

## CHINA'S CLEAN ENERGY THRUST

China has been able to achieve high growth rates for several decades by increasing inputs of labour and capital while tapping on cheap supplies of fossil fuels. Due to the rapid pace of industrialisation, urbanisation and motorisation, China's energy consumption has grown rapidly and currently takes up 17% of worldwide energy demand. According to IEA projections (based on current policies), China alone will account for 44% of the global energy demand growth by 2020<sup>1</sup>.

However, Chinese policymakers have recognised that this high carbon and energy-intensive development path is not sustainable and will undermine the achievement of key economic and social development goals if left unchecked. Consequently, China has in recent years stepped up efforts to transit to a clean energy economy, for a number of reasons:

### *Supplementary energy sources*

Firstly, rising energy demand in the country has generated a need for China to turn to alternative energy such as nuclear, hydropower and renewable to augment its energy supplies from traditional sources.

### *International pressure for clean energy development*

As the world's largest emitter of carbon dioxide, China is also facing strong international and domestic pressure to address environmental concerns brought about by its rapid development. Beyond pursuing the development of renewable and clean energy sources for power generation and implementing other "green" measures such as planting new forests, China has, for the first time, set domestic targets to cut by 2020 the amount of carbon produced per unit of gross domestic product between 40 and 45 per cent from 2005 levels.

### *Clean technology is a growth sector*

Beyond these resource and environmental concerns, Chinese policymakers also see the development of the clean energy sector as a means to fuel its next phase of growth. Cognisant of the growing demand for clean energy, China is now pushing to become the global manufacturing capital for the renewable energy sector, specifically in solar panels, wind turbines and batteries. Besides harnessing renewable energy through its favourable natural attributes – these include the Gobi desert for solar power and rich natural resources such as lithium for producing renewable energy component parts - China is also building itself up to be the world's biggest market for these products.

The solar photovoltaic (PV) sector is a good example of China's push to grow renewable energy into a key export industry - Chinese solar PV manufacturers, many of whom did not exist ten years ago, now supply 30% of the world's demand for solar panels.

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<sup>1</sup> "World Energy Outlook" (2010), International Energy Agency

It is worth noting that China's push towards clean energy is driven primarily by pragmatic economic reasons and does not yet reflect a fundamental shift towards green policies and a new state of environmental consciousness. Its investments into alternative energy notwithstanding, the Chinese economy will remain fossil fuel-based for a long time to come, largely due to its huge resource base. Coal will remain the dominant energy source for the foreseeable future, and represent some two thirds of China's projected total primary energy demand in 2020, with nuclear, hydropower, biomass and waste accounting for most of the rest. And while China leads in making green investments, it still faces significant environmental challenges, particularly pollution problems arising from its rapid industrialization.

### **China's key energy policies**

While the Chinese government has yet to unveil an overarching and comprehensive energy policy framework for the country, it has taken first steps towards this with the establishment of a high-level national commission to coordinate energy policy.<sup>2</sup> Currently, energy goals and objectives are articulated in the Five-Year Plans developed by the National Development and Reform Commission (NDRC) - the main policy making body in China on energy, environment and climate change – and implemented through various bills, such as the Energy Conservation Law, Public Sector Energy Saving Regulation and Civil Energy Bill. Such legislation has varying applicability to local governments (county, municipal and provincial); compliance with the guidelines and targets set by the central government depends on the alignment of interests between the central and local governments, which means that the policies may sometimes not be implemented in the manner intended by Beijing.

China's energy policies can be generally grouped according to the three key policy objectives they seek to address, as follows:

#### *(1) Improving energy efficiency and enhancing energy conservation*

Energy efficiency is a key regulatory priority. In 2008, China revised its Energy Conservation Law to declare that it “implements an energy strategy of promoting conservation and development concurrently while giving top priority to conservation”. In terms of goals, each province has been assigned an energy intensity reduction target ranging between 12% and 30% of 2005 levels by 2020, with the respective governors held accountable to the targets.<sup>3</sup> To date, China has made some headway towards reaching this goal, having achieved a 14.4% reduction nationwide by end 2009.

