

China's green leap forward

Facing dire pollution and wanting to be in on what may be the next industrial revolution, China positions itself to be a leader in green technology – with major implications for the rest of the world.

By **Peter Ford** | Staff writer of The Christian Science Monitor/ August 10, 2009 edition

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Behind the notorious clouds of filth and greenhouse gases that China's industrial behemoth spews into the atmosphere every day, a little-noticed revolution is under way. China is going green. And as the authorities here spur manufacturers of all kinds of alternative energy equipment to make more for less, "China price" and "China speed" are poised to snatch the lion's share of the next multitrillion-dollar global industry – energy technology.

Chinese factories already make a third of the world's solar cells – six times more than America. Next year, China will become the [largest market in the world for wind turbines](#) – overtaking America. This fall, a Chinese firm will launch the world's first mass-produced all-electric car of this century. And where are American utilities buying the latest generation of "clean coal" power stations? China.

"The Chinese government thinks of renewables as a major strategic industrial option" that will help fuel this country's future growth, says Li Junfeng, deputy head of energy research at China's top planning

agency. “We will catch up with international advanced technology very quickly.”

China will likely remain the world’s worst polluter, emitting more CO₂ than any other nation, for the foreseeable future. Its reliance on cheap coal to generate the bulk of its electricity makes that almost inevitable.

At the same time, however, “this country is installing a one-megawatt wind turbine every hour,” points out Dermot O’Gorman, head of the World Wide Fund for Nature in Beijing. “That is more encouraging than the one coal fired power station a week” that normally dominates foreign headlines.

Indeed, China is pushing ahead on renewable technologies with the fervor of a new space race. It wants to be in the forefront of what many believe will be the next industrial revolution. If it succeeds, it will hold far-reaching implications for the planet – affecting everything from Detroit’s competitiveness to global warming to the economic pecking order in the 21st century.

“The rest of the world doesn’t even realize that we are very likely ceding the next generation of energy technology to the Chinese,” says Todd Glass, an energy lawyer with Wilson Sonsini Goodrich and Rosati in San Francisco.

A 20-MINUTE DRIVE from the Great Wall, along the south shore of the Guanting reservoir, straw-hatted peasants tend their corn crop as the elegant blades of windmills spin idly above them in the gentle breeze, farming the wind.

Guanting’s 43 wind turbines provided some of the power for last year’s “Green Olympics” of which China was so proud, and they continue to generate not only electricity, but admiration: The wind

farm is a favorite spot for newlyweds to take their wedding photos.

“They find the windmills beautiful and magnificent,” says Yin Zhiyong, the Guanting wind farm manager, as he shows a visitor around. “So do I.”

Mr. Yin trained as a coal engineer; when he was at college 20 years ago, wind-power courses were not offered. Today, he is convinced, “new energy sources are the new way of development. I’m part of the future.”

The Chinese government shares that view. The country’s installed wind power capacity has doubled each of the past four years, and is likely to exceed the 2020 target next year, a decade ahead of schedule. A revised goal, expected to be more than three times higher than the current one, will be announced soon, officials say.

Beijing has deliberately stimulated the wind sector with an array of subsidies and tariffs and a rule obliging power companies to buy renewable energy similar to a law now before the US Congress. So fast have windmills been built that the national grid cannot handle all the energy they generate, and much is wasted.

But the industry built by government policy is now looking much further afield. “Goldwind’s goal is to become a multinational and international company,” Wu Gang, the CEO of Goldwind, the firm that built Guanting’s turbines, told the “Securities Times” last month. “That is our business target.”

Already, he pointed out, Goldwind is building wind farms in Texas, and Goldwind acquired its key technology by buying 70 percent of the German company Vensys, not by developing it itself. That deal points up a key ingredient in Chinese firms’ strategies: If they don’t have time to develop technological proficiency, they will use their

financial clout to get ahead.

China's top planning agency is soon expected to announce plans to raise the proportion of renewables in the country's energy mix to 20 per-cent by 2020, matching the European Union's ambitious target.

Goals like this act as clear pointers for the state-owned power generating companies, where "the idea of planned industrial policy is in their blood," as Ellen Carberry of the China Greentech Initiative puts it.

That approach is apparent in the electric-car sector, says Ms. Carberry, who represents 60 global and Chinese companies seeking to grow the green technology market here.

Two Chinese firms, BYD Auto (for Build Your Dreams) and Qingyuan are vying to bring an all-electric car to market this fall. In December, BYD started selling the world's first mass-produced plug-in hybrid vehicle.

With the passenger vehicle sector moving forward, the government ordered 1,000 hybrid buses for Beijing and Shanghai earlier this year. It announced customer rebates of up to 40 percent off the price of new cars, depending on their energy efficiency.

Almost overnight, Beijing has focused world attention on the Chinese hybrid vehicle market. "They saw that Detroit was in a muddle, so they will leapfrog," says Carberry.

The government has taken a different path with solar energy, refusing until recently to offer any encouragement of its use at home because solar's price was still much higher than traditional fuels and incentives would have been very expensive. But that hasn't stopped Chinese and foreign venture capital firms from investing in the

manufacture of solar panels for export. Here, as in other fields, “China is a fast follower,” says Alex Westlake, a founder of Clearworld Now, which invests in Chinese green-tech firms.

