China's energy security and student attitudes

Cheap supply of coal and electricity is a vital element in the state's provision of basic necessities to its people. Environmental concerns mean China must move away from coal and invest heavily in alternative fuels. Energy security is a high priority for China's policy makers and their choices have great global significance. Eduard Vermeer identifies the driving factors in China's energy policies, and establishes the energy policy preferences of students and researchers in Beijing. They may indicate what future policies will be, or at least whether current policies are in line with public opinion.

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ERICA DOWNS CAPTURED CHINA'S energy policymaking apparatus well in a few words: 'ineffective institutions and powerful firms.' Different departments and companies clash over energy pricing, hydropower development, support for cleaner coal technologies, and environmental constraints. Even when central policies are clear, local governments and power companies do not necessarily follow them. Without an open debate and democratic decision-making, it is hard to tell how various arguments and stakeholder interests are weighted by the coordination agencies. The foreign policy dimension of energy security is even less transparent. There we find private daughter companies of state-owned oil companies operating in dozens of foreign countries with or without overt backing by Chinese economic bureaucracies – but apparently uncoordinated in an overall foreign policy framework

Remedial policies seem to be supported by a broad political consensus. China should develop and improve its use of domestic coal as a substitute for oil imports, increase its domestic oil and gas production, invest in the development of overseas oil resources, speed up nuclear power development, develop renewable energy, economise on oil, and build up oil reserves. The exception is the scope for expansion of hydropower, a contested issue because it creates intractable environmental and social problems in minority areas. Moreover, it requires sizeable central government investment in long distance power lines. The Chinese government provides considerable support to wind, solar, hydro, and biomass energy in the form of tax breaks, loan subsidies and special funding. This was spurred on by rising prices for oil and coal. So far, even as prices of oil and coal have come down and most electricity networks suffer from oversupply and falling demand, political support for alternative energy has not been waning.

China's quest for overseas oil.
Since 2001, China has adopted strategy of 'going out' to acquire overseas oil resources. However, Chinese experts realise that the main supply of oil has to come from the international market rather than from equity oil from overseas wells, and thus they stress the need for international cooperation. China has enough money to buy oil from abroad – even if, in the most expensive oil year of 2008, it had to pay US$169 billion on oil imports – 14 percent of its total import bill. China faces a tough world, dominated by other large powers, and must seek cooperation. Its quest for overseas oil and gas has drawn increasing criticism, because of an apparent disregard for UN and US sanctions or Western political sensitivities about Sudan, Iran, Burma and other regimes. Particularly China's Africa policy has been put under scrutiny.

China concluded several treaties with African countries that in addition to investment and trade agreements contain sizeable foreign assistance elements, particularly in the development of infrastructure and hydropower stations. The resulting presence of so many Chinese companies and construction workers in countries characterised by corruption, civil war and failed states has made some foreign governments and existing stakeholders in Africa worry about China's intentions. China is a formidable competitor, with national oil corporations and Sovereign Wealth Funds with very deep pockets, seemingly willing to go to any length to secure overseas supplies of oil and mining resources and capture the African market with its textiles, machinery and consumer products. However, now that prices of oil and other commodities have plummeted, it may be China that has to do the worrying. Will its investments in Africa still pay off in economic terms?

Chinese analysts see nothing unusual in China's oil activities in Africa. Most other regions (Middle East, Southeast Asia) were already dominated by Western presence, so China's oil companies had easier access in Africa where upstream markets are open to foreign investors. Analysts have wondered in how far China's foreign policy makers were able to set conditions for and influence the behaviour of China's national oil companies CNPC, CNOOC and Sinopec in various African countries. China's political image in the West is of no concern to them.

Technological advances may bring solutions.
Chinese planners assume that even as the use of oil increases, coal will remain the dominant source of energy in the next decades. China's central government and part of the public are concerned about the environmental effects of coal and increased dependency on oil imports, but are unwilling to slow industrial growth or sacrifice the use of cars and other energy-consuming amenities of modern life. Reluctantly but surely the Chinese have become more accepting of high levels of foreign dependency. This conflicts with the general nationalist attitude, even stronger among the populace than in government circles, that China should be self-reliant and foreign countries and markets in general cannot be trusted. This situation has led to a considerable gap between official government propaganda and actual policies, and between technical expert advice and public views as reported in the media.

One way out of the dilemma is a high confidence in future technological solutions. Another is the belief that government policies and measures can be effective in creating a more secure supply of energy and mitigating the environmental effects of increased energy use. The Chinese government favours an all-out approach, under which as many as possible sources of energy are tapped simultaneously. The state invests heavily in nuclear and wind power, in oil wells owned by Chinese companies in Africa and in cleaner coal in the Chinese interior, in giant pit power stations in North China and medium-size integrated heat-power stations in coastal cities, in large hydropower stations and in LPG tanker facilities. The apparent lack of selectiveness may have to do with the size of the country, differences in local geographical and economic conditions, and competing bureaucracies and energy companies.

