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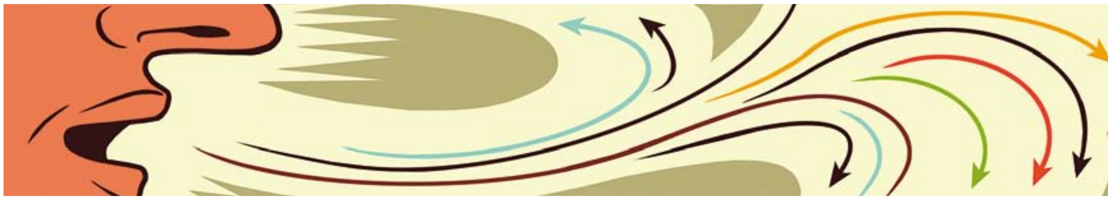


# Pioneers to industrialists: How to grow profitably as the renewables sector matures

**As the industry grows to substantial size, its complexity will increase, making success and returns more difficult to attain.**

**Carlo Germano and Sebastien Leger**

## Winds of change

Companies that make, use, and operate technologies to harness solar, wind, and biomass into energy are growing rapidly. The renewables sector has long been considered a pioneering group of small, start-up companies, but it is now reaching an important stage in its development and is on the verge of achieving critical mass. The global generating capacity of the renewables sector doubled between 2000 and 2006 to 210 gigawatts (GW). Wind and solar power generation led the sector during this period with compound annual growth rates (CAGR) of 26 percent and 30 percent, respectively (Exhibit 1). Rapid growth in the renewables sector will present great opportunities as well as some unique challenges and will be driven by four major factors.

First, the pressure to reduce carbon emissions is growing rapidly with many countries taking action. Major energy markets—China, Europe, India, and the United States—expect the renewables sector to play a key role in reducing their greenhouse gas emissions.

Second, concerns about the security of energy supplies will continue to intensify. Over 70 percent of the world's oil reserves are held in regions with significant geopolitical risk, driving many countries to seek to reduce their exposure to energy supply interruptions through the development of domestic renewable sources.

Third, despite recent volatility, energy prices (for alternative energy, gas, oil, and coal) have increased structurally from the levels of the previous decade, and sustained growth in global energy demand, primarily in Asia, means that oil and gas prices are likely to remain at relatively high levels.

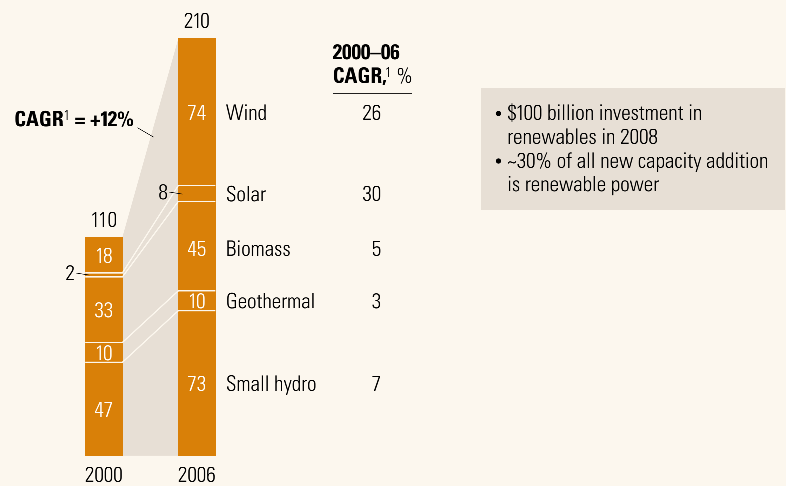
Finally, renewable technologies are becoming less costly (Exhibit 2). As technologies mature, pioneering companies are reaping the benefits of this progress and are pushing technological developments in solar photovoltaics (PV), concentrating solar

Exhibit 1

**Renewables are growing rapidly**

The renewables-installed base has grown by 12% annually since 2000, to reach 210 gigawatts in 2006.

