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**ENEL GREEN POWER:
IS CHINA AN ATTRACTIVE MARKET FOR
ENTRY?**

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ACADEMIC YEAR 2012/13

ABSTRACT

“ENEL GREEN POWER: IS CHINA AN ATTRACTIVE MARKET FOR ENTRY?”

INTRODUCTION

“We're reaching the point where the Earth will have to end the burden we've placed on her, if we don't lift the burden ourselves.” - Steven M. Greer

The paper's aim is to figure out a hypothetical strategy to enter the biggest and quite closed energy market around the world, looking from an Enel Green Power perspective.

Air pollution, CO2 emissions, fossil-fuel reserves, unexploited garbage, compromised environment, industrial evolution, economic growth and country development. What these different words have in common is all about one thing: the energy production. Human being made huge walk on the technological bridge, starting from nature fire until to arrive in the space. Unfortunately, the biggest mistake was to link and base his infinite progress run to something that can bring to a drastic end. World's pollution has reached critical levels, as a cancer that are affecting the Earth, and as all diseases has its big causes and roots: the world's factory, it is China. In 2009, China has become both the largest energy consumer and CO2 emitting country in the world. Along with high-speed economic development and increasing energy consumption, the Chinese Government faces a growing pressure to maintain the balance between energy supply and demand, showing a long-term sustainable solution need. China has understood that its following evolution is strictly linked to new energies, as stated in its 12th Five Years Plan, extremely focused on very high green targets and on a higher degree of openness to the West World. Global Renewable companies and utilities can make this change easier, through operations and know-hows, because their technical engineering can be the essential line forwards the green evolution inside a new economic eve. The “Red Dragon” has already become the biggest renewable market in the world, and is going to get the first position in the global economy as well, a result achievable just running on the renewable and sustainable bridge.

The process will follow a drill-down approach, from general to details. Starting from an overview of the renewable sector, the focus will move around its huge investment trends, observed in both historical and planned terms, through a deep breakdown by country, technology and type. After, the attention will turn on competition field, entering the huge renewable M&A segment, accounting latest results, the different flow directions and the principal issues and sentiment affecting the industry. A special focus on Chinese perspective will characterize all the previous arguments. In the second part, there will be a complete shift on Chinese electricity market. There will be displayed its structure, its historical and actual regulation, trying to describe all active or passive players that take a role inside this industry, with a big attention to the foreign ones.

The following part will give a snapshot about Enel Green Power, looking at its actual and planned operational diversification, both technological and geographic, its financial milestones and its sources of competitive advantage respect the competition.

In the end, a strategy will come to life, analysing all viable actions, in an attempt to understand the hypothetical attractiveness of such risky and fragmented operation.

CHAPTER 1 – “AN OVERVIEW OF THE RENEWABLE SECTOR”

“Renewable energy is derived from natural processes that are replenished constantly. In its various forms, it derives directly from the sun, or from heat generated deep within the earth. Included in the definition is electricity and heat generated from solar, wind, ocean, hydropower, biomass, geothermal resources, and biofuels and hydrogen derived from renewable resources .” (IEA).

Renewable energy replaces conventional fuels in four distinct areas: power generation (19% of electricity generation worldwide), hot water/space heating, motor fuels, and rural (off-grid) energy services. At the national level, at least 30 nations around the world already have renewable energy contributing more than 20% of energy supply. National renewable energy markets are projected to continue to grow strongly in the coming decade and beyond.

Wind Power is the conversion of wind energy into a useful form of energy, such as using wind turbines to make electrical power, windmills for mechanical power, wind pumps for water pumping or drainage, or sails to propel ships. During 2012, almost 45 GW of wind power capacity began operation, increasing global wind capacity 19% to almost 283 GW. It was another record year for wind power, which again added more capacity than any other renewable technology despite policy uncertainty in key markets.

Hydropower or waterpower is power derived from the energy of falling water and running water, which may be employed for useful purposes, producing through large-scale dams, micro hydro-system in rural areas, and run-of-the river systems from ocean and river. In 2012, an estimated 30 GW of new hydropower capacity came on line increasing global installed capacity by about 3% to an estimated 990 GW. Electricity production amount was about 3,700 TWh.

Solar Power applies energy from the sun in the form of solar radiation for heating or generating electricity. Solar electricity generation can use either photovoltaic or heat engines (concentrated solar power). During 2012, the solar photovoltaic (PV) market saw another strong year, as total global operating capacity reached the 100 GW milestone, with eight countries added more than 1 GW of solar PV, and new installations will continue to broaden.

Biomass, as a renewable energy source, is biological material from living, or recently living organisms. In the first sense, biomass is plant matter used to generate electricity with steam turbines & gasifiers or produce heat, usually by direct combustion. In the second sense, biomass includes plant or animal matter that can be converted into fibres or other industrial chemicals, including biofuels. Total primary energy supplied from biomass increased 2–3% in 2012 to reach approximately 55 EJ.

Geothermal Power is from thermal energy generated and stored in the Earth. This energy originates from the original formation of the planet (20%) and from radioactive decay of

minerals (80%). In 2012, geothermal resources provide energy in the form of direct heat and electricity, totalling an estimated 805 PJ (223 TWh). Two-thirds of this output was delivered as direct heat, and the remaining one-third was delivered as electricity.

