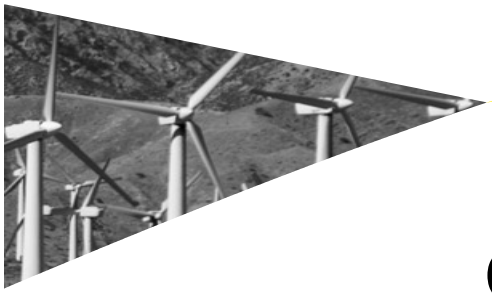
August 2011
Issue 30

Renewable energy country attractiveness indices



In this issue:

Global highlights

The recent turbulence in the financial markets has been an unwelcome reminder of the enduring vulnerability of today's global economy. From the ongoing Eurozone debt crisis to disappointing growth rates and the divisive negotiations on US sovereign debt, it is clear that sustained economic recovery remains far from assured. With policy-makers in pursuit of a miracle cure to the lingering consequences of the financial crisis, the renewable energy sector has, perhaps inevitably, not proved immune to the stalling economic landscape.

Sovereign credit rating downgrades in the most affected countries such as Greece and Italy have increased financing costs for projects, while at the same time reducing the appetite of investors for lending. This issue we look at the challenges of current lending practices and how the credit crunch has shaped the future of renewable energy project financing.

There has been little movement in the top half of the All Renewables Index, with China maintaining its position in first place. The Chinese government has signalled its continued support for offshore wind by announcing that it will hold tenders for 2GW of projects to reach its target of 5GW by 2015. However, investment is needed to improve grid reliability and transmission access for onshore wind projects in remote locations. Support for offshore wind has also been witnessed elsewhere, with France releasing its long-awaited tenders for 3GW of projects, and Germany launching a €5b program to provide incentives to this sector.

With President Obama and leading Democrats continuing to push for a Clean Energy Standard, the debate continues in the US over the future of support mechanisms for renewable energy. The loan and grants programs have helped support onshore wind and solar power, which have doubled in installation rate since the first quarter of 2010. However, these programs are currently due to expire by the end of this year.

Governments have responded with mixed messages in the aftermath of the Fukushima nuclear disaster. Germany and Italy have announced an end to their nuclear programs, while France and the UK have continued their support. Government and corporate responses to the nuclear disaster and the 'Arab Spring' put more emphasis on the strategic importance of energy mix - which will have an increased role for renewable energy.

In the lower half of the table, Romania is the highest climber as the European Commission approved its Green Certificate scheme, which is likely to stimulate significant investment in onshore wind development. Meanwhile, the South African Department of Energy has invited developers to bid for a range of renewable energy generation projects.

As the global debt crisis impacts on government funding for renewable energy, more innovative forms of finance are required at both the corporate and project level. In this issue we examine the growing need for a Chief Capital Officer to tend to the strategy and practice of capital formation and deployment. The lead article this quarter reflects on the complexities of the biomass sector and the challenges that have limited its growth.

Ernst & Young
Quality In Everything We Do

Ernst & Young was ranked the leading project finance advisor in the Americas, Europe, Middle East and Africa between 2001 and 2010 by *Project Finance International*

Overview of indices: Issue 30

The Ernst & Young country attractiveness indices (CAI) provide scores for national renewable energy markets, renewable energy infrastructures and their suitability for individual technologies. The indices provide scores out of 100 and are updated on a quarterly basis.

The CAI take a generic view and different sponsor or financier requirements will clearly affect how countries are rated. Ernst & Young's Renewable Energy Group can provide detailed studies to meet specific corporate objectives. It is important that readers refer to the guidance notes set out on page 34 referring to the indices.

Long-term indices

The long-term indices are forward-looking and take a long- term view (up to five years); hence, the UK's high ranking in the wind index, explained by the large amount of unexploited wind resource, strong offshore regime and attractive tariffs available under the Renewables Obligation (RO) mechanism. Conversely, although Denmark has the highest proportion of installed wind capacity to population level, its score is relatively low because of its restricted grid capacity and reduced tariff incentives.

All renewables index

This index provides an overall score for all renewable energy technologies. It combines individual technology indices as follows:

1. Wind index - 65%
   (comprising onshore wind index and offshore wind index)
2. Solar index - 18%
   (comprising solar photovoltaic (PV) index and concentrated solar power (CSP) index)
3. Biomass and other resources index - 17%

Individual technology indices

These indices are derived from scoring:

- General country-specific parameters (the renewables infrastructure index), accounting for 35%
- Technology-specific parameters (the technology factors), accounting for 65%

Renewables infrastructure index

This provides an assessment, by country, of the general regulatory infrastructure for renewable energy (see page 34).

Technology factors

These provide resource-specific assessments for each country.

Long-term wind index

This index is derived from scoring:

- The onshore wind index - 70%
- The offshore wind index - 30%

Long-term solar index

This index is derived from scoring:

- The solar PV index - 73%
- The solar CSP index - 27%

For parameters and weightings see page 31.

Comments and suggestions

We would welcome your comments or suggestions on any aspect of the indices. Detailed attractiveness surveys and market reports can be provided, taking account of specific corporate objectives.

Please visit our websites **www.ey.com/renewables** or **www.ey.com/CAI** or contact either:

Ben Warren: bwarren@uk.ey.com

Andrew Perkins: aperkins@uk.ey.com

Arnaud Bouille: abouille@uk.ey.com

Enquiries to the guest columnist should be addressed to mtoy@uk.ey.com

The most appropriate way to access historical information in Bloomberg is from Ernst & Young Renewable Energy – Total Renewable CAI page: {EYRE<GO>}. Each value can be evaluated to reveal history.

Biomass: the next major business opportunity or continuing carbon conundrum?

Guest columnist – Jonathan Johns

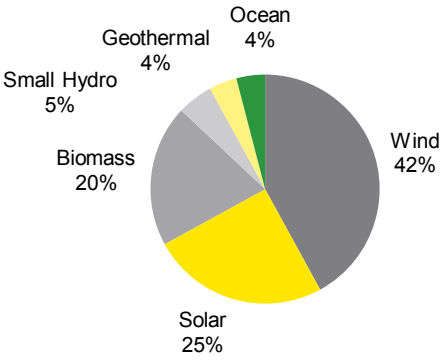
Ten to fifteen years ago, biomass for electricity (bio-power) was expected by many commentators to be a key player in the transition toward a more renewables-based electricity economy.

In 2000, in terms of dollars invested, biomass was easily the leading technology globally, equal to that in wind and solar combined, with Europe and Asia accounting for the bulk of activity.