Energy policy preferences in Beijing.
In order to get a better idea of educated Chinese views, we conducted a survey of 230 advanced students and researchers in Beijing in early 2008. Most were selected because they attended classes (mostly in economics and business) at leading research institutes and universities. Only ten percent was directly involved through education or work in energy questions. Average age was 28 years old. One-third were women. Ten percent had studied abroad. We found significant attitudinal differences between men and women, and between the younger and older.

Less than half of respondents could give a fair estimate of China's dependency on foreign oil. Saudi Arabia, Russia and Iran were well-known as major oil suppliers to China, but Angola was not. One third held that China should be self-sufficient in oil, an obvious impossibility. On average, respondents accepted an increase of oil dependency between 2010 and 2020 by about 7 percentage points. Men, the older and the better-informed were more ready to accept high dependency ratios than others. Two thirds thought that the competition with Japan and the US on the world oil market would produce political conflicts, and almost all were concerned or very concerned that energy shortages and high oil prices would destabilise the world economy. Generally, it was felt that China's access to the world oil market was worse than that of western countries. The best remedial actions were held to be purchase of foreign oil resources (particularly by men and the older), and cooperation with international oil companies (by women). Concluding political treaties was believed to be more effective than taking a share in production agreements with foreign countries. Average trust in the security of oil supply from foreign countries was neither high nor low, with Kazakhstan and Iran trusted most and Russia and Vietnam least. Because so far, China has not suffered from oil supply disruptions from any of these countries, these trust levels should be attributed to past history (1979 war with Vietnam, earlier conflicts with the Soviet Union), perceptions of power relations (Kazakhstan as dependent on China for its oil exports), stability of their regimes and the like.

Many factors have an effect on oil energy security, including the level of reserves, substitution rate, exploitation/reserves ratio, dependency on foreign imports, the concentration of imports and international crude oil prices. Respondents gave the highest scores to the level of reserves and substitution rate, and the lowest ones to the international oil price and import concentration. The low valuation of the world market price of oil may have been influenced by Chinese subsidy policies of keeping domestic oil prices low and stable.

Most respondents felt that China's energy industry should make a substantial contribution to the reduction of emissions of greenhouse gases, and that these should not be voluntary, but imposed by government. However, almost none agreed with our suggestion that high energy prices might have a positive effect on China's energy security by reducing its rate of industrial growth, energy demand in general and stimulating investment in new energy sources. Energy security in general was believed to be furthered most by R&D, diversification of energy sources by type and origin, energy savings and increasing managerial and technical resilience of energy supply systems. Good information, proper functioning of markets and China's participation in the IEA were valued least. Particularly the younger group placed high hopes on R&D.

The best domestic policy for enhancing energy security, according to our respondents, was investment in alternative sources of energy. Optimisation of the energy structure and nuclear power came second and third (men were more positive about nuclear power than women, but only very few people were negative). The least favoured policies were: inviting foreign companies to China; letting the market decide while supporting infrastructure; and subsidising oil prices to stabilise price. These preferences were partly at variance with actual government policies, notably in their strong support for investments in alternative energy sources, clean coal technologies, and raising taxes on energy use and emissions. One reason may be that economic risk and budgetary and managerial constraints played only a minor part in our respondents' preferences.

Finally, most believed that China should give more support to its oil companies to purchase and develop foreign oil and gas fields. At the same time, particularly women favoured China's participation in international cooperation for renewable and clean energy technologies. Concluding supply agreements with producing countries was seen as the third best option. Strengthening the navy in order to protect shipping lanes, and cooperation with foreign oil companies, were least preferred.

Conclusion
Domestic policy preferences reflected a great deal of belief in technological solutions and alternative forms of energy (including nuclear). Government rather than companies should play the leading role in providing secure, clean and cheap energy. The students' foreign policies might be characterised as economically aggressive and independent, technologically cooperative, and placing confidence in governments rather than in markets. Almost all viewed oil supply as a major problem in China's 'peaceful rise', as they feared that foreign powers would deny China an easy access to overseas resources.

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Origin of Chinese crude oil imports 2008 (million tonnes)

Saudi Arabia	36.4
Angola	29.9
Iran	21.3
Oman	14.6
Russia	11.6
Sudan	10.5
Venezuela	6.5
Kuwait	5.9
Kazakhstan	5.7
Arab Emirates	4.6
Congo	4.4
Yemen	4.1
Libya	3.2
Brazil	3.0
Other	17.2
Total	178.9

China's energy production in 2008 (+ % increase over 2007)

Coal	m. tons	2,793	+ 4.1%
Crude oil	m. tons	190	+ 2.2%
Natural gas	bn cu.m.	76	+ 9.9%
Electricity	bn kWh	3,467	+ 5.6%
– Thermo	bn kWh	2,790	+ 2.5%
– Hydro	bn kWh	585	+20.6%
– Nuclear	bn kWh	68	+ 8.7%

China's increasing energy consumption (%)

	2007	2008	2009
Coal	7.9	3	2.4*
Oil	6.3	5.1	3.8
Nat.gas	19.9	10.1	10*
Electricity	14.1	5.6	4.5
Total	8.8	4	3*

Sources: NDRC May 2009 *Author's estimate