Though solar technology is not as advanced in China as in the US, producers here have used the country’s traditional cost advantage to vault to the top of the solar sales league.

And when the government does make up its mind which technology to back, its support “will make the Chinese photovoltaic market the biggest in the world,” predicts Miao Liansheng, CEO of Yingli, one of the country’s top solar-cellmakers.

The sheer size of China’s market, and the economies of scale that size allows, are key components of the country’s advantage. “They are using their manufacturing strength and imposing cost discipline on the world,” says Mr. Glass.

NOWHERE ARE CHINA’S green ambitions more evident than in its drive towards new “clean coal” technology, which would help Beijing reduce its emissions of pollutants and CO₂ while remaining reliant on its giant coal reserves. China burns coal to generate 80 percent of its electricity; the United States uses it for half its power. No matter how many sources of renewable energy those two countries tap, coal will remain their dominant fuel source for several decades.

Many energy experts are pinning their hopes on new ways of using an old technology, coal gasification. It cuts SO₂ and NO_x emissions and separates out CO₂ so that it can be captured and then either used in industry, digested by biodiesel-producing algae, or stored permanently underground.

The US was meant to lead the way toward a near zero emissions coal-fired power plant by building one first while other countries,

including China, waited for experimental data before constructing their own.

But the US Futuregen project ran into so many cost and political troubles that it was shelved. As a result, the Chinese government decided last year to move ahead with its own project. The Greengem plant, designed to be the most efficient and cleanest coal-fired power station ever built, should begin operations by the end of next year, officials here say.

In the meantime, two Chinese research centers, the East China University of Science and Technology and the Thermal Power Research Institute, have developed coal gasification techniques to challenge America's lead in the field. Both recently licensed their inventions to American firms building power plants in the United States.

"The general thinking in the US is that we are 30 years ahead of China in technology," says Ming Sung, a Chinese-born American who worked most of his career with Shell. "We think it's a one-way transfer. China licensing technology to the United States is still very unusual. But it will become less and less unusual."

He points to underground coal gasification, where solid fuel is converted to gas without even being extracted, as an example. China graduated 17 PhDs in that field last year. Only two graduated in the rest of the world.

Not that the US is a technological laggard, of course. US firms were developing advanced coal gasification technologies 30 years ago, but the Department of Energy lost interest in them when the oil embargo ended, complains Mr. Ming. "The US is very innovative, but everything comes to fruition in China," he says.

Or, as Zhang Hongmei puts it: “In America, some people say there is no such thing as clean coal. It is very controversial. Here it’s not a question of debate or lobbying. It’s a question of doing something.”

Ms. Zhang is director for technology strategy and development at ENN, China’s largest privately owned clean-energy provider. At its spacious and exquisitely manicured campus in Langfang, 40 miles east of Beijing, executives live in villas by the fairways of the company golf course.

That is the kind of perk that has helped the company recruit many engineers abroad – both foreigners and Chinese whom ENN has tempted home. “In China as a whole, research levels are still generally low. We are at a very, very young stage compared to the US or Europe,” says Gan Zhongxue, ENN’s chief technology officer. “So we recouped many researchers from the US and Europe who are familiar with advanced technology and can then do something for ENN.”

“China cannot yet produce things with the credibility and quality behind the ‘Made in Germany’ label,” adds Jennifer Morgan, an analyst with E3G, a London-based environmental think tank. “They are not there yet.”

Still, the country has plenty of reasons to attempt to be the world’s next green-energy power. For one thing, it has few natural energy resources of its own. Plus, its pollution problems are so severe that it has little choice. The country’s outsized reliance on coal is literally a matter of life and death: 750,000 people in China die prematurely each year because of air pollution, a World Bank study in 2007 found (though the Chinese government insisted the bank cut that statistic from its final report). Only 1 percent of the population breathes air that would be considered safe in Europe.

Moreover, Beijing – just like US President Barack Obama – sees renewable energy as an economic boon. Building out a new global energy industry over the next half century will generate more business than any other sector, Chinese officials predict, and they want a hefty chunk of that business. “This gives us an opportunity to develop a new area for a new industry” says Professor Li. “It’s good for our long-term development.”

BUT THE QUESTION LOOMS: What does China’s rise as a green power mean for the rest of the world? Certainly it has its benefits. A China with more solar cells and electric cars will help reduce the amount of heat-trapping gases building up in the Earth’s atmosphere.

It could also reduce the competition for, and depletion of, dwindling natural resources – notably oil. If China rises as a green-technology manufacturing hub, it could supply the world with low-cost solar panels and wind turbines as it does now with toys and textiles.

Yet there are worries for the West, too. If green energy is the new industrial revolution, Beijing will be grabbing many of the jobs of tomorrow. That will likely hasten the day when China becomes the world’s No. 1 economic power.

“China sees [green technology] as an enormous market that is not claimed or controlled by any one nation, and there is an opportunity for them to do it,” says Carberry. “The combination of urgency; the enormous needs; a focused, systematic planned government; an army of engineers; and access to capital may define China as the platform for the green- technology industry globally.”

Mr. Westlake of Clearworld Now, echoing the 1980’s song by the American rock band Timbuk3, puts it more pithily: “The future’s so bright, you gotta wear shades.”

Also: [How Baoding, China, becomes world's first 'carbon positive' city](#)

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