At the turn of the century, the United States had by far the most capacity globally - driven by the 1978 Public Utility Regulatory Policies Act (PURPA) with just over 10GW of plants. These were mostly cogeneration (i.e., heat and power) primarily using forestry, pulp and other waste residues. In 2000, US biomass electricity production, due to its much higher capacity factors, far exceeded electricity produced from 4GW of wind and 30MW of on-grid solar (although, by this time, growth had slowed following electricity market deregulation).

The steadily declining cost curves of the wind and solar manufacturing industries, and their relatively simple project development business models, led many commentators to expect that initially wind, and then solar, would overtake biomass as the leading forms of renewables investment in the 10 years to 2010 - and this has proved to be correct. However, as Figure 1 shows, biomass was expected to remain a leading force in the industry, with 20% of investment and a greater share of electricity produced.

Figure 1 – Renewables investment (forecast 2000 - 2010)



Estimates were partly driven by anticipated growth in Asia and South America (due to resource availability), a strong market expected in Europe due to favorable incentives and further growth in biomass for heat, and an anticipated resurgence of growth in the US.

However, by 2010, the story was different, with wind and solar industries far outstripping biomass, becoming the technology of choice for many countries and industry players.

As shown by Table 1, biopower investment by the end of the decade had grown respectably - but its 8 times growth in annual investment was pedestrian compared with the 75 times growth in wind and 100 times growth in solar. Biomass power markets with the most potential simply did not grow at the speed anticipated.

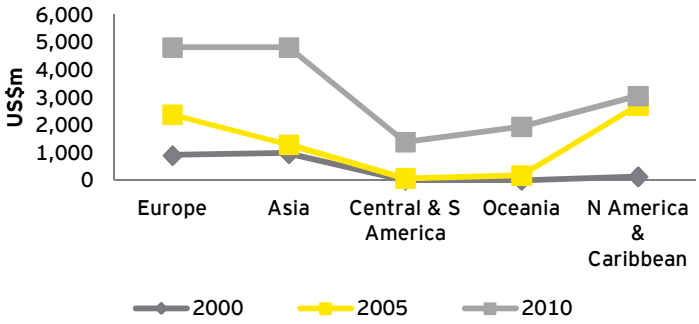
Table 1 – Investment levels for renewable sectors

Sector	2000	2005	2010
Wind	$1.2b	$24.0b	$90.0b
Solar	$0.8b	$3.7b	$79.0b
Biomass	$2.0b	$6.7b	$16.1b

Source: Bloomberg NEF

(Data does not include transactions that were undisclosed to the public)

Figure 2 - Investment levels for biomass by region



Source: Bloomberg NEF

In Asia, significant investment occurred more toward the latter half of the decade than at the start: India gradually grew to over 2.5GW of capacity as the Indian Renewable Energy Development Agency financed small - medium - scale rural projects, and in China, significant growth occurred toward the end of the decade, as it only just met its 5.5GW biopower installed capacity Five Year Plan target - whereas in wind and solar, targets were easily surpassed. In South America, a resurgence in investment did not occur until the end of the decade, when "green reserve" auctions in 2008 Brazil encouraged cogeneration (from bagasse for example).

In the US, investment in the early part of the decade was affected by the 'stop-start' nature of the Production Tax Credit (PTC) support mechanism and the exclusion of open loop biomass (i.e., forestry residues and other waste products) from support until 2005. In 2010, the US remained world leader in terms of capacity, but this was more due to pre-2000 capacity rather than its more modest recent investment.

Biomass: the next major business opportunity or continuing carbon conundrum? (cont'd)

Meanwhile, in Europe, steady progress occurred in Germany (making it a top five global player) and steady growth occurred in Scandinavia. However, neither cogeneration nor electricity generation from biomass attracted the same attention as offshore wind or, indeed, solar PV - with landfill gas in the UK and Germany the area that attracted most infrastructure player investment. The disparate supply chain for biomass generally failed to create a sufficiently scaled biomass power market.

At under 10% of the renewables investment market in terms of dollars spent in 2010 (rather than the expected 20%), biopower has become to many observers the afterthought of the renewables industry - even though there remains huge underexploited resource in many prime markets, not only in terms of closed loop biomass but also in terms of open loop (i.e., residue- and waste- originated biomass). There are pressures on landfill in Western Europe that are increasing the flows of organic waste (such as kitchen waste and waste wood) available for energy recovery with gate fees (improved in the UK by avoided landfill tax and landfill trading allowance costs).

So why has biomass fallen so far behind in the investment race and does it deserve an upgrading from investors and policy - makers?

Certainly the contribution it makes to renewable energy production should not be overlooked. Its much higher capacity factors and base-load flexibility mean that, while it has fallen down the league tables in terms of nameplate capacity, it remains significant in many countries in terms of power contributed to the grid. For example, wind power only overtook biopower as the major producer of renewable electricity in the US in 2007 and still produced 38% of that country's renewable electricity in 2009. In Germany, in 2010, biopower produced only slightly less electricity than wind (33% compared with 37%) and nearly three times that generated by solar - even though Germany was by far the largest dollar investor in capacity in the solar sector.

Wind and solar have a number of advantages that explain their success, but that does not mean that the challenges posed by biomass business models cannot be overcome for adequate reward.

Wind and solar both benefit from free natural resources obtained by way of land or roof lease (with relatively modest royalties) rather than complex feedstock contracts. They also pose fewer issues concerning sustainability than biomass.

For wind and solar project development, risk relates primarily to permitting risk (e.g., dealing with the issue of noise, the effect on bird populations, and the remoteness of grid connections in the case of wind). By contrast, biomass tends to be reliant on complex feedstock supply chains often obtained at an input cost (or gate fee revenue where waste products are involved). Development risk for biomass plants is generally lower, as they commonly use brown-field sites, as opposed to green-field sites preferred for wind development.

Most biomass feedstocks come with an exposure to commodity (and shipping) prices that is difficult to avoid completely - with the economics of established plants at times adversely affected by rising input costs. On a local level, competition can emerge from a new plant within a fuel supply radius – analogous to reduction of wind quality due to neighboring project development. This has led to undersupply of feedstock in some markets where waste streams have declined due to lower levels of economic activity or increased recycling. Consequently, banks prefer projects to have sponsors who control feedstock and waste streams or for projects to have the benefit of long-term supply agreements for at least a significant proportion of the feedstock - for a period ideally exceeding the tenor of the loan and providing known parameters for price fluctuations.

Some utilities have responded to feedstock supply risk by physical ownership or control of the biomass source (usually forests) needed to supply their plants, in some cases on other continents. These utilities have often placed biopower plants at deep water ports to potentially reduce shipping costs.