Aware that surging energy demands means a growing reliance on imported energy, China is aggressively driving energy efficiency and conservation even as it seeks to

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<sup>2</sup> According to a statement by the State Council, the commission, headed by Premier Wen Jiabao, will formulate a "national energy development strategy," review energy security and development issues, and coordinate international cooperation. Besides Wen, the 23-member commission will include several of the country's ministers, including those with the finance, foreign affairs, commerce and environmental protection portfolios.

<sup>3</sup> “China Begins Its Transition to a Clean-Energy Economy”, Julian Wong and Andrew Light, Center for American Progress, 4 June 2009.

augment its energy supply. Measures include setting EE benchmarks for enterprises<sup>4</sup>, rebate programmes to subsidise the purchase of energy efficient light bulbs and “green” government procurement. Steps are also being taken to enhance the efficiency of China’s energy infrastructure. These include hastening the development of the west-to-east power transmission system and replacing small oil-burning units to improve energy efficiency in the power generation sector<sup>5</sup>.

In transportation, apart from setting high fuel economy standards<sup>6</sup>, the Chinese government is also leading the adoption of energy-efficient vehicles. A total of thirteen Chinese cities will be piloting subsidy schemes for “new energy vehicles,” ranging from US\$7,350 for small hybrid passenger cars to US\$87,700 for large, fuel-cell-powered commercial buses. The subsidies will target public-sector purchases such as public transportation, sanitation, and postal services. In addition, the government is building up its automotive manufacturing capacity to roll out highly efficient cars, including hybrid-electric and pure electric vehicles. This thrust is not only aimed at improving the overall efficiency of the transport system, but is also meant to create new export opportunities<sup>7</sup>.

### *(II) Development of renewable energy industry*

China’s Renewable Energy Law of 2006 and subsequent Medium and Long Term Development Plan for Renewable Energy, set an ambitious framework of targets to develop various renewable energy sources, calling for the percentage of renewable energy to rise to 10% of total energy consumption by 2010 and 15% by 2020<sup>8</sup>.

Correspondingly, the NDRC expects the country to have to invest more than 2 trillion yuan (US\$300 billion) in renewable energy development to reach these goals. Half of this proposed investment will go towards exploring China’s rich hydropower potential. Hydropower, which accounted for 17% of China’s electricity generation in 2008, has become an important alternative to coal in its energy mix, as have wind and nuclear power. Wind power is projected to increase 27-fold and contribute 3% to China’s power needs by 2035. Nuclear energy is also projected to increase its share of power generation from 2% in 2008 to 7% in 2035.

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<sup>4</sup> The Top 1,000 Energy-Consuming Enterprises program, which China started in 2006, sets energy efficiency benchmarks for the top 1,000 energy-consuming enterprises across nine sectors of heavy industry. These 1,000 industries alone constituted 33 percent of China’s overall energy consumption.

<sup>5</sup> Smaller and less efficient power plants in China are closing down as larger, more efficient power plants are built. This active policy of “opening the large and closing the small” has led to the shut down of 34GW worth of small, inefficient plants between 2006 and 2008, with another 31GW of such plants expected to be closed over the next three years.

<sup>6</sup> China has fuel economy standards that translate to 36.7 miles per gallon (mpg), which compares well to that of the US, which currently stands at less than 30mpg and will be raised to 35.5mpg by 2016.

<sup>7</sup> A good example of this would be China’s push to gain first mover advantage in the mass production of electric vehicles. The world’s first, mass-produced, plug-in hybrid (the FD3M) was launched by China’s BYD Auto in December 2008.

<sup>8</sup> Specific targets for the various renewable energy sources, especially in the power generation sector, include 300 000 MW for hydropower, 30 000 MW for wind power and 1800 MW for solar power.

These developmental initiatives are supported by a series of tax policies, ranging from preferential tax treatment for companies in the renewable energy sector<sup>9</sup> to a levy on electricity tariffs that is channelled towards renewable energy projects<sup>10</sup>. From 2010, China's utilities have been required by law to buy all the power produced by wind farms and other renewable sources.