Global demand for renewable energy continued to rise during 2011 and 2012, despite the international economic crisis, trade disputes, and policy uncertainty and declining support in some key markets. Renewable energy supplied an estimated 19% of global final energy consumption by the end of 2011. Of this total, approximately 9.3% came from traditional biomass, which is used primarily for cooking and heating in rural areas of developing countries. Useful heat energy from modern renewable sources accounted for an estimated 4.1% of total final energy use; hydropower made up about 3.7%; and an estimated 1.9% was provided by power from wind, solar, geothermal, and biomass, and by biofuels.

Most technologies continued to see expansion in both manufacturing and global demand. However, global market growth slowed for most technologies in 2012 relative to the previous few years. Uncertain policy environments and declining policy support – such as policy reversals and retroactive changes – affected investment climates in a number of established markets, and slowed momentum in Europe, China, and India.

Total renewable power generation worldwide exceeded 1,470 (GW) in 2012, up about 8.5% from 2011. Actually, renewables accounts more than 26% of total global power generating capacity and supplies an estimated 21.7% of global electricity, with 16.5% of total electricity provided by hydropower. Also wind and solar power are achieving high levels of penetration in different countries, accounted for 5.6% of generation during 2012. China, United States, Brazil, Canada, and Germany remained the top countries for total renewable electric capacity by the end of 2012, while in terms of non-hydro renewable power capacity after the previous countries, Spain, Italy, and India are gaining good positions.

CHAPTER 2 - “ANALYSIS OF THE HISTORICAL AND PLANNED INVESTMENTS IN THE RENEWABLE SECTOR”

Historical overview

Global new investment in renewable power and fuels was USD 244 billion in 2012, down 12% from the previous year’s record amount of USD 279 billion. Despite the setback, the total in 2012 was the second highest ever and 8% above the 2010 level. The decline in investment—after several years of growth— resulted from uncertainty over support policies in Europe and the United States, as well as from actual retroactive reductions in support. On a more positive note, it also resulted from sharp reductions in technology costs.

Investment Breakdown

By country - In the developing world, renewable energy outlays reached USD 112 billion, up from USD 94 billion in 2011, and represented 46% of the world total (up from 34% in 2011 and 37% in 2010). By contrast, outlays by developed economies fell sharply (29%), from USD 186 billion in 2011 to USD 132 billion in 2012, the lowest level since 2009. This shift reflects three important trends: a reduction in subsidies for wind and solar project development in Europe and the United States; increasing investor interest in emerging

markets that offer both rising power demand and attractive renewable energy resources; and falling technology costs of wind and solar PV.

By sector - In 2012, solar power was the leading sector by far in terms of money committed; at USD 140.4 billion, solar accounted for more than 57% of total new investment in renewable energy. Wind power was second with USD 80.3 billion, representing almost 33%. The remaining 10% of total new investment was made up of bio-power and waste-to-energy (USD 8.6 billion), small-scale hydropower (<50 MW) (USD 7.8 billion), biofuels (USD 5 billion), geothermal power (USD 2 billion), and ocean energy (USD 0.3 billion). With the exception of small-scale hydropower and ocean energy, investment in 2012 declined relative to 2011 in all renewable sectors tracked by Bloomberg New Energy Finance (BNEF).

By type - Global research and development (R&D) spending on renewable energy inched 1% higher to USD 9.6 billion in 2012, marking the eighth consecutive year rise. Global R&D investment has almost doubled since 2004 in absolute terms (up 93%); however, R&D spending by OECD governments as a proportion of GDP is scarcely a quarter of its level 30 years ago. Venture capital and private equity investment (VC/PE) in renewable energy fell by 30% to USD 3.6 billion, the lowest level since 2005, as VC/PE investors faced a bleak economic outlook in Europe, China, and the United States. New public market investment (in stock markets) in renewable energy slumped by more than 60% to just over USD 4 billion, scarcely a fifth of the peak level established in 2007. The main reasons for under-performance of renewables shares were distress in the wind and solar supply chains due to overcapacity and unease about policy developments in Europe and the United States. Asset finance of utility-scale projects again made up the lion's share (61%) of total new investment in renewable energy, totalling USD 148.5 billion in 2012. This was down 18% from the record USD 180.1 billion in 2011, but ahead of the USD 143.7 billion in 2010. Mergers and acquisition (M&A) activity – which is not counted as part of the USD 244 billion in new investment – fell sharply (29%) in 2012 to USD 52.3 billion, from an all-time high of USD 73.4 billion in 2011. The decline was almost entirely due to a collapse in corporate mergers and acquisitions caused by the general economic slowdown.

Planned Investment

Green investments (excluding hydro) are expected to rise from USD 195bn in 2010 to USD 395bn in 2020 and to USD 460bn by 2030, according to Bloomberg New Energy Finance analysis. Over the next 20 years, USD 7 trillion of new capital will be needed to sustain this growth. Solar will attract around half of the spend, at USD 1.1 trillion between 2011 and 2020 and USD 1.5 trillion in the next decade. Wind (onshore and offshore) will follow, absorbing a little over one-third of total investment this decade and 41% over the next. After 2020, new energy policies together with lower costs of renewable technologies will lead deployment of renewable energy technologies. In the decade to 2030, world investment in renewables will increase by a more modest 2.5% per year, as a consequence of a very significant development as the cost of technologies decrease.