Biomass can give rise to significant sustainability issues if it competes with food crops for land (an issue in common with the solar farm industry), or if energy crops lead to deforestation. It poses more of a carbon conundrum than free resource renewables and poses similar issues to first generation biofuels, such as far eastern palm oil.

In cases where biomass fuels are originated many miles from their use (for example, the use of biomass pellets from North America in large-scale European coal plants converted to biopower), not all environmentalists accept the argument that the net carbon savings justify conversion - instead preferring coal plants to be scrapped and replaced by biomass plants using local waste materials and energy crops satisfying the proximity principle. There is also a preference for heat to be recovered from new plants placed closer to population centers and for industry to use district heating networks.

Similar arguments have led to environmentalists opposing the cofiring of biomass in coal plants (as has occurred in Germany and the UK), arguing that it extends their life - although such practice has arguably allowed biomass fuel supply chains to become more developed. At the time of writing, Drax in the UK was suggesting that the forthcoming RO banding review should increase the subsidy for cofiring to allow it to use biomass for 50% of its 2GW capacity. (Drax has also stated that it needs improved RO incentives for two recently approved 299MW biomass-only plants to go ahead.) Certainly in countries such as China and India, where the drive to increased coal capacity is relentless, increased biomass cofiring from sustainable biomass offers the prospect of significant carbon reductions. Will regulation adapt to support co-firing or stay with pure-play?

To help the debate, sustainability criteria are increasingly being set - with the UK requiring a minimum saving of 60% of greenhouse gas emissions, and general restrictions on using materials sourced from land with high biodiversity value or high carbon stock.

Biomass: the next major business opportunity or continuing carbon conundrum? (cont'd)

Biomass also faces competition for resource from biofuels, which have achieved greater levels of government support in many jurisdictions (such as the US), so that biofuels have diverted investment dollars and attention away from biomass for electricity production - even though energy conversion in terms of carbon tonnes saved can be less. Very strong biofuels industries have emerged: with the production of ethanol from sugar cane in Brazil, wheat in the US and maize in Europe, and biodiesel from vegetable oils and animal fats. Biofuels for aviation are likely to become a large new market, as are second and third generation biofuels derived from cellulosic materials and algae, for example. The emerging market for direct injection of cleaned-up biogas into the grid (as occurs in Germany) provides further forms of resource competition, albeit that complementary technologies are used.

The core wind and solar technologies are well established with a global supply chain, high levels of reliability and low levels of risk at construction and operating stages (with the possible exception of offshore wind).

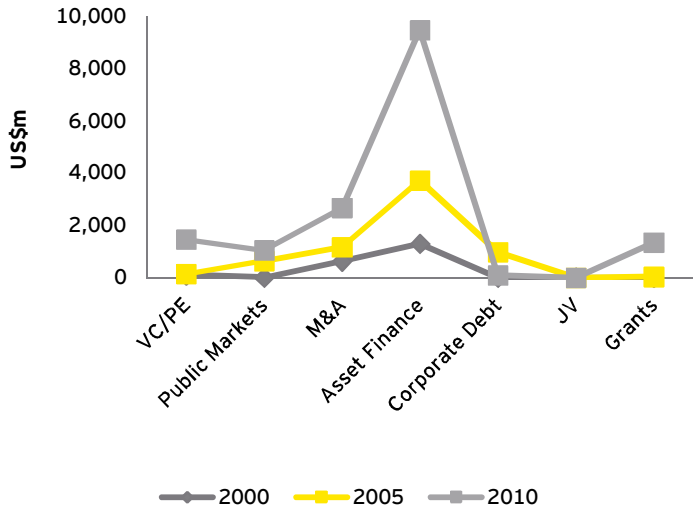
Wind turbine design has been largely settled for many years (with a trend from gearbox toward direct drive designs) and a well established pattern of cost reduction through increase in turbine size. This has allowed rapid globalization of the industry and the entry of significant competitors to Western players from India and China. It has also benefited from its ability to go offshore – albeit with attendant deployment risks in a much harsher and less accessible environment. In the case of solar, crystalline PV has dominated (with a degree of challenge from thin film), with an even more aggressive downward trajectory in costs due to technology improvements and manufacturing efficiencies, together with cost improvements by location of plants in Asia. Solar has benefited from its strong position in the built environment, where it is able to displace electricity at retail prices (often significantly higher than wholesale prices).

As a result, well-known wind and solar manufacturers have emerged that are able to offer warranty and maintenance support. By contrast, the biopower technology industry (other than in landfill gas) has no large players and is a collection of largely unrelated subsectors, each with many often locally or regionally based manufacturers. Technologies include direct combustion with steam cycle generation, and the more advanced technologies such as anaerobic digestion, gasification and pyrolysis, as well as liquefaction for biofuels. Moreover, as feedstocks vary by locality, there is an added degree of complexity as most technologies require relatively homogeneous inputs. This is resulting in a trend towards technologies that can run on a mixed feedstock supply.

Accordingly, each subsector tends to have its own supply chains with specifications varying according to plant size and fuel type, and often involving the integration of equipment provided by different providers - rather than the simple deployment of additional megawatts of identical units in a wind or solar farm. As a consequence of the disparate nature of the biopower supply chain, the pace of technology development has been slower.

Consequently, many biopower technology suppliers do not always have the financial strength required by banks and specialist investment funds for project financing, with construction contractors often required to provide turnkey wraps to absorb risk. Indeed, some banks (especially post 'credit crunch') have been reticent to lend to some technologies due to some early poor performing loans - in part due to optimism bias concerning availability and efficiency, as well as difficulties arising from system scale - up or integration risk. Difficulties have also emerged, for example, in the control of emissions. Careful selection of technology supplier is required with either whole equity financing or less aggressive debt structures.

Figure 3 - Investment levels for biomass by funding source



Source: Bloomberg NEF

The simplicity of wind and solar more readily gives them the characteristics of an infrastructure asset investment rather than a business investment.

As a consequence, infrastructure funds have predominantly gone to the wind and solar sectors - with biopower not attracting the same level of committed funds from such investors. Indeed, it is possible that the flow of funds into biofuels and the poor performance of some of these investments (due to regulatory policy changes, rising commodity prices and sustainability issues) has led to biopower possibly suffering by association.

Perhaps due to its disparate and complex nature, the biopower industry has tended to be less well organized and less favored by policy-makers.

To deal with the diversity and localized nature of the biomass market, incentive mechanisms are often complex and vary considerably by jurisdiction, technology and feedstock.

