dramatically affect water-thirsty crops such as rice, Bedford said.

"Being the world's largest rice producer and consumer, the country has

**650**  
million kilowatts  
China's renewable power installed capacity in 2017

already started to safeguard its food security," he said.

"The good news for China is that political timelines there are along five and 10 years, rather than the two- and four-year timelines we have in the US and other Western countries.

"That allows for high consistency and long-term progress measured in real results rather than in political

wins and losses," Bedford said.

One of the big issues that China faces is how climate change affects its water resources.

"Climate change is projected to have substantial impact on China's water resources through factors that include changes in rainfall patterns and increases in the frequencies of droughts and floods in some areas of China," Bedford said.