In country terms, Europe will continue to be the largest regional market for renewables up to 2014, with 25% of world investment, but will see a reduction over this period as the value of clean energy support mechanisms will be under revision by governments, due to the persisting sovereign debt problems. In China, investment in renewable energy is expected to

growth continuously for all years, achieving by 2014, first position as the largest single market for renewable energy with an annual expenditure of about USD 50bn, accounting for 21% of the world market. The US and Canada are also expected to recover after lasting decrease in project building, together with USD 50bn of total investment by 2020. The rapidly developing economies of India, the Middle East and North Africa (MENA), Africa and Latin America will experience the fastest growth, thanks to growth rates of 10-18% per year between 2010 and 2020.

Focus on China

Renewables are scheduled to play a key part of China's strategy to meet its growing energy demand. Around 17% of the country's power comes from renewable energy, including hydro, and this figure will need to increase significantly to achieve the national non-fossil fuel policy targets. Economic growth has increased power demand in China to such an extent that power rationing has already been usual in some coastal and central provinces for years. GDP will remain the dominant driver of power demand. A key of China is to reduce carbon emissions per unit of GDP (carbon intensity) by 40-45% by 2020 on 2005 levels. The more relevant target is the government's intention to increase the share of non-fossil fuel energy sources to 11.4% of primary energy consumption by 2015 and to 15% by 2020. By 2020, China aims to have at least 160 GW of wind capacity, 30 GW of biomass & waste-to-energy and 50 GW of solar. It will add approximately 35 GW of coal, 13 GW of nuclear, 12 GW of hydro and 26 GW of other renewables every year up to 2020 (average growth). These developments will reduce the carbon intensity of the power generation sector by 33% by 2030.

In terms of investment dollars, China is projected to remain the world's largest market for clean energy investment worth USD1.4 trillion over the next 20 years, equivalent to 20% of the world market. Wind will secure approximately USD 240bn by 2020 and USD 270bn by 2030, of which USD 110bn will go to offshore projects. Solar market will also grow significantly, but up to 2020 it will remain around half the size of the wind market. Some USD 112bn is expected to be spent on solar power generation technologies up to 2020 decade and, half of which will go to small-scale installations. Over 2021-30 the solar market will increase more rapidly, with USD 241bn, as costs continue to fall and fossil subsidies are phased out.

CHAPTER 3 - "M&A TRENDS ACTIVITY IN THE RENEWABLE SECTOR"

Global renewable energy M&A activity has grown constantly during the past four years. A total of 591 acquisitions valued at USD 37.8 billion were announced in 2012, a 58% increase on the 375 deals, totalling USD 42.1 billion, announced in 2009. An absence of large deals resulted in the decline in the total value of announced transactions. After a 42% increase in activity value in 2011, the value of announced deals fell 14% to USD 37.8 billion in 2012, a 4% decline in the number of announced deals. Only five billionaire deals with a total combined value of USD 8.6 billion were announced in 2012, comparing with seven similar sized transactions (total value: USD 14.3 billion) in 2011. This trend demonstrates a high focus on smaller deals respect to the past, as a consequence of continuous industry's assessment in these years. Looking in details, three of the four billionaires deals interested the solar sector, even if wind asset deals made up the largest M&A share, with 60% of total

renewable deal value in 2012. In country terms, the hottest were USA and Canada, where there was a high domestic inbound activity, except for Canadian GDF Suez renewable portfolio that was acquired by Japanese Mitsui in collaboration with Canadian private equity firm. Important movements were registered in UK, where wind sector is fruitful field, targeted by a differentiated bidder base. European-based deals showed the most diversified activity in terms of technology, as showed by a billionaire Biomass deal in Netherlands, Hydro deal in Sweden and wind one in Germany.

Principal issues

The ongoing decline in equipment and system costs will bring M&A activity to remain constant during the next 18 months. Costs for a number of renewable energy technologies continued to fall significantly in 2012. Costs have fallen to such an extent that renewable energy has now achieved grid parity in a number of emerging markets, due to big falling in costs. This means that, depending on the country, new built renewables can compete directly against fossil fuels ones without subsidies. Although renewable energy costs continued to decline in 2012, investment in a number of core markets was typified by retroactive changes to subsidies, such as Spain and Germany, even if costs continued to decrease in 2012. Retroactive policies affect investor confidence on the countries, in which they are applied. Outside Europe and North America, subsidy frameworks and procurement processes are just beginning to be smoothed. European style feed-in tariffs to subsidise renewable energy investment has been left out by many emerging markets. A range of subsidies (as part of its climate change bill) has been introduced by Mexico in April 2012, bringing the country to a 50% cut in carbon emissions by 2050. This explains why these markets are grabbing the attention of international developers.