Biomass: the next major business opportunity or continuing carbon conundrum? (cont'd)

Table 2 – Biomass Support Mechanisms

Country	Biomass Support Mechanisms	Examples
US	Tax Credits (PTC or ITC until end 2013) or Treasury Grants until end 2011, and Renewable Energy Credits (RECs)	► Closed loop bioenergy (using dedicated energy crops) receive US$22/MWh and open loop bioenergy (farm and forest waste) receive US$11/MWh
China	FIT, PPA	► FIT for biomass of US$110/MWh
Brazil	Government regulated auctions, government subsidies	► US$98/MWh was set as the ceiling price in the last government auction
India	Renewable Energy Credits, Clean Energy Targets, government subsidies	► Government will provide up to 40% of development costs for biogas plants for electricity production ► US$87/MWh for RECs
UK	FIT or ROC, RHI	► FIT, anaerobic digestion 250kW ► 500kW receives £130/MWh ► ROC for schemes >5MW, £38.69 for 2011 (0.5 to 2 ROCs depending on biomass technology) ► RHI for biomass 200kWth - 1000kWth £47/MWh
Germany	FIT	► €77.9 – €296.7/MWh for installations less than 20MW, with 1% annual degression
Italy	FIT or Green Certificates	► FIT €180 – €280/MWh for schemes under 1MW. ► GC for schemes > 1MW. €87.38 for 2011. (0.8 to 1.8 GCs/MWh depending on technology)
Sweden	Green certificates, carbon tax	► Enacted a carbon tax on heat consumption from fossil fuels in 1991, which was €108 in 2009

Arguably there is less competitive pressure between countries in biopower compared to wind and solar where investors and developers routinely shift their attentions according to resource availability, permitting success, grid availability and easily compared tariff levels. Perhaps in response to better - organized single focus groups, legislators have tended to prefer the relatively easy build - out provided by wind and solar - especially if manufacturing gains have been on offer. This has most recently been seen in offshore wind, with the UK providing strong tariff support and earmarking of Green Investment Bank funds and Germany's recent announcement of €5b of KfW funding to potentially 10 offshore projects with up to 50% of offshore wind project costs, following on from an improvement in offshore tariffs. It is not certain that the difficulties in obtaining bank finance for some of the advanced biopower technologies are so well known or will lead to such a large level of state support. Certainly steps are needed to encourage broader engagement by more members of the banking sector.

In relation to regulatory support, it is to be hoped that the hiatus that occurred in the US in the last decade is avoided by policy - makers. In the UK, similar problems occurred in the initial period of the unbanded RO, when most biopower projects were uneconomic, and also in the last couple of years, when there was a reluctance to allow full grandfathering of biomass banded tariffs.

The strong tariffs put in place by Italy and Germany for smaller scale biomass have been helpful in setting support levels and developing a local supply chain, as has the UK's recently announced upward revision of small-scale feed in tariffs for anaerobic digestion.

In biomass, returns are possible in the high teens rather than low teens (for most wind and solar projects), with less exhaustion of available opportunities.

The good news for biomass is that the flow of funds to the wind and solar sectors has been such to drive down returns to very low levels – albeit adjusted upward post credit crunch. In many jurisdictions, the most attractive sites for wind and solar development are already taken, with only riskier markets such as offshore wind or new territories providing volume opportunities. In addition, pressure on landfill in many developed countries is creating new markets for biopower, particularly in the treatment of organic waste streams.

Biomass as a non - intermittent technology offers base load renewables with localized embedded generation and a relatively high capacity factor for its cost.

Table 3 - Typical technology costs (2010) and load factors in the UK

Technology	Capital Cost (£k/MW)	Operating Cost (£k/MW)	Levelized Cost (£/MWh)	Load Factor
Biomass >50MW	3,342	168	135	90%
Onshore Wind >5MW	1,524	57	91	29%
Offshore Wind >100MW	2,722	166	174	38%
Solar PV >50kW	2,710	21	282	11%
Geothermal	5,571	190	242	90%

Source: Ernst & Young and Arup (2011)

When cost per MW is compared to capacity factor and the relatively attractive embedded base load provided by biomass, it is arguable that regulators have favored both wind and solar disproportionately. As the challenges of moving economically to a low carbon environment become clear, the case for biopower and cogeneration will improve. Ironically, the provision of fixed feed - in tariffs and priority of dispatch in many jurisdictions – designed to assist intermittent renewable - removed some of the competitive advantage biomass had by way of its provision of quasi base load export profiles.

Biomass: the next major business opportunity or continuing carbon conundrum? (cont'd)

From a policy perspective, biomass provides greater local economic stimulus and more cleantech jobs than transient construction - oriented employment.

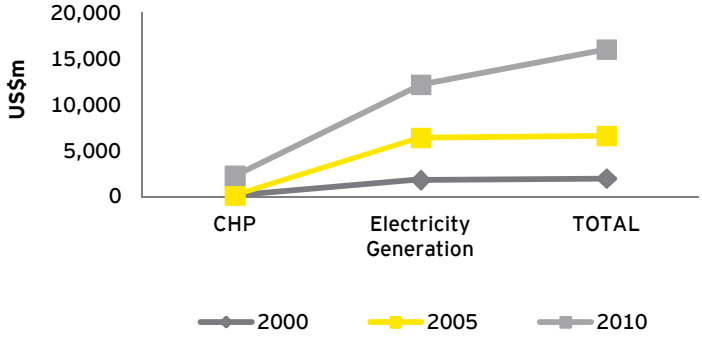
Biomass businesses create much higher numbers of ongoing local jobs - to manage feedstock supply, operate the plant and interface with customers, and in some cases, sell by-products. Manufacturers tend to be more regionally based and subcontract greater proportions of the plant infrastructure to local fabricators.

When combined with district heating, biomass offers very high levels of energy conversion .

Other than in Scandinavia and Denmark (and to a lesser extent Germany), insufficient support has on the whole been provided for district heating, with the consequence that there has been less emphasis on the location of plants near to heat users – which would optimize overall efficiency. (This has notably been the case in the UK, and it is uncertain whether the pioneering Renewable Heat Incentive has fully addressed the issue.) In most jurisdictions, the funding of pipe networks for heat remains a significant issue, as does the quality of the heat offtaker, with many banks discounting heat from their debt - sizing calculations.

Arguably, the focus of biomass on cogeneration or combined heat and power remains one of the most challenging areas for regulators, with the consequence that large - scale biopower-only plants could, in the relatively short term, come under pressure due to their relative inefficiency in energy conversion terms.

Figure 4 – Investment levels for biomass CHP and electricity generation



Source: Bloomberg NEF

While it is unlikely that biomass will achieve the levels of growth in investment achieved by wind and solar in the last decade, some commentators are expecting the global market to at least double to 120GW by 2020 - which would represent a significant outperformance of the last 10 years.

