Opportunities for renewable energy project finance

A takeover of substantial portions of the energy infrastructure by renewable sources has been predicted by renewables advocates since the oil crises of the 1970s and 1980s, but has their day finally dawned?

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AS THE 21st century opens, relatively new voices are predicating a renewable takeover in the energy equation. Firms and investors with their very rootstock in the fossil fuel economy have begun to seriously consider renewable energy as a viable part of the energy mix and their own growth investment portfolios. As firms such as Shell, BP, Enron and a variety of conventional electric utilities from around the world move aggressively into renewables, it is a good opportunity to take stock of the chances and challenges within the emerging paradigm.

For energy professionals who recall similar hyperbole in the early 1980s and have continued scepticism towards the renewable energy segment, it is important to recognise that certain fundamental value drivers have changed since that time. These drivers principally encompass the performance of the underlying technologies and the marketplace and policy parameters into which these technologies are being implemented. To this, we can now add the heightened concern over international energy security, which is likely to make many countries try to mitigate the risk of disruptions in supply by enhancing domestic energy capacity. To ignore these concurrent trends would be perilous. An often repeated quote from former Enron executive John Palmisano, currently managing director of Evolution Markets, states that "there are several Microsofts waiting to come forth in the clean energy business, and we'll all wish we'd have invested in them in the late 1990s when they were still tiny."

The driving forces behind today's renewable energy revolution are multifold. Most importantly, certain renewable energy technologies – notably wind – have progressively become less expensive and more reliable. The earlier renewable energy push of the 1980s was characterised by technologies that were both expensive (seemingly justifiable due to projections that placed oil at $100+ a barrel by 2001) and unreliable. But today's technologies are getting closer to having mission critical capability, within the context that certain renewables can only operate when suitable ambient conditions prevail.

Growing technical achievement

For any technology, key determinants for long-term success are whether it is technically and economically viable and can be externally financed. While there is, of course, interplay between these variables – nothing that fails the first test will ever pass the second – it is important to recognise that the converse is not true. Many potentially viable technologies and other investment opportunities never achieve the market impacts that are projected at their inception. This may not be because of the underlying shortcomings of the technology itself, but because external capital markets perceive such a shortcoming, or at the very least do not perceive a substantial benefit when compared with the *status quo*. It is as much the inability of new technologies to convince capital markets that they are 'investable' that dooms such developments as any intrinsic value itself.


Photo: NEGMicon

Renewable and alternative energy technologies sit at a crossroads in this regard. Earlier US market pushes in the 1980s proved to be fairly disastrous for many investors, other than providing convenient tax shelters for individuals. Even in the 1990s, prominent public companies such as Kenetech and New Energy Alternatives ended up in bankruptcy, leaving institutional investors with bad experiences in the sector – experiences that have been difficult to overcome. Nonetheless, it is increasingly clear that certain technologies are overcoming these investor biases. Whether this will – or even should – create a rising tide that will lift all renewable technologies is questionable. However, for the time being it is clear that certain subsets of the renewable and alternative energy field are financed, both at a corporate level and at a project level.

As such, in most industrial countries, there continues to be a variety of government-led financial incentives for renewable energy, ranging from grants, low interest loans and tax credits. This is because many governments consider renewables to be of long-term strategic value. Given the increased uncertainty about global energy supplies following the 11 September incidents, it is highly unlikely that any industrial country will reverse this bias in the near future.

Of the renewable energy technologies in market, it is clear that wind energy is most advanced in becoming a permanent part of the mainstream energy mix. Whether this indicates that other technologies will follow the same trajectory is an open question. In any event, the aggressive emergence of wind energy is a good example of the potential strength of the renewable paradigm. Over the past five years or so, wind energy installations have consistently grown at a 25 per cent compounded rate, rising from just over 5,000 MW to more than 20,000 MW globally by the end of 2001. There are few signs that this growth is slowing.

Wind is now a $5 billion a year industry, yet the vast majority of the growth has taken place in only a few markets – Denmark, Germany and Spain. Of the 3,800 MW installed globally in 2000, more than nearly 80 per cent were installed in those three countries alone. However, in a growing number of places, wind is now generally within the conventional financing matrix. As the US anticipates nearly 2,000 MW of installations in 2001 alone and with Dresdner Bank predicting nearly 15,000 MW of wind installations in the US over the coming five years, it is clear that capital markets are accepting wind as a utility-scale power technology.

The general acceptance by the finance community of wind technology on a project level has, in turn, helped advance the underlying technology. In just over five years, the largest turbines on offer from the major manufacturers – Vestas, NEG-Micon, Enron, Nordex and Enercon — have grown from approximately 750 kW to new designs as large as 5 MW. This has only been possible because of the emerging

belief by financiers that the technology developers and implementers have largely solved the key issues of the technology.