Project debt finance displayed some cracks. Only USD 156 billion of project finance was directed to renewable energy assets globally in 2012, a 13% decrease on the USD 180 billion invested in 2011, meeting its first annual decrease. The cost of project finance debt varies significantly by region and technology: in Europe, solar PV farms, onshore wind farms and biomass plants are currently financed at an average of 320 bps above Libor; in North America similar projects expect to secure better terms by on average 40 bps. Banks are obliged to offer more competitive rates, because of decreasing number of projects seeking financing. There is limited scope for debt to be brought into tax equity-financed projects, since the cash flows are swallowed up by tax equity investors and are therefore unavailable to be used to repay debt. This is forcing banks to compete more aggressively to participate in transactions.

In terms of *project sponsorship*, eight of the ten most active project sponsors (measured by the number of projects financed) in 2012 were Chinese. China Guodian was the most active, securing USD 4.9 billion for 54 wind farms and 9 solar PV plants, all located in China. Enel Green Power and IKEA Group were the only non-Chinese project sponsors to feature in the top ten list, with 26 and 22 projects, respectively. Many other global corporates from multiple sectors have also started out on the renewable energy journey: Google, Nike, HSBC, Volkswagen, Nestle, BT, PepsiCo, Cemex, Renault, BMW and Apple – are a few of the brands moving into this space.

The most active acquirers of renewable energy assets are financial investors. In 2012 private equity funds, infrastructure funds, pension funds and life insurance companies announced 124 acquisitions valued at USD9.7 billion, less than the 111 acquisitions totalling USD 12.6 billion announced in 2011, but higher of the USD 6.1 billion and USD 5.0 billion announced in 2010 and 2009, respectively. Last year they were ranked second behind independent power producers.

Major utilities are divesting non-core renewable energy assets to rebuild their balance sheets and free up capital to invest in offshore wind assets. In 2012, major utilities announced the sale of 32 renewable energy asset portfolios valued at USD 12.5 billion, more than double with respect to the USD 5.4 billion of asset sales announced in 2011. In the first quarter of 2013, utilities have announced disposals of 16 renewable energy asset portfolios valued at USD 2.0 billion. European utilities or subsidiaries of European utilities accounted for 87% of all assets divested by utilities (USD 10.9 billion in 2012). Utilities are expected to be involved in new acquisitions as well. According to survey respondents, utilities are now ranked third most active acquirer behind infrastructure funds and independent power producers. Two years ago they were ranked most likely active acquirers. As a result of a survey, the top five countries and regions for M&A and investment globally in the next 18 months are the USA, targeted by 44% of respondents, Germany (21%), China (21%), the UK (20%) and Canada (20%).

Focus on Asia-Pacific

Asia-Pacific acquirers started to make significant investments abroad. Their companies participated in 38 acquisitions in 2012 (36 in 2011) valued at USD 6.0 billion (USD 1.9 billion in 2011) outside Asia. Japanese acquirers, like Marubeni Corp., Innovation Network Corporation of Japan, Mitsui, Mitsubishi and Sumitomo all acquired renewable energy assets in North American and/or Europe in 2012. Chinese companies are still aggressive but less than before, due to two essential reasons: solar module manufacturers want to acquire pre-construction stage projects so they can deploy their equipment; and equipment manufacturers want to acquire distressed manufacturing assets to obtain a physical presence in Europe and North America.

China-Europe deal flow and viceversa

There has been a notable increase in cross-border deal activity between Chinese and European companies in 2012. Chinese companies have announced 12 acquisitions of European clean energy companies in 2012 thus far, more than the ten that were announced between 2009 and 2011. Slowing dynamic growth and an increasingly competitive domestic renewable sector, is pushing Chinese energy companies to enter new markets. M&A is the fastest route into a new market. In addition, a large number of distressed European clean energy assets that have become available, and Chinese acquirers now consider the region more attractive than North America, which is interested by policy uncertainty. Chinese utilities are interested in operational projects to accelerate their expansion internationally. The significant demand for energy efficiency acquisitions likely stems from China's emphasis on energy efficiency in its most recent five-year plan. Significant technology knowhow will have to be imported if China is to meet its ambitious energy efficiency targets.

In the reverse sense, opportunities, for European companies in China, lie in plugging gaps in the local supply chain by providing essential technology and knowhow. Technology is only one component of any supply chain. Chinese companies will also need to obtain process engineering and technology integration knowhow if they are to develop integrated supply chains capable of meeting the demands of the country's future high growth industries. Indeed some industry experts believe that the greatest opportunities for European firms in China lie in exporting process engineering expertise and knowhow, rather than technology itself. However, a lot of doubts still remain about IP protection and cross-border financing.

CHAPTER 4 – “CHINESE ELECTRICITY MARKET OVERVIEW”

The People's Republic of China (PRC), commonly known as China, is the most populous state in the world, with over 1.3 billion citizens. Located in East Asia, it is a single-party state governed by the Communist Party of China (CPC). At about 9.6 million square kilometres (3.7 million square miles), the PRC is the world's third- or fourth-largest country by total area. According to the International Monetary Fund, China's real gross domestic product (GDP) grew at an estimated 9.2 percent in 2011 and 7.8 percent in the first half of 2012.