Global installed base, gigawatts (GW)




[1] Compound annual growth rate.

Source: ABI Research; ABS Energy Research; BTM Consult ApS; International Energy Agency; International Institute for Industrial Environmental Economics; National Renewable Energy Laboratory (US Department of Energy); Worldwatch Institute; McKinsey analysis

power (CSP), and wind (both onshore and offshore), which will drive costs down. Within three to seven years, for instance, unsubsidized solar power could cost no more to end customers in markets such as California and Italy than electricity generated by burning fossil fuels.

## Expansion of regulatory support

The imperatives to control greenhouse gas emissions, improve energy security, and mitigate energy price increases have led governments around the world to adopt regulatory mechanisms to support the development of renewable-energy sources. While 15 years ago only 4 countries provided such assistance, today more than 45 countries offer incentives. In the last 5 years in particular, subsidies in Germany, Spain, and the United Kingdom have almost tripled. Coupled with market-driven forces, this led to $70 billion in new investments in renewable generating assets in 2007.

Growth of the sector will in part depend on the level of regulatory support and the price of oil and gas, but biomass and onshore wind in Europe are in many instances already cost competitive with conventional power generation. Indeed the outlook is so bright, that the installed base of wind is forecasted to grow to 820 GW by 2020, an eightfold increase from today (Exhibit 3). In a sign of this potential, financial markets are raising the valuation of some of the major renewables players whose price-to-earnings ratios (P/E) are as much as 60 percent higher than the average conventional utility or equipment manufacture.

The financial markets may be forecasting significant growth for the sector, but how this expansion phase is managed will be critical to the long-term success of individual companies.

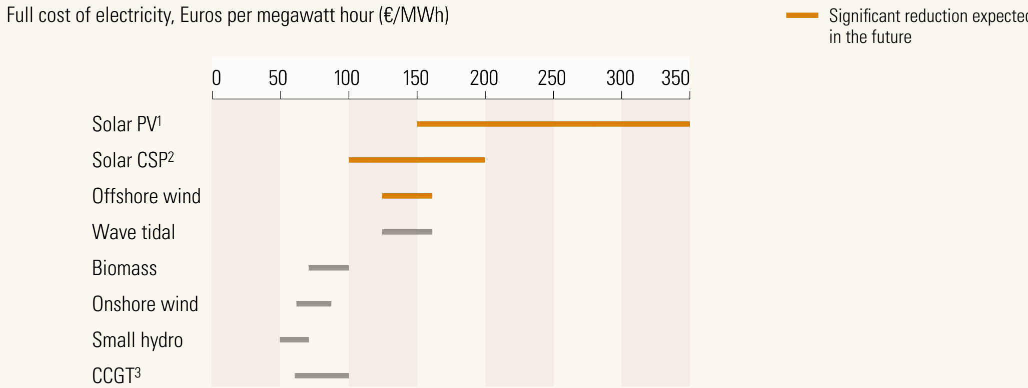
## Growing pains

The expansions of the Internet sector, as well as of the biotech and computer industries, provide precedents for how extensively this sort of growth affects a fledgling sector. The primary lesson they offer is that

Exhibit 2

## Renewables are becoming less costly

Technology evolution is bringing renewables close to conventional-energy production costs.

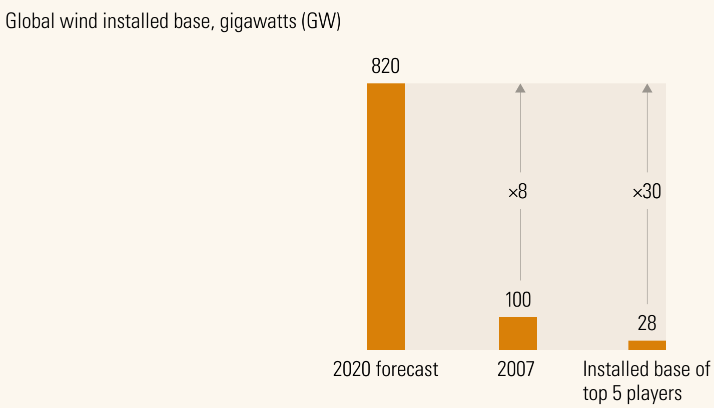



[1] Photovoltaic.
[2] Concentrating solar power.
[3] Combined cycle gas turbine.