Other renewables have made similar technical and acceptance gains, though not to the degree that characterises wind. While photovoltaics have made impressive gains, it still remains outside the money in terms of conventional applications. It is estimated that electricity prices must still be greater than ¢20/kWh for solar to be economically viable. Solar has great potential for certain niche situations – off grid applications, distributed rooftop generation and, potentially, system peaking applications in the medium-term future. Solar thermal systems remain an application with strong potential in particular circumstances, but has yet to fully grab the imagination of developers and financiers. In part, this may be because key policy supportive markets for renewables in general – Northern Europe and North America — have comparably little domestic applicability for solar thermal, meaning that the technology's evolution has been comparatively stunted

Biomass takes two particular forms – biomass combustion for the generation of electricity and the creation of biofuels, principally for the transport sector. Direct combustion to electricity represents a fairly mature and relatively financed technology in many instances, as the technology risks are fairly minimal in boiler applications. More advanced biomass energy extraction technologies – such as gasification and pyrolisis to bio-oil are advancing rapidly, but are still relatively untested in the financing market. Bio-fuels represent a potentially important renewable energy for the transport sector, as policies in the US and Europe are emerging that strongly encouraging large-scale development of ethanol and biodiesel resources. Biomass and its cousin waste-to-energy clearly have great applicability to the developing world. The degree to which developing countries adapt policies to tap these indigenous energy resources, as opposed to continued reliance on imported fossil fuels, will be a major dynamic over the coming years.

Environmental policy parameters

The second major driver for renewable energy is the environment. Since the first World Environment Summit in Stockholm in 1972, the embedding of environmental concerns has consistently progressed across industrial nation policies. While local environmental quality issues – the first addressed in most countries – rarely created policy incentives for renewables, the emergence of global climate change has proven a tremendous boon to the sector's prospects. Together with nuclear, renewable energy represents the only reasonable prospect of maintaining and expanding the energy rich way of life that the industrial world embodies, while also addressing the serious prospect of climate change.

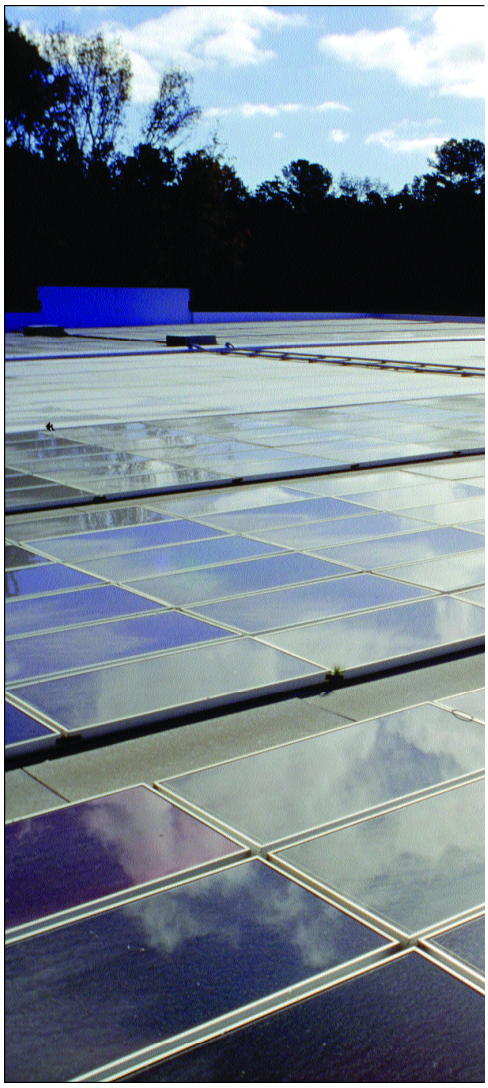
It is key to recognise that while technical performance of alternative energy sources has improved dramatically, growth in the market has also been dependent on favourable tax and subsidy policies in key markets. From the financiers perspective, this has meant that renewables have received a variety of subsidies, tax incentives and accelerated depreciation across many jurisdictions. This largely reflects incentive systems that have been used for conventional energy exploration and production and is therefore not unique to renewables.

Emerging policies that are unique to renewables are the emergence of so-called 'environmental commodities' or 'greenstream' values. Expressed in the form of either carbon emission rights/reductions or renewable energy certificates, the principle of environmental commodities is the social ability to place a greater market value on renewable energy than its conventional counterparts, due to positive environmental characteristics.