The structure of the Chinese Electricity Market (CEM) is divided in 3 layers: the national, regional and provincial electricity markets. Each of the above layers can be segmented into three different phases: Generation, Transmission and Distribution.

Electricity consumption has been increasing strongly in the past decade, with a 12% average per year between 2000 and 2010 (compared to 8% average per year between 1990 and 2000). Then, according to the National Energy Administration (NEA), the growth should continue at a rate of 10% in the coming years.

Historically, Chinese electricity markets has been characterized by a fragmented and monopolistic action, resulted in the constitution of China State Power Corporation (CSPC) in 1997, and reformed just after five years. China's 2002 Reform Policy was in fact fully consistent with the broad strategy of vertical separation and the creation of "upstream" competition that has nowadays become a sort of standard, even a "default" strategy, for the restructuring of natural monopolies around the world. The Plan aimed at introducing elements of free market with a view to increasing the efficiency. However, at the same time it aimed at creating an integrated electricity market network under the supervision of the government, which would legitimate the pricing mechanism in transmission and distribution, as retail prices should be the result of market demand and supply. The CSPC's power generation assets were restructured into the following five power generation companies, each of which is limited to no more than 20% of the generating capacity in each regional network: China Huaneng Group (CHNG), China Datang Corporation (CDT), China Huadian Corporation (CHD), China Guodian Corporation (CGDC), and China Power Investment Corporation (CPI). These companies own about 45% of all Chinese market, while the remaining part is distributed between local Government-owned power producers and IPPs, namely private and foreign Independent Power Producers.

The CSPC's grid assets were restructured into the China State Grid Corporation (SGCC), and the China Southern Power Grid Company (CSG), both State-Owned Enterprises (SOEs). These two companies controlled also the distribution segment, therefore, this together with

transmission constitute de facto one single market. Main players act inside Chinese market, distributed at different levels: The State Council operates at a Supra-ministerial one; at ministerial level, there are the National Development and Reform Commission (NDRC) and the National Energy Commission (NEC); while National Energy Administration (NEA), State Electricity Regulatory Commission (SERC) and State-owned Assets Supervision Administration Commission (SASAC) play at under-ministerial segment.

Renewable Energy

The use of renewable energy is an increasingly hot topic and important issue in China. There are three key drivers behind the continued interest in renewable: increasing demand for electricity, need to reduce its reliance on coal for energy production and need to reduce its greenhouse gas emissions.

Chinese government is quickly realising that coal will no longer be able to support the growth of its economy. Considering the logistical aspects of using coal, China has to either import it or have it removed from mines. The country now faces significant pressure from international organisations to reduce its carbon dioxide emissions. In November 2009, just before the United Nations Climate Change Conference in Copenhagen, Chinese Premier Wen Jiabao pledged to reduce China's carbon dioxide emissions by 40-45% from 2005 levels by 2020. Despite this uncertainty, the Chinese government is investing both economically and legislatively in renewable energy in a bid to meet its self-prescribed targets.

The China Renewable Energy Law was accepted on 1 January 2006 and was China's first state-supported mandate to help develop the use of renewable energy in China. The law is still a key driver of renewable energy development in China. The 2006 Renewable Energy Law not only encourages the continued construction of renewable energy facilities, but also puts pressure on the Chinese grid operators to purchase the power generated by approved renewable facilities.

The 12th Five Year Plan focuses heavily on adjusting the economic growth model. Sustainability is highlighted as key for future development of the economy during this planning period. Three areas for focused investment have been identified for the planning period, namely clean energy, energy conservation and clean energy cars. Energy use is targeted to be reduced by 15% per unit of GDP, with carbon dioxide emissions to be reduced by 17% by the end of the planning period. There will be a minimum investment of RMB 5.3 trillion (around USD 830 billion) into the power industry, with hydro power, wind, solar, biomass and grid development as key targets for this investment. Despite having set very ambitious targets, questions still remain as to how effective these strategic targets will be at developing the supporting industries, highlighting discrepancy between the planned goals and the implementation roadmap.

Current Overview

China is the world leading renewable energy producer, with an installed capacity of 321 GW (28.1% of overall country's power installed capacity of 1144 GW). Since 2005, the overall renewable energy growth rate has been about 11%. Despite hydropower still represents almost 77% of total installed capacity, huge increases have been recognized in wind and solar sector, increased of 32% and 48% respectively. In terms of electricity generation, renewable energy has growth by 30%, showing increasing focus about grid connectivity, which has

always represented a big weakness for wind and solar sector, accounted for a growth of 35% and 400% respectively. With about 5,000 TWh, renewables actually accounts for 20% of overall electricity generation. In 2012, hydropower installed capacity reached about 250 GW, slowing its growth pace respect to previous years, as a result of an approaching decline stage, even if its CAGR is about 11% on year-base. Wind installed capacity has reached about 60 GW, following a CAGR of about 80%, despite the decline in new installation pace during 2012, showing trend quite close to a maturity. Chinese solar industry is now a multi-gigawatt market, with over 3 GW of newly installed solar PV capacity in the last two years, resulting in the fastest growing solar PV market in the world, with cumulative capacity expected to continue climbing over the next few years. Biomass and biofuels represent a key potential future growth area for renewables in China, with opportunities in second generation biofuels, ethanol and energy produce from feed stock sources, considering an actual installed capacity of just 8 GW.

