

# Global Clean Energy Leaders – China

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To successfully invest in global clean energy stocks requires a review of companies exposed to countries with the ability to best finance and implement policy change as it relates to energy security, growth in energy demand and in dealing with the opportunities that arise from climate change issues.

In world leading economies such as China and Germany, and emerging economies like Brazil and India, huge long term investments are being made to transform these economies so as to best position them for a low carbon future. There are benefits of improved energy security, stronger trade balances, growth in employment, technology and industry leadership - and of course the associated environmental gains. Countries like Japan, Korea, South Africa and Saudi Arabia are likewise investing aggressively in low carbon technologies, furthering large scale deployment and learning.

A review of recent advances in the Chinese green economy indicates that there are many technologies that are world leading and will have an impact on the global economy in the next few decades.

A key strength of the Chinese political system is that, unlike most Western economies, this system has allowed the Hu-Wen administration to successfully focus on the long term strategic positioning of China. The gigantic surge in Chinese energy consumption means dealing with the associated escalation of national energy security risks is exceptionally high on the list of Chinese government priorities. Cementing China's technology and industry leadership in high value added industries of a low carbon economy dominates the 12<sup>th</sup> Five Year Plan. Dealing with the environmental pressures and resulting health issues gives an added imperative to the Hu-Wen administration to deal with emissions pollution.

To this end, there has been significant progress in China's comprehensive national energy plan which contains a number of mutually dependent features. Key amongst these is the marshalling of financial, industrial and technological resources to fund a multi-decade plan to lift energy generation from domestic renewable sources. Initially focused on hydro and on-shore wind, more recently this has been expanded to include offshore-wind, solar photovoltaic (PV), biomass, energy-from-waste and even Carbon, Capture and Storage.

However, to facilitate this transformation, China has had to first commission a massive national smart grid rollout. This involves a decade-long program of investment to upgrade the transmission network (high voltage direct current cabling nation-wide) coupled with a

rollout of 300 million smart meters. To-date, the magnitude of this grid transformation investment is only paralleled by Germany.

Given the rapid urbanization and industrialization of the economy, per-capita consumption of energy continues to accelerate. To alleviate this, the government has mandated significant gains in energy efficiency of 3-4% pa. Adding significant new capacity across the entire renewable energy generation spectrum while improving the grid and driving energy efficiency provides such a combined momentum as to make real progress this decade.

China is aiming to increase its technology and industrial self-sufficiency and global leadership, both to best gain from the high value employment opportunities and build its export domination of these newly emerging global industries.

It is recognized that China's growth challenge is so large that demand for coal, gas and oil will continue to rise for another five years at least. China's carbon emissions will continue to rise as a result. However, the size of the country and rate of China's GDP growth means it needs every available clean energy solution in orders of magnitude greater than anywhere else in the world. That said, China is doing all it can to address these issues within the context of moving towards a more sustainable economic model. Fossil fuel demand in China will peak before 2020 and then progressively decline as new technologies are rapidly scaled up. While China is also making mistakes in the process by trying to move too fast (witness the July 2011 Wenzhou rail disaster and the massive opportunity cost of non-grid connected wind farms over 2009-2011) the quantity of capital investment is such that China is driving down the costs of these emerging technologies and building economies of scale.

It is useful to provide a snapshot of supporting facts that provides a basis for this bullish view of cleantech investments in China.

### **Environmental Protection**

China's 12<sup>th</sup> Five Year Plan detailed an intention to invest RMB 3.1 Trillion (USD500 billion) in environmental protection projects. A major area of focus is waste management, including a push to expand Waste-to-Energy and Water Treatment. Hong Kong listed China Everbright International is a major beneficiary of this investment program, being a leading operator in both these segments. China Everbright (HK: 0257) reported revenues up +25% year-on-year in 2011, with this rate of growth forecast to be repeated in 2012. This reflects a massive step-up in investment. China Everbright stated in its interim report:

*"In the first half of 2011, energy conservation and environmental protection have been accorded first priority among seven emerging strategic industries by the Central Government and efforts have been escalated to promote environmental protection and energy conservation industries." It added that the company "has secured 58 environmental protection and alternative energy projects commanding a total investment amounting to RMB 12 billion."*

With each tonne of landfill avoided by Energy-from-Waste processing, almost a tonne of carbon dioxide emissions into the atmosphere is also avoided. Given the ongoing trends of urbanization and increased consumer spending, avoiding landfill issues is a key Chinese priority. The by-products of clean electricity, steam generation and reduced carbon emissions are more than a convenient bonus.

