How China’s energy shift will affect the country’s decelerating economy

Economic and environmental uncertainties linger as the world’s largest energy user generates more renewables.

If CGN Power is expected to commission 4.4 GW of nuclear power capacity this year, then it will play a significant role in fulfilling China’s 12th Five-Year-Plan, which aims to reduce the carbon intensity per unit of GDP in the country by 17% from 2010 to 2015.

Another milestone in the energy sector was the establishment of Shanghai Petroleum and Natural Gas Trading Center funded by the Xinhua Financial Investment Co. Ltd and other companies in January 2015. This Center, according to Anthony Jude, director of Energy Division at Asian Development Bank, is instrumental in improving the energy pricing system, and the pricing reform of natural gas.

However, analysts believe that revolutionizing China's energy profile is not as simple as rolling out clean energy efforts, as the performance of the power sector is heavily tied not only to energy demand but also to the country’s economic activities. If PRC's economic growth weakens from 7.4% in 2014 to 7% this year, then a chain of changes is in the wind.

Energy demand will enter a new phase characterized by steady slower growth in total energy demand, says Jude. Because of this, China’s energy sector is likely to face challenges brought by the new growth pattern. Jude forecasts the industry executing actions, such as “adjustment and optimization of the energy structure, adoption of innovative energy systems and mechanisms, initiatives of energy efficiency improvement, and accelerated development of clean energy, and enhanced security of energy supply to support PRC’s economic transformation.”

Different slants

But not all forecasts of energy demand growth in China are the same. Adnan Z. Amin, International Renewable Energy Agency (IRENA) director-general, reports in the agency’s Remap 2030 analysis titled “Renewable Energy Prospects: China” that China’s total energy demand in 2010 was 57 EJ (1,950 Mtce) of which 59% was consumed by industry, 21% by the building sector and 13% by the transport sector. Remap 2030, which is IRENA’s global renewable energy roadmap, cited a review of 10 energy models showing that the total energy demand of China would rise between 50% and 125% by 2030 compared with 2010 levels.

China touts that its per capita energy consumption is still much lower than advanced economies, says Damien Ma, a fellow at the Paulson Institute and author of the paper “Rebalancing China’s Energy Strategy”.

“The Chinese government has historically concerned itself with supplying enough energy for the entire country and has hardly focused on managing end-user consumer demand. Yet at the same time, energy demand is rising rapidly among the Chinese urban middle class as they buy cars and homes. Residential demand will be a key driver of natural gas consumption as urbanization progresses,” Ma explains.

He points to management consultancy McKinsey & Company’s prediction that China will become the world’s largest car market by 2020. He attributes this growth to China becoming 60% dependent on crude oil imports.

“How and to what extent the auto market grows in China will certainly have profound impacts on consumer energy demand. Two chief aspects will overwhelmingly determine how the transport sector will shape China’s future energy demand: the vehicle penetration rate and the type of fuel that will fill those vehicles,” Ma says.

Energy consumption may transfer from industry to the residential and transport sectors as services and consumption start driving the economy.

Is it the twilight of the coal industry?
Is coal still king?
Industrial growth in China, according to Ma, shapes the country's overall energy profile and remains largely coal-based. His report shows that in 2012, China delivered annual steel production that was eight times that of US production, constituting 46% of the world's steel production, and is the source of 45% of the world's aluminum and nearly 60% of its cement.

"What is striking, however, is just how sharply China's energy mix is skewed toward coal, especially when compared with other major economies," he says.

Ma stated that the share of coal in China's power generation in 2012 may have been as high as 75 to 77. "When placed next to fellow BRICS countries, such as Brazil and Russia, China’s outsized reliance on coal stands out. Already, the Chinese economy consumes nearly as much coal as the rest of the world combined. The majority of power generation in China relies on coal, and the steel industry consumes large amounts of coking coal, a specific type that is of higher caloric content," he adds.

But those numbers will be greatly affected by the country's 2014-2020 energy strategy action plan. Ma states that top Chinese leaders have started welcoming an energy strategy to diversify away from coal, boost industrial energy efficiency, and support clean energy and pollution mitigation.

The actions of the Chinese government have notably targeted the coal market. Jude mentions that these programs include the “Guideline on Deepening Market-oriented Reform of the Thermal Coal Sector” which allow the market to decide thermal coal prices and the tax reforms for coal resources administered by the Ministry of Finance and State Administration of Taxation.

The government is forcibly shutting down small producers, while requiring industrial consolidation to operate super-producers with scale and improved efficiency, according to Ma. He adds that these new movements will have an impact on global commodity prices, from coal and iron ore to copper.

“This means that the relative decline of coal in China's general energy mix and in the power sector, in particular, will yield a corresponding ramp up of just about every other energy resource — particularly natural gas, hydropower, nuclear power, and renewables,” he says.

In his report for the Economic and Security Review Commission titled “China’s Wind and Solar Sector: Trends in Deployment, Manufacturing, and Energy Policy”, Jacob Koch-Weser, former policy analyst of Economics and Trade, reveals that on top of China's list are the following: the domestic deployment of solar power; the improvement of grid connectivity for wind farms; and the easing of curtailment of renewable electricity by grid operators.

Comparing China and the US, Koch-Weser says that the former is following the US’ lead in the use of smart grid technology, improving grid flexibility in ways that facilitate the wind and solar sectors.

“China is also ahead of the United States in building ultra-high voltage (UHV) transmission lines that reduce power loss over long distances. UHV lines help transmit wind and solar power generated in China’s western regions to population centres further east,” he adds.

Building technology
Wind power, according to Ephrem Ravi of Barclays Bank – Hong Kong, can surpass its 2014 addition of 20 GW and may become the country's second largest contributor of power capacity growth despite its low base.

Meanwhile, Amin notes that China's renewable energy policy touches mandatory market share for renewables by sector and technology, tariff-based support mechanisms, and government financial support for renewable energy.

China runs a large wind turbine and solar PV production capacity. The massive scale-up of solar PV production in the country has contributed significantly to the rapid decrease of solar PV investment costs. Some two-thirds of all solar water heaters and 90% of biogas installations are also located in China,” Amin says.

Based on Remap 2030, China, being a global leader in solar thermal, is likely to increase its installed six-fold under Remap 2030: 30% in manufacturing and 70% in residential and commercial buildings.

Emissions trading is also one way to achieve efficiency and carbon emissions cuts across the country’s industry sector, according to Amin. He said that this can also improve air quality and reduce the country’s contribution to climate change. The government is also studying the possible implementation of a national cap and trade scheme, a carbon tax, or pollution limits.

For Ma, technology is not enough for China to meet its energy goals. He believes that diversifying away from coal can cause changes in the country's energy profile and eventually ease its part in global emissions. “The commitment and political capital behind economic restructuring need to be maintained, while more creative and sophisticated policies will also be required, including rationalizing and marketing energy prices,” Ma says.