### *(III) Securing energy resources all over the world*

Whilst it seeks to develop its renewable energy capacity and capabilities, China is realistic about the limits of energy efficiency and diversification, and recognises that it will not be able to completely wean itself from dependence on imported fossil fuels. Consequently, it is actively negotiating contracts to secure piped gas and oil countries such as Kazakhstan, Iran and Myanmar. In the last 3 years, China has made large overseas oil investments in Venezuela and Latin America, a move which would help reduce its reliance on existing suppliers in the Middle East, Africa and Australia. These sources also have the strategic benefit of sidestepping vulnerable sea-lanes such as the Straits of Hormuz and the Malacca Straits, thereby lowering exposure to external geopolitical turbulences.

## **Challenges**

Despite strong financial and political backing, China's push towards clean energy and a low carbon economy is not without its challenges. One such challenge comes from the continued dominance of energy intensive industries<sup>11</sup>, which has been identified as a contributing factor in China's inability to meet its first short-term energy intensity reduction target<sup>12</sup>. Recognising this, the NDRC has announced plans in 2010 to raise power prices for some energy-intensive firms in renewed efforts to control the expansion of such energy-guzzling and pollutive industries.<sup>13</sup> In the years ahead, China would need to carefully calibrate the contribution of such industries to its economy to effectively manage the inherent tension between its low carbon aspirations and ongoing industrialization drive.

Another key challenge for China would be to augment its current suite of legislative and industrial policy tools with market-based tools to drive consumer and business behaviour towards energy conservation/efficiency and low carbon technologies. This

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<sup>9</sup> For example, companies in the renewable energy sector and other energy technology sectors identified by the government stand to enjoy a preferential tax rate of 15% (compared to the normal tax rate of 25%). Buyers of renewable energy component parts - for example, wind generation equipment - also enjoy a lower VAT of 8.5% for such purchases compared to the standard 17% VAT applied to other goods.

<sup>10</sup> All electricity end-users (other than the agriculture sector and residents of Tibet) have had to pay a renewable energy surcharge of 0.001 yuan per kWh since 2006. This surcharge doubled to 0.002 yuan per kWh for commercial and industrial users in August 2008. The fee increases residential electricity bills by 0.25 percent to 0.4 percent. For industrial users of electricity, the fee doubled in November 2008 to roughly 0.8 percent of the electricity bill. Proceeds from the surcharge have been distributed to renewable energy projects, mostly in wind and biomass.

<sup>11</sup> These include heavy metal/minerals industries such as aluminium, steel, zinc, ferroalloy and the chemicals-producing sector,

<sup>12</sup> "China's Green Energy and Environmental Policies", Elizabeth C. Economy, Council on Foreign Relations, April 2010

<sup>13</sup> "Higher power prices for energy-intensive sector", People's Daily Online, 18 May 2010

will include re-looking the practice of energy subsidies in the country, which is hindering the full realization of the potential energy efficiency savings in China.

## **Global Implications**

China's huge clean energy investments, coupled with its huge domestic market, have allowed it to stake a lead in the global clean energy race. In particular, its strategy for dominating the global clean energy sector through targeted and coordinated public investments in the development, deployment and procurement of new technologies has enabled it to establish an edge over competitors such as the US. Although it has already established a market leader position in areas such as solar PV manufacturing, China is planning further direct investments totalling at least US\$440-660 billion over ten years<sup>14</sup>, with much of the investments directed at growing domestic clean technology industries in order to meet aggressive low carbon and technology deployment targets.

In the face of such competitive pressures from China, countries that are seeking a slice of the clean energy pie would have to come up with strategies that are tailored to their strengths and natural attributes. In the case of big economies like the US, this would mean closing the investment gap, particularly in the area of public investments into clean technology R&D, manufacturing, deployment, and infrastructure.

Countries like Singapore, which have limited capacity and resources to take as aggressive a stance in making clean energy investments, will face more challenges. Hence we have to move quickly into specific niches where we can remain competitive in the clean energy race. Although Singapore may lack China's financial wherewithal, manufacturing capacity and market scale, we can still ride the industry growth trends by playing to our competitive strengths. From an overall system perspective, we remain an attractive "living laboratory" for companies to develop, showcase and export clean energy products and services. We should make full use of this advantage to anchor major clean tech players in Singapore.

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<sup>14</sup> "*Rising Tigers, Sleeping Giant*", Breakthrough Institute and the Information Technology and Innovation Foundation, Nov 09