Exhibit 3

## Wind power will grow rapidly

The race has begun, with an eightfold increase in wind capacity expected by 2020.




no matter how strong a sector's fundamentals may be, rapid growth always brings a host of challenges—strategic, operational, and organizational, as well as ones that involve talent and development management. Managing these issues intelligently has separated the winners from the losers in the past, and that will be true this time, but the rapid expansion of renewables will present a set of problems all its own.

A rapidly globalizing market. More so than in expansions of other pioneering industries, this sector is globalizing very quickly across markets, competitors, and value chains. Leading markets are spread across Asia, Europe, and the United States, so that for many renewables players this is no longer a 4- or 5-country business, but one in which they must be active across 40 to 50 countries. The result is a far more complex environment with, in effect, more than 100 potential markets and regulatory environments to understand. This added complexity will make it harder to create value during this expansion, but it also provides the opportunity to spread risk across a number of different markets and sectors.

Renewables will become a truly global market on the supply side as well. Top Chinese and Indian suppliers are already among the industry leaders. Suntech, one of the leading Chinese-owned solar-equipment makers, saw revenue growth of 433 percent in 2007 to reach $1.4 billion. By one estimate, 1 million people are already employed in the renewables sector in China.

An evolving value chain. Supply bottlenecks are an enduring issue, driving margin shifts in the upstream, midstream, and downstream parts of the sector. The value that can be captured differs according to technology. Thus the price of turbines for wind power generation, which had fallen 23 percent between 1999 and 2004, increased 74 percent in the past four years. Prices for polysilicon have increased significantly of late, but that is likely to be reversed in the next three to five years. This turbulence means that margins will shift differently along different value chains, so not everyone will benefit from the sector expansion.

*Securing access to raw materials without becoming tied to the wrong technology or partner will be an issue right across the renewables sector*

Increased operational complexity. Major renewables projects are becoming larger and, from an operational perspective, extremely complex. For instance, a large-scale, wood-based biomass plant in the United Kingdom generating between 200 and 300 megawatts (MW) will need to source its wood chips from either the Atlantic basin or Eastern European countries. This will mean 30 huge shipments, or two million tons, a year along a supply chain from forest to ports to boat to plant. This creates challenges of establishing long-term sourcing contracts, hedging risk on feedstock and shipping prices, and optimally managing logistics and storage, with a complexity and scale reminiscent of the liquefied natural gas (LNG) supply chain.

Given that price increases are very likely when biomass demand picks up, operators would benefit from designing multifeedstock, multisupplier strategies. Wood-based biomass of this kind, for example, will need to be complemented with energy crops and agricultural residues. In general, securing access to raw materials without becoming tied to the wrong technology or partner will be an issue right across the renewables sector.

Tightening economics. Increased competition for assets and locations means that the industry is becoming more competitive. In established markets like Spain, the best locations for wind farms have already been taken. As a result, the new plants are in more marginal locations, and in 2006 new wind farms ran for 26 percent of the time, compared to 31 percent for those established in 2000. This decrease has reduced the profitability of the investment.

All this is occurring as regulations are starting to tighten and subsidies are likely to begin to fall. Draft legislation for feed-in tariffs for solar parks in Germany and Spain, for example, foresees a decrease in the current level of subsidy.

## Renewable solutions

To increase profitably in this new environment, executives in the solar, wind, and biomass businesses must move beyond the land-grabbing approach of the past to make more strategic choices about developing expertise and competitive advantage.