There are a number of challenges, not least the need for policy - makers to ensure that tariff support and bank and equity finance flow through to the sector. The danger still remains that biomass is swamped by the various glamor sectors: offshore wind in Northern Europe, and onshore wind and solar elsewhere.

Certainly, regulators need to think carefully about their desired position in the bioenergy market as a whole: whether they favor large - scale stand-alone, or cogeneration, or more localized biopower. They also need to consider the extent to which they wish to engage in the biofuels, biogas and bioheat markets, and the degree of interaction needed with the waste market. The role of energy crops also needs careful consideration.

As financial pressures mount on the cost of decarbonization, the high capacity factors afforded by biopower relative to the cost of nameplate capacity ought to lead to a renewed focus on the sector. This may not occur if the biomass industry does not become more adept at presenting its case and providing a lobby as strong as that of the competing technologies. With many countries reducing emphasis on nuclear, there is a lot of power to fight for.

There are some early encouraging signs in the renewables roadmaps set out by EU Member States to 2020, indicating a significantly increased contribution from biomass (albeit that some targets appear stretched). China is widely expected to accelerate its development of biopower and biofuel facilities. Even in the US, biopower grabbed a higher level of federal support at US$1.1b (€762.2m), (up eight-fold from that in the previous year) and similar to that provided to the solar sector - with biofuels by far the largest recipient at US$6b (€4.2b) followed by wind at US$5b (€3.5b).

Indeed, there is the possibility that, by the end of the decade, the distinction between biofuels and biopower (and indeed biogas and bioheat) could have melted away. Bioenergy may become regarded as a single market with different points of delivery: by which measure, in some markets, it already eclipses wind and solar in its contribution to the new low carbon economy. Perhaps the industry should think that way now.

Guest columnist:
Jonathan Johns

Contact:
James Barrett-Miles
Tel: +44 1392 284372
Email: jbarrettmile1@uk.ey.com

Turning the corner: global views on lending to the renewable energy sector

Since August 2010, when we last focused on debt funding within the renewable energy sector, the world has seen a number of unprecedented events affecting the sector and its associated lending practices.

Underlying the past 12 months have been sovereign debt crises in Europe and the US. Both crises have been treated through essentially temporary measures (limited bailouts and limited budget legislation, respectively).

Although asset-level renewable energy financing is overwhelmingly loan based, debt capital market events have had a marked impact on bank lending appetites.

Sovereign credit rating downgrades in Europe, from Ireland to Greece, have pushed benchmark borrowing costs to new lows in safe havens, such as the UK and Germany, and to new highs in peripheral countries, such as Spain and Italy. This makes refinancing more expensive in affected countries, with individual projects likely to face tougher terms in the future. Yet even safe haven countries are affected due to more conservative bank lending policies in the face of wide exposure to crisis-hit economies. Most importantly, the overall cost of funding is increasing just when the industry could help an economic recovery by continuing to expand.

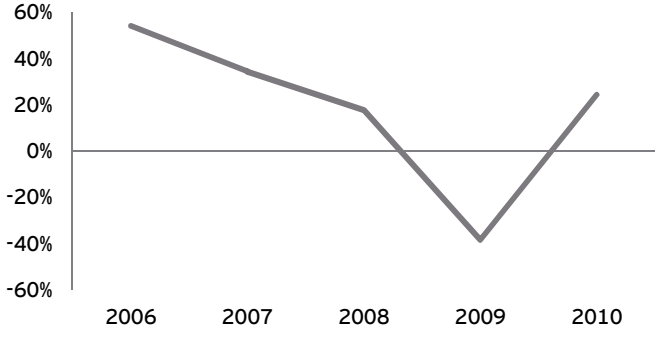
However, our recent research shows that a corner has been turned in lender attitudes to the renewable energy sector.

The global bank appetite for renewables

We have undertaken a survey of banks across the world to take the pulse of global lending in the current, post-credit crunch financing landscape.

Over the past five years, the year-on-year rate of project finance lending (by number of deals) has slowed as the credit crisis swept across the capital markets. It is pleasing to see a 24% rebound in deal volume in 2010, and with H1 2011 lending reported to be almost equal to H1 2010, expectations are high for a strong H2 2011.

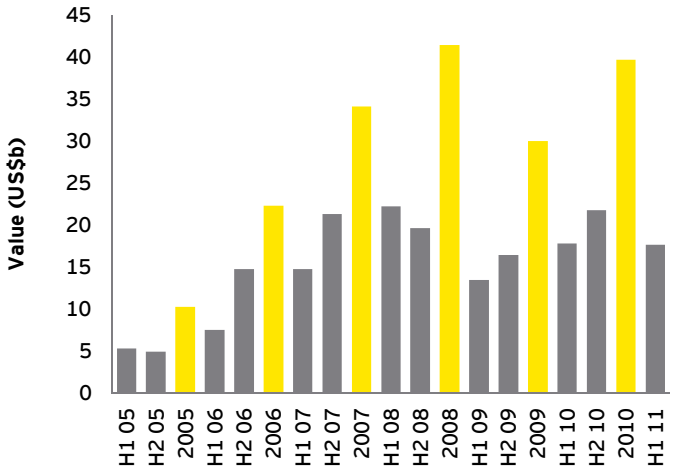
Figure 5: Change in volume of annual global renewable energy project finance deals



Source: *Infrastructure Journal*, Ernst & Young analysis

Statistics show that 2010 and 2011 lending levels are returning to pre-crisis levels, a trend we hope to see continue.

Figure 6: Value of annual global renewable energy project finance deals



Source: *Infrastructure Journal*

The combination of both volume and value charts shown here indicate signs of a recovery. The drop in deal volumes, with a broadly consistent continuation of deal values, indicates that larger investment grade deals were getting done and smaller deals were being stalled. A recent rise in deal volume (combined with consistent deal values) suggests these smaller deals are now being approved, and confidence toward renewable energy is returning to the lending sector.

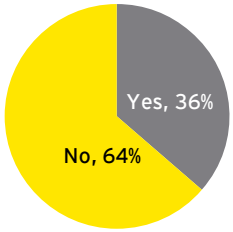
Global survey results: overall market

Our survey touched lenders on every continent and has aggregated results of detailed conversations with experienced lenders.

When considering the general lending environment, our survey revealed the majority of lenders have concerns over the global financial market stability. They are particularly concerned about the stability of the Eurozone and related sovereign debt risks.

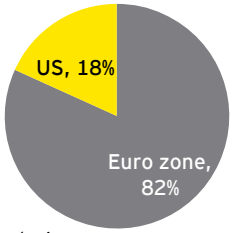
Turning the corner: global views on lending to the renewable energy sector (cont'd)

Do you feel the global financing market has now stabilised?



Source: Ernst & Young

Question: Where, if anywhere, do you see risks remaining of a relapse?