CHAPTER 5 – “FOREIGN PLAYERS IN CHINESE RENEWABLE ENERGY”

Foreign investment in Chinese electricity market have always experienced an up-and-down trend, due to an alternation of fragmented policy and tricky regulations. Negotiations for the first foreign-invested power project in China kicked off in the early 1980s between Guangdong provincial government and China Light and Power Co. Ltd (CLP) of Hong Kong. Following economic policy, in the first half of the 1990s, allowed important commitments to foreign-invested projects, approving even those, which envisaged full foreign control over the power plant. The boom period was specially noticed between 1994 and 1997, when the growth of FDI was tremendous, and the electric sector became especially attractive. The need for foreign participation in the power sector in the '90s was motivated by three main factors: capital, technology and some degrees of competition. Hence, cumulative FDI in the power sector went from zero in 1985 to 13% of total investment in the Chinese power in 2002 (whereas in other sectors FDI stood at a 6% average). Just as remarkable is the precipitous drop-off later on: in 2005 foreign IPPs accounted for barely 9% of Chinese installed capacity. High amounts of potential customers did not automatically translate into profits for foreigners given that individual Chinese in the 1990s were at the lower level of spare income. In addition to the mismatch in expectations, foreign IPPs suffered more severely than locals of lack of competitiveness in terms of tariff levels as they typically require higher returns and incur higher costs. These challenges may be regrouped in three categories: information barriers, weak rule of law and poor enforceability of contracts, and gradual decrease of governmental support for foreign investment.

Foreign players in Chinese Renewable

This is an analysis of data regarding foreign renewable players in Chinese Energy Market. Due to lack of national level data, all information have been gathered from company websites and newspaper. Three different groups are recognized:

- *Actual Foreign Renewable Players*: companies that are actually involved in the market. Some examples: *China Light & Power (CLP)*, an Hong Kong based company, which as an overall installed capacity of about 1,098 MW, through 18 wind

farms, 3 hydro plants and one biomass plant, jointly-owned with some of the most important Chinese renewable companies; *Hong Kong Energy* (HKE), that operates 5 wind farms, accounting for 535 MW; *KEPCO*, Korean-based company, has formed two joint ventures, Chifeng and Gemeng International, through which owns 919 MW of wind power plants in Inner Mongolia, Gansu province and Liaoning province with another 396 MW project to be added soon; *UPC Renewables China*, United States company, has three projects in operation and two projects in construction with 4 wholly owned projects and 9 JV projects approved by the NEA; *Nuon*, a Netherland based company, the first company to enter into a PPA for a wind farm that stipulates payment in hard currency and indexing of the price of energy to a foreign entity; Asia Power Corporation, from Singapore, mainly involved in hydropower.

- *Last Exiting Foreign Renewable Players*: companies that had been involved in the market in the last years, but that have exited. For example: *AES Corporation* (USA), has just sold its jointly-interest in 2 hydro plants and 5 wind farms to *Sembcorp* (Singapore); *Meiya Power* (USA), an ex-leading foreign hydro player, recently acquired by China Guangdong Nuclear Power Corporation (CGNPC).
- *Further Incumbent Foreign Renewable Players*: companies that have already planned to enter the market. Such as: Spanish *Solaria* and Belgium *Enfinity N.V.* in the solar sector; *Electrobras* (Brazil), *Hytex* (Malaysia) and *Welwind Energy International Corp* (Canada) in wind sector; *Abengoa* (Spain), *TMO Renewables* (United Kingdom) and *METSO* (Finland) in biomass power; *Lockheed* (USA) in ocean power and *Orka Energy* (Iceland) in geothermal one.
- *Other Energy Related Big Foreign Players*: companies that are involved in other segment of the Chinese Electricity Market, like American *General Electric* (GE) and the two French-based *GDF Suez* and *Energies de France* (EDF).

CHAPTER 6 – “ENEL GREEN POWER”

Enel Green Power, established in December 2008, is the Enel Group company that develops and manages energy generation from renewable sources at a global level, with a presence in Europe and the Americas. EGP is a major global operator in the field of energy generation from renewable sources, with an annual production of 22,5 TWh, covering the energy consumption of more than 8 million clients and avoiding 16 million tonnes of CO₂ emissions per year. It has an installed capacity of 8,044 MW, produced by more than 700 plants in 16 countries and with a generation mix that includes wind, solar, hydro, geothermal and biomass. The company has a great focus on innovation and new technologies, as it demonstrated in 2012, carrying out activities for the development and demonstration of innovative technologies worth approximately 12 million Euros with a total commitment of approximately 50 million Euros by 2015. EGP has a huge geographic diversification, minimizing regulatory and country-specific risks, ensures a good mix of growth strategies. In Europe, which represents a 71% share of its market across Italy, Spain, Portugal, Greece, France, Romania and Bulgaria, the company operates 3,316 MW of wind, 1,590 MW in hydropower, 722 MW of geothermal energy, and other 200 MW, half divided between solar and biomass power. Across North America (USA and Canada), accounted for a 15% share of

EGP's market, the company has an installed capacity of 832 MW for wind, 313 MW of hydro, and other 150 MW, fairly shared between the other three technologies. Latin America is another important market, for a 13% share, with 732 of hydro, 168 for wind and 268 MW of geothermal energy, covering Mexico, Costa Rica, Guatemala, Panama, Chile and Brazil.

