



Green Technology: China Means Business

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In recent months, China has implemented a few significant environment-friendly policies. It has confirmed that 20 per cent of the country’s energy requirements should be generated from alternative sources by 2020 and the National Development and Reform Commission (NDRC) has announced subsidies and feed-in tariffs for the solar and wind power industries. Moreover, a few high-profile projects that were part of the stimulus spending, notably in hydropower, have been denied approval on environmental grounds – if not proof, then at least an indication that China is not willing to disregard the environmental costs of its development.

Two broad tendencies are clearly visible: the diversification of energy resources to include renewable resources such as solar and wind; and

efforts to reduce the adverse effects of China’s main energy input, coal.

Renewable energy resources

The Chinese government as well as enterprises have been active in developing renewable and alternative energy resources for a number of years now. Competing third-generation nuclear power projects with heavy involvement of foreign engineering firms have been getting more traction; projects that focus on biodiesel production from used vegetable oils have sprung up across China; and the use of livestock methane in rural areas is increasing. But the most significant and visible developments have been taking place in the areas of solar and wind power.

According to BTM Consult, a Danish wind power consultancy, China last year saw the fastest growth rate in the world in installed wind power capacity, and is on track to become the second largest market in installed capacity after the US this year. The new targets for wind power by 2020 look very ambitious: 100 GW of installed generation capacity, compared with 12.5 GW today. This year, China is set to become world’s leading manufacturer of wind

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turbines, according to the Global Wind Energy Council.

All of China's five leading electricity generation companies are presently busy installing wind and solar generation capacity. Both local and foreign manufacturers of wind turbines, as well as a growing number of China's manufacturers of photovoltaic cells and solar panels, have benefited from new installations.

July saw the introduction of a new set of feed-in tariffs for wind power generation for four different types of onshore wind generation projects, between 0.51 and 0.61 renminbi (7.4 and 8.9 US cents) per kilowatt hour (on average a 64 per cent premium over feed-in tariffs for coal). In another unprecedented move, the Ministry of Finance has announced major support for new solar power projects: the state will finance up to half of the investment costs (or up to 70 per cent for projects in remote areas).

The idea of a 'smart grid' is also rapidly taking hold in China and at a recent ultra-high voltage (UHV) technology conference, the State Grid Corporation of China presented an aggressive upgrade plan for the country's electricity grid that envisions efficient UHV transmission lines to link remote energy-rich areas (for both renewable sources and coal generation) in western and central areas of China with the densely populated coastal areas. In addition, the plan will include an integrated transmission and distribution system to help balance power generation from different traditional and renewable sources.

Clean coal: putting lipstick on a pig?

The second important ongoing trend in China's energy sector is the push for greener technologies in coal generation, which currently helps produce more than 77 per cent of China's electricity and will likely continue to be a major means of power generation in the future. To mitigate the adverse environmental effects of coal generation, a variety of technologies are being actively implemented, ranging from simple technologies that could have been implemented a long time ago but were not due to lax controls and a mindset of 'growth at any costs', to relatively new, advanced and expensive technologies that promise to achieve significant efficiency gains or pollution reduction.

Coal-fired power stations are showing increasing interest in many of the simpler technologies, such as advanced scrubbers in coal-burning plants and coal washing, as smaller units are being closed down and newer and larger plants are coming online. The consolidation of these plants into larger and more efficient players is a trend that, for the past few

years, can also be seen in other industries in China – notably, coal and iron ore mining, and steel production. Consolidation allows for more stringent environmental controls, as well as higher profitability and an easier access to funds for upgrading.

Chinese electricity generation companies have also been buying sophisticated coal generation equipment from global companies such as General Electric, bringing the efficiency of Chinese coal-fired power stations closer to that of developed countries.

Some of China's cleaner coal technologies are already at a stage where they can be exported to other countries. In a recent announcement, Huaneng, China's leading integrated power utility, detailed plans to build an integrated gasification combined cycle plant in Pennsylvania in the US, utilising advanced two-stage pulverised coal pressure gasification technology.

This brings us to the forefront of cleaner coal technologies – underground coal gasification (UGS) and carbon capture and sequestration (CCS) – as yet unproven technologies that are being developed in advanced economies around the world as solutions to global warming and pollution. China is actively conducting pilot schemes using both these technologies – 10 pilot projects in UGS and two pilot projects in CCS are currently either under construction or in operation.

Long-term implications for China and the world

The trends that we have outlined here suggest that China is really serious about utilising advanced technologies in gaining efficiency and decreasing the environmental impact of energy generation.

Moreover, China is apparently pursuing another important goal in the deployment of 'green' technologies. It sees domestic firms, especially in engineering and manufacturing, joining the top global rankings. We are at an inflection point for many green technologies and the next 20 years will be crucial for the emergence of new leaders in this field. It is only natural for Chinese carmakers to try and take the lead in technologies where their global competitors have no significant advantage and the playing field is level – for example, all-electric plug-in vehicles. Expect to see major investments by Chinese firms and support from the government in this area.

The same goes for wind and solar power, and clean coal, where China has both manufacturing advantages and a domestic market advantage – expect the local players and the government to utilise every possible avenue to buy and develop

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new technologies, deploy them at home and expand capabilities, and then aggressively push into foreign markets.

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