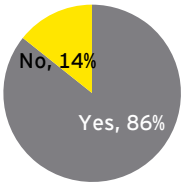


Source: Ernst & Young analysis

And while the majority of lenders feel feel suitably capitalized to lend in 2011, an interesting regional split between Asia and North America has occurred. North American institutions show higher confidence for continued lending, while most European lenders are comfortable with their positions. Some institutions have reported concern over significant exposure in areas they feel could be problematic; for example, real estate.

Question: Do you feel suitably capitalized to lend in 2011?

Asia



North America

Source: Ernst & Young analysis

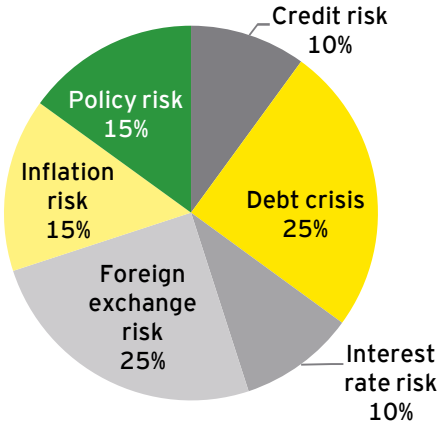
Considering the risks of concern to the lending community, the global view reveals no surprises in the different types of risk. From the population of surveyed institutions, the key risk areas across the globe are foreign exchange rates and the continuing sovereign debt crisis.

But individual regional responses did not always reflect the wider macroenvironment; for example the largest concerns in Asia are the risks relating to policy changes adversely impacting renewable energy market opportunities (policy risk) and interest rate risk; much discussed inflation concerns is a key risk for 13% of our surveyed Asian lenders.

Conversely, North American lenders are significantly concerned about foreign exchange risk and the ongoing debt crisis in both the US and abroad. Exchange rate concerns are a common theme from Canada, where an unprecedented beyond par Canadian dollar (with the US dollar, Canada's largest trading partner) is being supported by a commodities-based economy.

Question: What do you see as the key risks to lending in 2011?

Global response

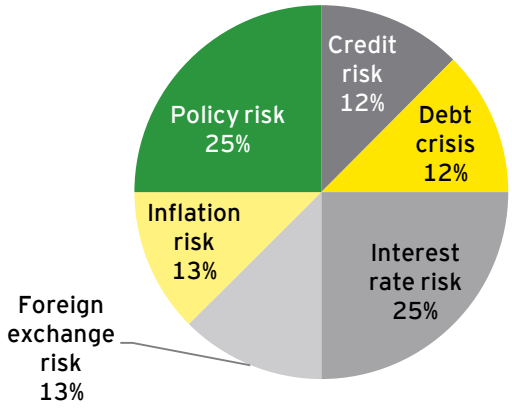


Source: Ernst & Young analysis

Both North American and European lenders, reflecting the wider European macroenvironment, indicated the ongoing debt crisis and associated risk over economic recovery is a key concern, while Asian lenders have much reduced concerns regarding these risks.

Question: What do you see as the key risks to lending in 2011?

Asian response

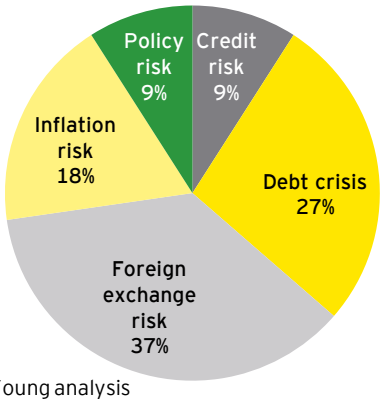


Source: Ernst & Young analysis

Turning the corner: global views on lending to the renewable energy sector (cont'd)

Question: What do you see as the key risks to lending in 2011?

North American response



Source: Ernst & Young analysis

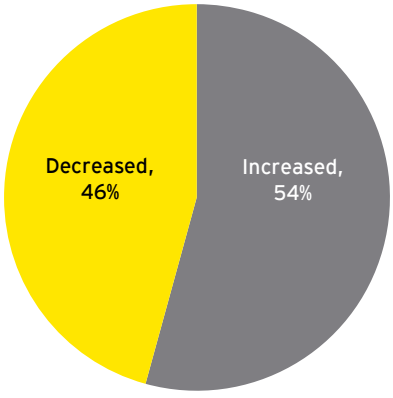
Global survey results: renewables specific lending

With the wider lending climate as the context, our survey discussed the key drivers for renewable energy and specific points relating to lending in this sector. The fundamental drivers include security of supply (ensuring sufficient energy inputs and continual energy supply); de-carbonization of the electricity supply (removal of harmful gases from the production of electricity); energy price security (minimizing impact from volatile conventional energy costs); and energy security (minimizing risk over catastrophic failure at generation or transmission infrastructure, either man-made or natural).

With the global economy in a post-credit crisis era our survey sought to establish the long-term effects the credit crisis had on the fundamental drivers for renewable energy, from the perspective of lenders.

The majority of our surveyed lending community felt the risks to the fundamental drivers behind renewable energy had increased following the credit crisis.

Question: Has the credit crunch increased or decreased the importance of the fundamental drivers for renewable energy?

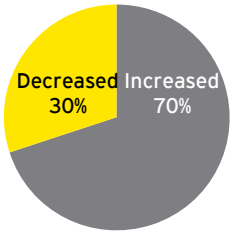


Source: Ernst & Young analysis

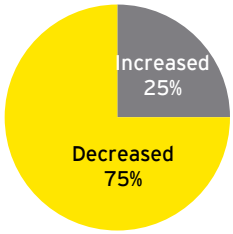
When considering the individual drivers, the lending community indicates the need to de-carbonize the global electricity supply has reduced, while the importance of all other drivers (security of supply, energy price security and energy security) has increased.

Question: How has the credit crunch changed the importance of the fundamental drivers for renewable energy?

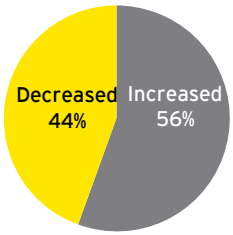
Security of supply



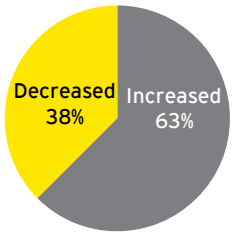
De-carbonisation of electricity supply



Energy price security



Energy security



Source: Ernst & Young analysis

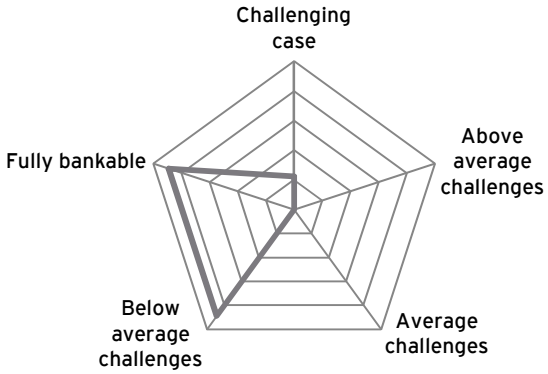
When considering the challenges around bankability for each renewable energy technology, lenders clearly showed trends or preferences toward certain technologies. While project specifics are paramount in lending decisions, some trends appeared.