In climate change, additional value occurs when public policy restricts the emission of greenhouse gases – therefore creating a premium value for generation that can provide electricity without associated emissions. When emission trading is the policy choice, it enables renewable energy installations to sell emission 'credits' or 'allowances' to those facilities impacted by carbon reduction policies. This creates a second viable financial stream for renewable energy owners, somewhat equivalent to an energy power purchase agreement or merchant sales situation. In general, current market prices for emission rights are between $2-$5 per tonne of CO_2 equivalent. It is impossible to give a thumbnail analysis of how that value impacts particular financings, as different installations will earn carbon reductions at highly varied rates per MWh, however, carbon can potentially add some 5-10 per cent to the revenue line of many renewable projects, quite a bit more for landfill methane

In Renewable Portfolio Standard (RPS) systems, which go by various names throughout Europe, the US and Australia, public policy forces electricity distribution companies to provide a set percentage of their electricity provision from renewables. Rather than physically providing that set percentage, distributors have the option to purchase renewable 'certificates' which are stripped out from power sales by renewable developers within the relevant policy area. The extent of that policy area differs, as distributors seek to have the widest possible pools of renewable energy credits for sale, as that will enable compliance prices to be minimised. RPS percentages range from 2-10 per cent and generally involve a linear increase over the coming years. Given the existing growth in energy requirements throughout the industrial world and the prevalence of this policy tool this will likely prove a strong instrument to encourage renewables, as well as helping mitigate domestic greenhouse gas emissions. As of late 2001, nearly 40 US states either had such instruments in place or under consideration while the EU had advanced substantially in creating a EU wide policy standard. Current market prices of renewable certificates vary widely across jurisdictions, but generally range from $3-10 per MWh. Estimates of future prices under the more restrictive EU standards that are forthcoming are substantially higher.

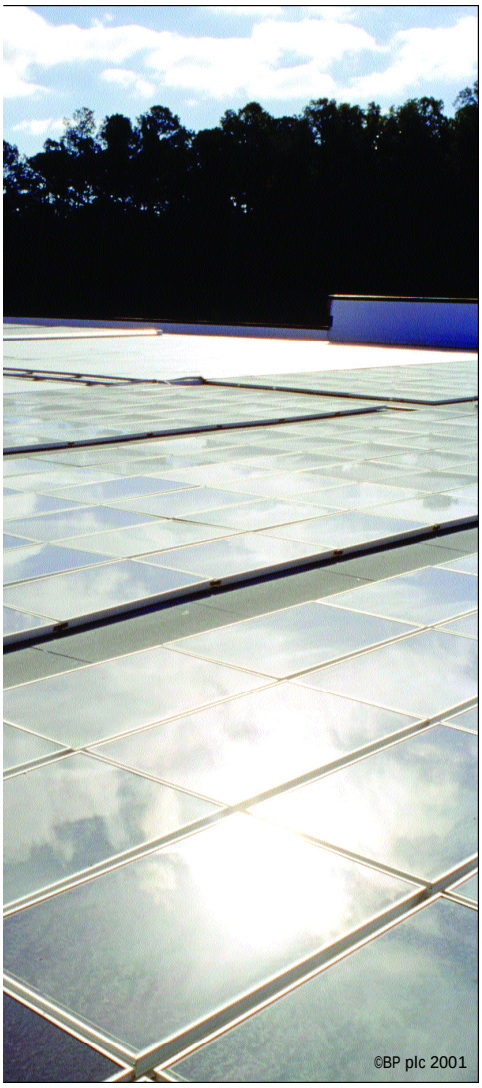
It is apparent that the issue of greenhouse gas emissions is not going to dissipate. Most of the industrial world is committed in principle to limiting emissions via the Kyoto Protocol, which is on track to be ratified by most of the OECD, less the US, within the next 1-3 years. While policies to limit emissions have moved far more slowly than most activists advocate,



it is undeniable that such policies have moved inexorably in only one direction over the past 10 years. That said, the timing, severity and structure of forthcoming policy initiatives remain extremely uncertain. If strong measures ultimately are undertaken, domestic regimes within the industrial world could paradoxically create a mass flow of investment into clean energy sources in the developing world. This is because the developing world has the exclusive ability to create additional emissions capacity for the industrial world via auditable Certified Emission Reductions under the Clean Development Mechanism.

Renewable finance characteristics

The renewable energy world is particularly heterogeneous in nature. Each major renewable type has its own performance and economic characteristics and its own particular challenges for the financing process. Financial tools that work for biomass energy are unlikely to be appropriate for wind energy and even less so for solar. The fact that solar and wind only work when the sun is shining or the wind is blowing is an intimidating construct to certain financiers. The newness and differentiation of the market segment frustrates efforts for financial standardisation, leading to



increased transaction costs and frustration for dedicated developers.

The limiting factor in expanding renewable energy penetration, and consequent reductions of future greenhouse gas emissions, is the attraction of private capital resources. The ability to attract private capital is related to the uncertainties existent in new energy technologies and maintaining stable markets for the debt service term. As a rule, private sector commercial lenders are averse to risk and there are a number of factors that can negatively impact perceptions of project risk. These factors usually lead to extensive time and money spent on due diligence efforts as project developers attempt to demonstrate their ability to alleviate risk to a variety of lenders.