### **Smart Grid**

Having introduced a standardized national technology basis for smart meters in 2010, China conducted tenders for 110 million smart meters over the course of 2010 and 2011. This represents the first 36% of a 300 million nationwide smart meter rollout. Some 70 million smart meters were installed in 2011 alone, with a goal to complete this national program by 2018. In 2011 China also introduced a progressive power tariff system, and we expect 2012 will see the introduction of time-of-use pricing – leveraging off the emerging smart meter system.

Wasion Group Holdings (HK:3393) is a HK listed firm that is the leading supplier of smart meters in China. Wasion has built up its own research and development capacity such that it is the number one supplier to both State Grid Corporation of China and China Southern Power Grid Company. We expect Wasion to grow into one of the leading global suppliers of new generation smart meters. In May 2012, Wasion announced a formal agreement with world leading clean energy firm Siemens AG of Germany. Wasion will progressively supply smart meters globally for distribution through Siemens network.

### **National Solar Plan – the Golden Sun Initiative**

The building of massive domestic scale in polysilicon, wafers, cells and modules manufacturing over 2008-2011 has driven huge economies of scale, resulting in dramatic reductions in cost of production at all stage of the solar manufacturing chain. Even though China installed less than 1% of all solar installations globally in 2010, it manufactured and exported some 40% of the world's solar modules. This global market share grew to 50% by 2012. Despite decades of technology leadership in solar by Japan, Germany and America, from a standing start in 2005, China has rapidly grown to today being placed as the world leader across the entire solar value chain.

2011 saw solar module prices drop 60% year-on-year to US\$1.00 per watt. A further 20% price decline has been seen to-date in 2012. We do not expect any sustained recovery in unit pricing for solar components. Indeed, further price reductions of 10-15% pa are expected over 2012-2015, driven by overcapacity, further technology innovation and economies of scale. This rampant deflation underpins a massive drive towards solar grid parity on retail pricing over 2012-2015 for high solar radiation and / or high power price states or countries (for example, Australia, Germany, California, Italy, India and parts of China).

The August 2011 Chinese national Feed-in-Tariff announcement (Rmb1.15/kWh in 2011, falling to Rmb1.00/kWh in 2012) was a landmark event for the solar industry globally. This heralded a push into downstream domestic installation of solar in China for the first time. Chinese domestic solar installations have quadrupled from 520 megawatts (MW) in 2010 to well over 2.0 gigawatts (GW) in 2011. As Suntech and Trina Solar each forecast early in 2012, we expect Chinese domestic solar installs to double again in 2012 to 4.0-6.0 GW and then almost double again to 6.0-8.0 GW in 2013. This is likely to see China as the #1 solar installation market in the world by 2013 at the latest (overtaking Germany, Italy and America). While the headline Rmb1.00/kWh tariff is low by global solar FIT comparisons, the Chinese Government has awarded 'one-off' additional subsidies of up to 50% of project costs to build initial installation knowledge and speed up-take. Progressive reductions in the FIT over time are a logical outcome to progressively reduce the rate of subsidy as the solar industry moves to being self-sustaining.

One Hong Kong listed firm, GCL Poly Energy (HK: 3800) first entered the polysilicon business in 2009 through acquisition then internal investment. GCL Polysilicon had 46,000 tpa of all-new polysilicon capacity operational in China by end 2011. We estimate GCL will hold a global market share of 20% in 2012. GCL exited 2011 with a cash manufacturing cost approaching US\$20/kg, the lowest in the world. Largely due to GCL's relentless drive to lower costs, improve efficiency and expand capacity ahead of demand, global polysilicon prices dropped 65% over 2011 to US\$30/kg. GCL is working on the premise it can sustainably deliver longer term gross profit margins of 30% even at polysilicon prices of US\$25/kg.

The speed of expansion in the downstream solar installation market in China is evidenced by a number of firms announcing solar development projects that each larger than any existing solar project in operation anywhere in the world today. LDK Solar (NYSE:LDK) announced in June 2012 it had won three 200 MW solar projects in Gansu province (in the cities of Jiuquan, Jayuguan and Zhangye). Shanghai Alex Solar Energy Science and Technology Co. announced that by 2016 it would develop a 1,000 MW solar project in Jinchang, also in Gansu. In December 2011 HK listed China Windpower (HK: 0182) announced a 1,000 MW solar power project development agreement with the Jiayuguan government. Having never developed solar projects, China Windpower commissioned three solar PV projects in 2011 with a combined 48 MW, making it one of the top solar developers within China.