Turning the corner: global views on lending to the renewable energy sector (cont'd)

First, considering onshore wind, unsurprisingly most lenders saw the mature technology profile as providing a strong lending case.

Question: Considering individual technologies, how bankable do you see each technology?

Onshore wind

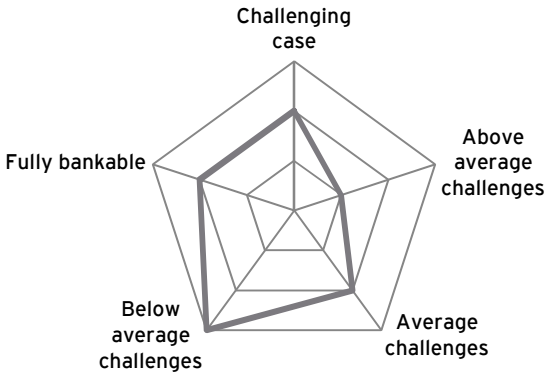


Source: Ernst & Young analysis

Lending opinions of ground mounted-solar PV projects show a more cautious opinion, with more lenders feeling this technology has more challenges than onshore wind.

Question: Considering individual technologies, how bankable do you see each technology?

Solar PV: ground mount

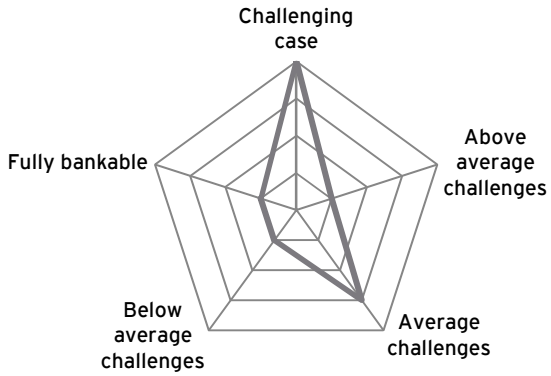


Source: Ernst & Young analysis

Rooftop solar PV showed a less favorable (at a high-level) view from the population of lenders. This is primarily driven by the need to reach a sufficient scale to justify transaction costs. In many markets, rooftop-aggregation increases risk of an overall portfolio. Large rooftop projects were perceived as lower risk.

Question: Considering individual technologies, how bankable do you see each technology?

Solar PV: rooftop

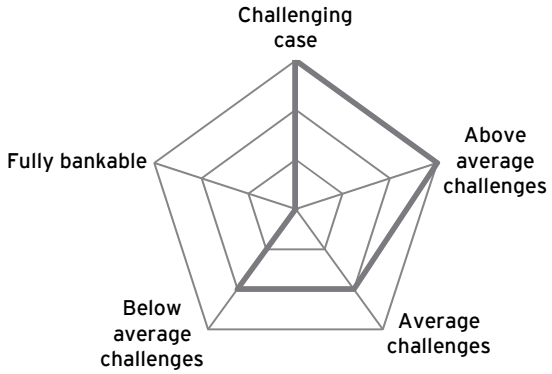


Source: Ernst & Young analysis

Solar thermal, despite being a more mature technology, was felt to pose greater challenges than both onshore wind and solar PV. This is likely driven by factors such as scale and lack of incentives (on a global basis), as to date, renewable electricity has received considerably more attention than renewable heating or cooling. Typical lending in the solar thermal sector has been real estate style lending with recourse to the host facility or business.

Question: Considering individual technologies, how bankable do you see each technology?

Solar thermal



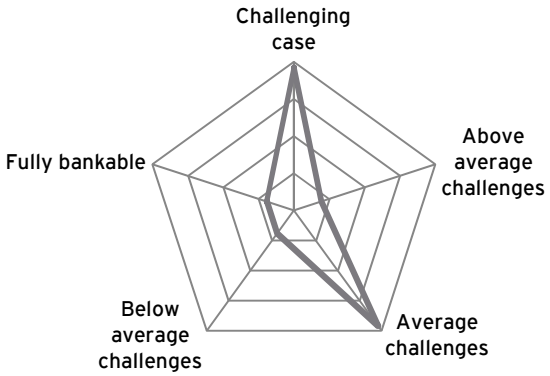
Source: Ernst & Young analysis

Turning the corner: global views on lending to the renewable energy sector (cont'd)

In the bioenergy sector, we asked our survey respondents to consider the bankability of "regular" biomass without CHP. The key risk and challenge identified was, as expected, feedstock security. There was an interesting regional difference as many Asian and South American lenders felt feedstock security might only pose average financing challenges.

Question: Considering individual technologies, how bankable do you see each technology?

Regular biomass without CHP

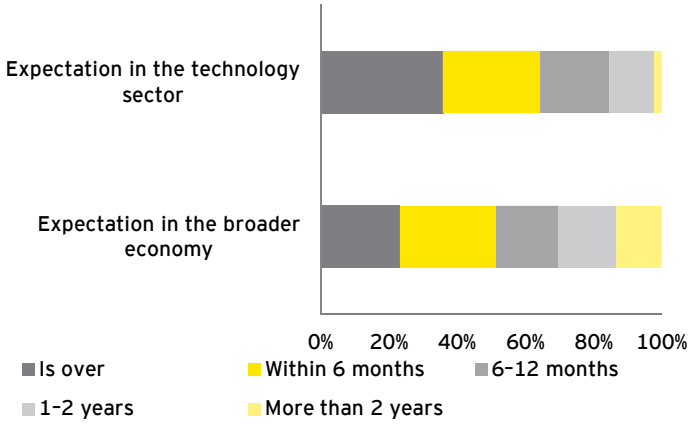


Source: Ernst & Young analysis

Industry's view on capital markets

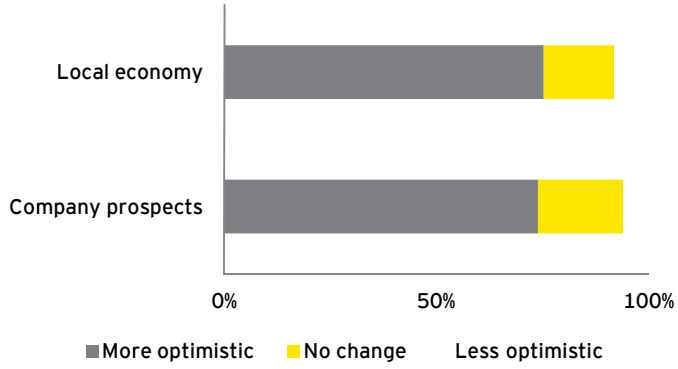
Considering the view from the technology industry as a whole, Ernst & Young's recent technology sector-specific capital confidence analysis (under our Capital Confidence Barometer methodology) revealed that the majority of technology industry leaders and executives believe the financial crisis and downturn has passed or will have passed by the end of 2011.