The various risks that concern lenders can be categorised as follows:

- Construction: Will the project be on time and on budget? Is the contractor capable of delivering that agreed to and do they have sufficient assets? In the event that they do not, will some act of God, *force majeure* or other physical loss impede or otherwise upset the project? Will some outside influence delay or stop the project before it starts?
- Operations: Will the project be properly maintained? Is the O&M contractor qualified and experienced? Will the project perform efficiently and at predicted capacity levels? Will there be labour difficulties, unplanned outages, physical losses and income losses caused by acts of God?
- Equipment: Is the chosen equipment suitable for the situation? Will it be delivered on time? Will replacement parts be readily available? Is there a technology risk? What is the stability of the manufacturer? Do they guarantee the power curve and availability factors and do they have sufficient assets in case of a fleet wide failure?
- Economic: Has the capacity factor been properly calculated? Will there be unexpected costs, problems with currency conversion, repatriation of funds, tax changes and policy changes? Will sinking funds and government agreements be sufficient or reliable?
- Power off-take: Will the project have the ability to sell power at sufficient rates to assure debt service and project health? Is the credit rating of the Power Purchase Agreement sufficient? Is the purchaser going to require the power they have agreed to for the full life of the contract? If not will they honour the contract? Will other purchasers be available? What is the ability of the government to back PPA's? What is the value of the country's Sovereign Guarantee?
- Political: A number of political or cross-border risks may need to be addressed such as private ownership, power sales, taxes, fuel use, emissions, currency, contract repudiation, expropriation, nationalisation, insurrection.
- Fuel supply resource reliability: Depending on the technology being used, different fuel reliability issues arise such as: Long-term supply contracts or agreements, the fluctuation in fuel prices, reliability of resource studies, weather risks, such as a lack of sufficient wind speeds or hours of sunshine for wind and solar projects.
- Equity: An obvious and in many cases difficult to find requirement. The developer may have the best project in the history of energy production, but without a source of equity, it is dead in the water.
- Special credits viability: With a growing number of projects using 'green' credits and 'carbon emissions' credits in the debt service portfolio, the obvious question becomes the long-term viability of these credits. At these early stages of the 'credits' market there is the question if they will materialise at all.

Traditional methods of mitigating these risks usually involve proving the reliability of EPC contracts, O&M contracts, PPA's, sovereign guarantees, resource studies, equipment performance data and setting sufficient sinking funds to cover 'expected' problems. Some aspects of construction and operational hazards are readily insurable and others, such as technology and credit risk, are not. The smaller the project – and many renewable projects tend to be smaller that conventional energy counterparts at this juncture – the more challenging overcoming these perceptions can be

A principle barrier is the reticence of conventional capital markets to invest in projects that are comparatively small, utilise 'unconventional' generation techniques or are located in the developing world. Projects that encompass two or three of these negative attributes are commensurately more difficult to source external finance into. The conventionally accepted reason for this reticence is that the high risks of undertaking new and less proven technologies in these circumstances are not compensated by commensurately higher returns.

If and when the private insurance sector does address the more critical issues of technology risk, off take credit risk, fuel supply risk and others, the answer is usually in the form of premium capital requirements well in excess of the projects ability to pay and/or the eradication of the very debt service margins that the lender is concerned with in the first place. This makes for tremendous challenges placed on the back of developers, who in developing countries have many other challenges to overcome also.

How to close market gaps

This identifiable risk gap has led to fairly prevalent use of government subsidies and development assistance for renewable energy implementation in high risk international markets. This has taken the forms of grants, export guarantees and other incentives. Since there is a limit on the volume of capital that is available from these sources, technology uptake has been comparatively slow and only a fraction of that which is available in conventional resources. It is hoped by many observers that emissions reduction value – primarily via the Clean Development Mechanism – will eventually provide some assistance in bridging this financing gap, as government resources are limited and generally non-replicable. The most useful form of how emissions reduction value might be used to leverage difficult-to-finance opportunities has yet to be determined. If emission targets are set too loosely, the subsequent price of international emission reductions will be low and their relative ability to overcome financier perceived risk will be compromised.

In wind energy in Northern Europe and the US, performance and experience together with friendly policies has overcome the relevant risk perceptions of financiers to enable the development of a strong, vibrant and self sustaining industry. The degree to which this can be replicated easily in higher risk locales with a wider variety of technologies as appropriate to individual situations is difficult to ascertain. That said, there is a growing pool of expertise and capital that is committed to the mainstreaming of renewable energy across a huge variety of technologies and regions. Given the other factors that are facilitating the emergence of renewables – as technologies improve, environmental policies are increasingly sympathetic and the perceived need for greater domestic energy security across many countries – it is apparent that the renewable energy revolution is finally here to stay. POWER

Biography

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