Financial Considerations

Since 2009, Enel Green Power's revenues has increased of about 51% (+ EUR 911 million), with a CAGR of 14.8%, especially thanks to its strong international expansion and ability to innovate through new technologies. In addition, its EBITDA has showed a great increase of about 39% (+ EUR 471 million), with a CAGR of 11.6%, confirming its huge focus on cost efficiency, throughout production and operating optimization, economies of scale and R&D emphasis. Group Net Income has remained quite stable during years, recording a decrease after 2010, due to changes in taxation and dividend payout. Net Debt has been reduced for about 14% (- EUR 731 million) during these last 3 years, even if it has seen an increase in 2012, due to huge amount of new investments.

In August 2013, the share price is in line with previous emission amount of EUR 1,66, after a previous black moment during 2012. Total Market Capitalization of EGP is about EUR 8,345 million, resulting in an Enterprise Value of about EUR 17 billion.

Future developments

Enel Green Power has presented its Business Plan on April 2013, continuing to focus on huge expansion and strong diversification, with a plan to install 12.4 GW by 2017, thanks to a stated Capex of EUR 6bn, which will be allocated especially to Emerging markets (69%) as geography and to wind (45%) as technology. Capital expenditures will be all self-funded by its strong Cash Flow from operation, through asset value maximization, EBITDA growth at 10% (EUR 2.7bn by 2017) and sustainable 11% overall IRR on new investment.

Diversification will bring to a best-in-class concentration level of about 0.08 by 2017, starting from an already good actual level of 0.13. New plans of geographic expansion have been already set in Morocco, Colombia, Turkey, Peru and South Africa.

Competitive Environment

In this section, it is developed a comparison of EGP's value drivers with the main comparable global operator, as of end 2012. Iberdrola Renovables, EDF Energies Nouvelles, EDP Renovaveis and Acciona Energy are chosen as the most competitors of EGP, in terms of size, global presence and business mix.

Two sources of competitive advantage are recognized: installed capacity's diversification and load factor. In detail, analysing comparable capacity breakdown by technology, it is highlighted a much diversified production mix, which is the most important source of EGP's competitive advantage, thanks to geothermal energy, in which EGP is among the best players, covering about 8% of overall global installed capacity (11 GW). In terms of geography mix, EGP shows again a good result respect to its peer, and the situation is expected to improve a lot, thanks to further plans to enter new emerging markets, especially in less discovered ones, such as Africa.

Load factor is defined as the ratio between net annual energy production and the theoretical productivity, allowing great operational efficiency and a higher profitability of carried

investment. EGP's load factor is completely higher respect to its competitors, as a consequence of a better generation mix, thanks to leadership in geothermal installation, while other companies are especially focused on wind.

CHAPTER 7 – “HOW EGP COULD ENTER THE CHINESE RENEWABLE MARKET?”

The aim is to wear EGP's clothes, and try to look forward a Chinese market entrance, analysing what would be the inside opportunities and barriers of a such quite-risky and fragmented strategy.

China's appeal

Following EGP's new market screening process, China has leadership in terms of growth for both GDP and Power demand, respect to countries, in which EGP plans to operate (Morocco, Turkey) or already plays (Brazil). Another important element is the Easy of doing business (IMF ranking from 1 to 185), in which China results in a better position respect two target countries, especially regard to Brazil, the unique BRIC country in which EGP has already entered. Looking at the resource potential, China takes a primary position, even if it is already became the biggest country in terms of installed capacity, showing a very impressive amount in a range between 90-95% of outstanding level around all sources, considering that until now renewable generation is about 1,006TWh, especially thanks to new actual unemployed technologies and resource. In policy terms, the 12th FYP will attempt to move the Chinese economy from its current focus on the manufacturing sector towards services; it will also seek to raise domestic wages, increase internal consumption and drive innovation. The Catalogue for the Guidance of Foreign Investment Industries restricts FDI in certain clean-tech sectors. FDI in biofuels, for instance, is difficult to achieve, as it requires provincial or even central-government approval. By contrast, FDI in wind power, solar energy, pollution control, waste disposal, recycling and environmental-protection equipment requires the approval of only local or provincial authorities.

Market Barriers

The last round of reform, basically, lays down a legal framework allowing the foreign and private sectors to invest more freely in China's electricity industry, but some barriers are to be blamed. This makes for a challenging market environment where additional resources are required to ensure successful market entry. Barriers are not only originating from electricity sector regulation, but also from wider institutional arrangements. For example, *inadequate legal framework, regulation and price competitiveness* create a high level of uncertainty; *local favouritism* forward SOEs makes difficult for foreign companies to ensure financial and grid connectivity; *IPR infringements* could enlarge disbursements in both capital and time.