Addressing these challenges will vary according to where you operate on the value chain, but renewables players should consider the following three approaches:

1. Develop a global presence. Success will likely depend on establishing operations in many different markets.

On the equipment side, the potential cost advantage of Chinese players and other newcomers cannot be underestimated. Compared to Western companies, Chinese ones have lower costs for labor, freight transportation, and key materials, plus a more flexible manufacturing process. Chinese solar-cell manufacturing costs are 25 to 50 percent lower than those in Europe, and Chinese wind power-equipment makers are typically three times more profitable than European companies. This threat, however, also represents an opportunity: Western equipment manufacturers could source directly from China to lower their own costs. This will require very robust sourcing strategies, as global supply chains are prone to disruption, so developing a global capability will be essential.

Asset developers, owners, and operators will have to be present in many countries to establish a leadership position in an increasingly global market. Being able to do business in 30 to 40 countries will mean finding employees with the right language and business skills to support expansion into new markets. Many of the largest renewables players have grown very quickly from a national base and will now have to develop their expertise and people to match their new markets. This is particularly challenging given that they will be acquiring skills that are scarce in the industry.

2. Deliver value via operations. Driving down costs during an expansion is always critical, but in this sector it will also need to be done quickly. In previous booms, growth camouflaged problems, and it was possible to address costs and operating effectiveness when growth slowed. This is unlikely to be true in the renewables sector, where players will need to get operating excellence in place fast.

In the wind sector, value is likely now to be found in running turbines more efficiently to minimize downtime and maximize their output. Lean operations can make a big difference. Every 1 percent improvement in the hours that wind turbines operate produces a 0.9 percent improvement in EBITDA[1] and a 3.1 percent increase in equity net present value (NPV). The difference between a well-run wind park and an average wind park can be more than 15 percent in NPV. Very often, pioneering companies simply lack the discipline and the skills to implement rigorous operational excellence, opening the way for larger, more established players such as the utilities to enter and consolidate the market by reaping the efficiencies.

Solar-equipment makers are pursuing different cost reduction strategies. SunPower has increased cell efficiency by up to 22 percent. Q-Cells and REC Solar have moved production to Malaysia to take advantage of tax benefits and low labor costs. Many others have looked for ways to reduce usage of polysilicon.

3. Consolidate up and down the value chain. Global players should consider partnering with or acquiring others along the value chain to defend their global businesses. This is not a question of whether to consolidate but more a matter of where to look for the opportunities. It can mean outright purchases, as was the case when Acciona bought the turbine manufacturer EHN in 2005. Iberdrola presents another model; it now owns 25 percent of Gamesa, which gives it proprietary access to the turbines and means a secure supply with quick access

[1] Earnings before interest, taxes, depreciation, and amortization.

to increased supplies if necessary, without binding the company to a single supplier. The arrangement also provides a hedge against betting on the wrong technology.

For large players in the biomass industry, the same options apply. Should the integration be upstream into forestry or downstream into generation? Some biomass producers are already looking at generating plants in order to create new markets for their products.

A confluence of circumstances means that practically all segments of the renewables sector are set to grow at a pace even faster than that of the boom of the past few years. Just as the major technologies for wind and solar power finally began to be competitive with conventional power generation, concerns about energy prices and security as well as greenhouse gas emissions have forced governments around the world to provide new incentives and regulations promoting renewable power. Increased government involvement and rapid globalization of the industry, however, combine to create some unique challenges for all players in the renewables field.

In order to succeed in a sector characterized by an evolving value chain, increased operational complexity, and the prospect of a more challenging economic environment, companies will have to blaze new, more complex trails even though to many it may seem that the pioneering era is coming to an end. At a minimum they will have to develop a global presence, improve operations, and reduce costs while uncovering opportunities either to acquire or to cooperate with other players in the field.

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