

Research explores future energy security of China

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China needs to reduce its dependence on coal and improve the range of fuels it uses if it is to have long term energy security, according to new research from the University of East Anglia (UEA).

The study, published in the journal *Technological Forecasting and Social Change*, looks at the future of electricity supply in China and the issues it faces in reducing its [carbon emissions](#) - nationally China's electricity sector accounts for more than half its total [greenhouse gas emissions](#).

The country's electricity sector is the largest in the world and [energy security](#) concerns mean that China meets its electricity needs with domestic resources, resulting in a system heavily reliant on [coal](#). However, increasing demand for electricity and direct coal consumption, and gradual depletion of its own supply, have led to it becoming the world's largest coal importer.

Lead researcher Dr Konstantinos Chalvatzis, of UEA's Norwich Business School and the Tyndall Centre for Climate Change Research, said: "China's energy sector is under pressure to achieve a secure and affordable supply while at the same time reducing its carbon emissions. There has been this long argument about whether China can give up coal because that would harm their supply security.

"We recommend that the Chinese Government continues to work towards two main objectives. First, increase the share of [renewable energy sources](#), such as wind and hydro-power, in the fuel mix and as a

result maintain high energy independence. Secondly, improve diversity in the fuel mix. If imports are necessary, prioritise non-coal fuels, such as nuclear fuels and natural gas. These two objectives will improve electricity supply security while allowing China to decarbonise its economy."

While acknowledging that China appears to be leading its electricity sector away from the dominance of coal, the researchers say that at this stage this is only a gradual, incremental change that will not deliver a radically different fuel mix in less than a decade.

"We argue that long-term aggressive deployment of renewable energy will unblock China's coal-biased technological dependence and increase supply security in all fronts," said Dr Chalvatzis, a Senior Lecturer in Business and Climate Change. "However, reduced supply diversity in China during the 1990s will not recover until after 2020s due to the long-term coal lock-in that can threaten to hold China's back from realising its full potential.

"China's rapid growth rate presents a challenge as well as an opportunity for the country's energy future. The challenge is to secure increasing energy supplies while maintaining a decarbonisation path. In contrast, the opportunity lies in transforming the historical coal lock-in into a diversified and secure energy supply system that will fuel the Chinese economy for the years to come."

China is the world's largest consumer of coal and its electricity sector is the largest single source of coal demand, consuming approximately half of the country's coal. Electricity consumption continues to grow rapidly, reaching a growth rate of 7.2% in the first three quarters of 2013, while [electricity](#) production for the same period grew at 6.8%.

Dr Chalvatzis said: "Policy makers must design a path that will be

influenced by the international energy prices and the role of technological 'dumping' caused by China or other countries. In this process climate policy, its effect on energy prices and their subsequent consequences for the well-being of the global economy will also need to be considered.

"The success of China's decarbonisation path is keenly observed by the international community. The capacity of the Chinese Government to commit to international emission targets is linked to its capacity to achieve these targets without compromising its energy supply security and development prospects."

'Electricity portfolio innovation for energy security: the case of carbon constrained China', Konstantinos Chalvatzis and Keagan Rubel, is published in the journal *Technological Forecasting and Social Change*.

More information: Electricity portfolio innovation for energy security: the case of carbon constrained China, *Technological Forecasting and Social Change*, 2015.

Provided by University of East Anglia

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