Technological Collaboration and JVs

Looking into China, there is good opportunity for foreign investors in the renewable energy sector to market their technology and services within China. To the extent that foreign capital support and technology can further China's own domestic development goals, foreign investors can expect to find willing partners among local businesses. As a result, regulatory

approvals and preferential financing or tax treatment may be more readily available to spur investments within China. In addition, CDM projects eligibility requires a 51% Chinese ownership, obliged them to make a joint venture with a Chinese partner in order to receive CERs advantages.

For companies looking to enter a new industry or geographic market, sharing knowledge and risk via a joint venture can be the way forward. This type of partnership is often considered by companies looking to expand their geographical footprint. JVs can be a great route to entry, allowing companies to gain insight into a given marketplace, while garnering a better understanding of the strategic fit and true value of a market from a partner. In countries such as India and China, which are burgeoning with opportunity, but carefully monitoring foreign investment, getting a small foothold in the market may be the best and only option available to investors. In 2011, China has registered an amount of USD 17 billion for cross-border minority interest transaction, recording a 365% increase yoy. EGP has always been active in JVs and minority stakes around the world, and its experience could become a secured base for starting.

How to exploit EGP's competitive advantage

Starting from all previous considerations, now, the focus will shift on what could be the hypothetical sources of strategic and technological competitive advantage for EGP, in an attempt to enter the Chinese renewable market, and in expectancy of what will be the further developments and evolutions of this continuously-under-consolidation market.

- *Geothermal leadership.* China's geothermal energy resources amount to 860 trillion metric tons of coal equivalent, an amount 260,000 times greater than China's annual energy consumption, according to newly issued statistics from the Ministry of Land and Resources, and it is expected to be a new government-targeted and investment-focused sector. As a global leader in geothermal generation, EGP should exploit these well-known skills for attack the Chinese renewable market, conscious to count on first-mover advantage as well, inside an highly growth and unexploited industry.
- *Network, expertise and supply-chain holes.* In solar sector, EGP could catch good opportunities, thanks to its JV with Sharp Solar, which has a great presence in the Chinese market. About wind, a good action could count a differentiated approach in both provincial and new unexploited rural areas. Foreign players entering the wind power will likely best be able to participate in projects organized on a provincial level, the BCG suggest, in an attempt to avoid SOEs competition.
- *Complementary Chinese collaboration for new target markets.* EGP has just entered the African renewable market, specifically in Morocco and South Africa, and it is already screening new areas of development in other 11 countries. China is already capitalising on this massive investment opportunity, representing the biggest player. Observing this situation, an hypothetical enter in the Chinese market, developing JVs and collaborations, could create a passable bridge to new African emerging markets, pushing on certified know-how, big network and impressive penetration of Chinese companies in the new frontier of renewable energies.

CONCLUSION

The previous analysis has given us an overall view of what is the renewable energy, what are its investment trends, how has evolved its competitive and transaction landscape, focusing on Chinese distinctive elements, in terms of both players and regulation. All these things have been observed by Enel Green Power's perspective. As resulted, Chinese is a quite fragmented market, in which open market frictions are still at an immature stage, even if government is working forward a well-targeted direction, emphasizing an efficient competition. Foreign players do not act freely, because, differently from adopted regulation, a "hidden" favouritism continues to influence project approvals, tenders and contractions.

On the other hand, as showed by the last two Five-Years Plan, renewable energy revolution has likely changed card on table, pushed by technological and expertise needs. During last years, Chinese green sector has growth mostly in quantity terms, without paying great attention on quality and transparency, figuring out a huge and undisciplined market as a result of shortly-oriented strategy. Otherwise, actually, something is shifting, as a consequence of an approaching-maturity sector. Government has recognized the most likely weaknesses of an industry, historically, focused more on numbers than on needed standards. They understood that a just aggressively penetration in developed markets, through huge capital injection, is not enough, because its domestic base is dispersive and badly managed, so that a reverse flow is needed. Last developed policies demonstrate this trend, creating more entrance for international players, always characterized by a quality-focused behaviour. However, market remains still under a continuous and uncertain process of consolidation, which, despite all, can create important chances for foreign companies, especially for these pulled by a long-term strategy. Supply chain holes and tech-shortages open attractive fields of actions, even if a sapient caution should remain in company agendas. The "Green Dragon" knows impossibility to reach its amazing targets alone, turning its focus on a long-run and opening to international collaborations.

History has always taught that who acts well during changing and uncertain times, has more chances to obtain a leadership in following steps, most likely taking all returns from run risks. Global renewable top-companies, like EGP, should always pay attention to these "greedy" competitive opportunities. Waiting too much could likely result in a wrong decision. China is going to change its policy and regulation, but not its own and traditional culture, which represents one of the most distinctive aspects. Experience shows that businesses need several years to build relations with business partners and government agencies before business will really take off and become profitable. Network (or *Guanxi* in Chinese) power and penetration are much more than most assume.

"When sustainability is viewed as being a matter of survival for your business, I believe you can create massive change." – Cameron Sinclair

Enel Green Power has all needed skills for acting before the bell's ring, and through its global well-known competitive advantages, it should pay great attention to the new "El Dorado" of sustainability revolution.