### **Funding of Clean Energy Initiatives**

In November 2011 China went further towards a clean energy future, increasing its thermal power tariff from Rmb0.4 to Rmb0.8c/kWh, allocating these funds to the National Clean Energy Fund. Goldman Sachs estimates this will see the China Clean Energy subsidy increase from Rmb21 billion in 2011 to Rmb 42 billion in 2012 (USD6.5bn pa). The polluting fossil fuel industry is being increasingly taxed to fund the development of renewable energy alternatives. The China government is clearly not caught in the Australian and American trap

of being beholden to the fossil fuel industry's lobbyists! It is entirely logical that the Chinese government will double this tax again in 2013, and probably again in 2014.

### **Lessons from the Development of the Chinese Wind Sector**

In 2008 China installed 6 GW of wind farms nationally, doubling their total installed base in one year to 12 GW after a decade of investment. By the end of 2011, China had an estimated total of installed wind farms of 57 GW. China installed some 15 GW alone over the 2011 year, 40% of all wind farms installed globally. China now has more wind farms than any other nation. China has the installed capacity to manufacture 20-30 GW of wind turbines annually.

Like the Wenzhou rail disaster, the Chinese development of wind farms has not been without its setbacks. Over the course of 2009-2011, some 30% of new wind farms in China were commissioned well before new transmission lines were installed to connect the facilities to the grid. From China's perspective, the magnitude of its energy security problem is such that the Chinese government underwrote the wind farm industry's off-take agreements until the State Grid Corporation of China was able to catch up.

China's National Development and Reform Commission (NDRC) released a report in October 2011 suggesting China's installed wind capacity could reach 1,000 GW (one million MW) by 2050. The NDRC estimates wind can generate 17% of China's electricity by 2050 (vs 2% today). China's intermediate plan to have an installed wind farm base of 200 GW by 2020 and 400 GW by 2030 'only' requires China to maintain the current 15 GW pa installation rate.

Bloomberg New Energy Finance estimates that the cost of wind turbines has fallen by a compound annual rate of 14% since 1984. In large part the development of Chinese wind manufacturing has accelerated this deflationary trend, such that wind is well on track to reach grid-parity with fossil fuels in the medium term. Thereafter, like the impact of solar energy, this will have a decidedly deflationary impact on Chinese energy prices longer term.

China's leading wind turbine companies have been accelerating plans to export wind turbines to Europe, the Americas, Australasia and Latin America over 2010 and 2011. Lack of firm orders was initially an obstacle for the as-yet unproven turbine technologies of China (a turbine needs to be proven up in each country's specific conditions before bankability is assured). However, given the massive financial resources available to develop export markets from the China Development Bank, Chinese wind turbine companies have vertically integrated downstream into project development during 2011 in Australia, Pakistan, Chile, Greece, Ireland, Bulgaria and America. By contrast, most Western wind turbine firms are busy closing manufacturing capacity as profit margins have collapsed post the financial crisis.

### **Offshore Wind Farms – 30 GW by 2020?**

China is also alongside Germany and the UK in accelerating the development of off-shore wind resources. Three factors are driving this:

1. offshore wind technologies are being developed at 5-7 MW per turbine (vs 1.5-3.0 MW for onshore turbines),
2. Offshore wind is remote to the population base on the Eastern coastline of China, but near enough to the largest population base, avoiding excessive land requirements and the need for very long distance cable grid systems; and
3. offshore wind turbine utilization rates of 35-45% are materially higher and more predictable than the 25-35% experienced on-shore.

We see it as only a matter of time before China becomes a world leader in this newly emerging renewables category. Extreme weather and high installation costs are likely to be overcome with further technology development and economies of scale as China targets 30 GW of off-shore wind farms by 2020. This could double again by 2030.

### **Conclusion**

If the trends we outline above come to fruition, I think it is quite feasible that by the end of this decade China will be in position where it will not need to add any further net new baseload coal fired power capacity. Given China has added some 1 GW of net new coal fired capacity every week on average in the last four years, this might seem a bold assertion. However, with the trends in solar, onshore and offshore wind, Energy from Waste, hydro and biomass, plus further energy efficiency gains – it is a possible scenario if the new Chinese leadership administration stays the course. This underscores the magnitude of the problem China faces, but also the opportunity for emerging new low-carbon technologies.

China is a country that is in the process of implementing a long term plan to deal with the related issues of energy security, growth in energy consumption and climate change. This is a world leading agenda that is impressive to behold.

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**Arkx Investment Management** (based in Sydney, Australia) focuses its investment approach on a portfolio of high conviction stocks in the listed global clean energy universe. It looks for proven performers with world leading technologies backed by strong balance sheets and priced on sensible valuation metrics. We have investments in some of the companies mentioned (Wasion Group, GCL Poly, China Longyuan, Trina Solar and China Everbright). [www.arkx.com](http://www.arkx.com)