The financial crisis/downturn will end:



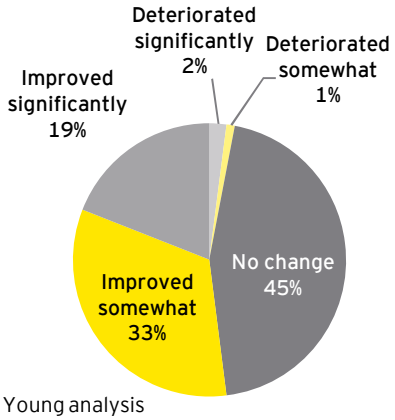
Source: Ernst & Young analysis

The level of optimism is reflective of this view, with three-quarters of all participants being more optimistic about prospects for their economy and for their company compared with six months ago.



Source: Ernst & Young analysis

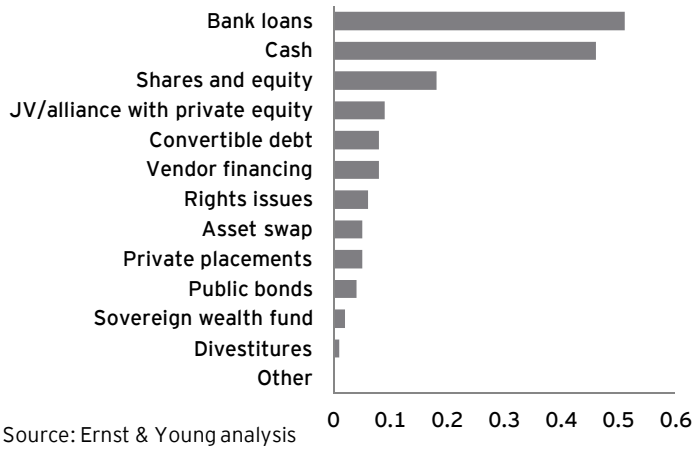
While optimism is important, the ability to fund research or finance joint ventures is critical to see this optimism converted into tangible results. Results from the technology sector-specific capital confidence analysis showed an equally positive position, with the majority of participants saying that, compared with six months ago, credit and capital conditions have improved significantly for their specific companies.



Source: Ernst & Young analysis

Interestingly, the technology companies surveyed clearly consider themselves to be in a stable cash position, with 46% of respondents suggesting the main source of deal financing in the next 12 months will be through cash. The majority of finance will be drawn from traditional bank lending, indicating industry's view that banks are open and lending in the sector.

Turning the corner: global views on lending to the renewable energy sector (cont'd)



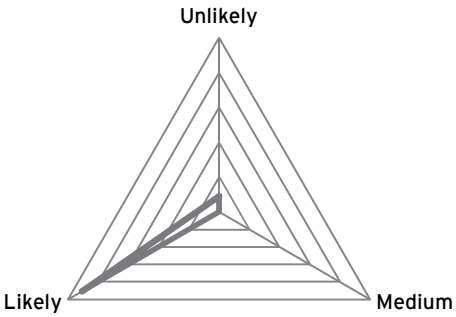
Source: Ernst & Young analysis

Beyond renewable energy generation infrastructure

When asked about views from the lending community on 'beyond renewable energy generation infrastructure' our survey showed high expectations of portfolio expansion by utilities over the coming year. Interestingly, views were split equally when considering the likelihood of major lending to support portfolio expansions by developers.

Question: Beyond renewable energy generation, how likely do you see investments being made in 2011 in the following areas?

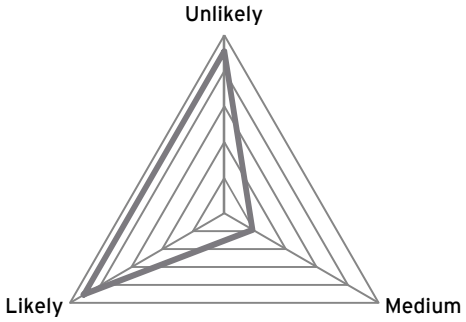
Portfolio expansion by utilities



Source: Ernst & Young analysis

Question: Beyond renewable energy generation, how likely do you see investments being made in 2011 in the following areas?

Portfolio expansion by developers

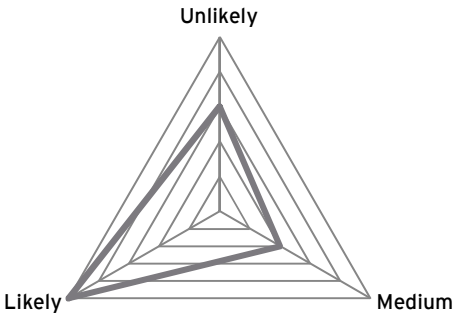


Source: Ernst & Young analysis

Equally divisive among our survey participants was the view on investments in the supply chain. The majority of lenders are expecting to see industry consolidation, while a dichotomy exists over the level of investment in the supply chain.

Question: Beyond renewable energy generation, how likely do you see investments being made in 2011 in the following areas?

Investment in supply chain



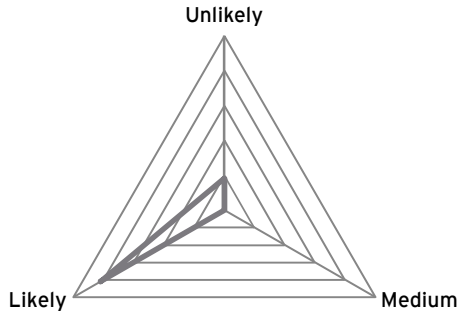
Source: Ernst & Young analysis

Interestingly, our survey participants predict strong M&A activity over the next 12 months, specifically centered on industry consolidation. In conjunction with lenders, we expect consolidation to occur across the value chain, driven by market diversification needs as price support levels adjust in individual markets and pressure increases on supply chain participants.

Turning the corner: global views on lending to the renewable energy sector (cont'd)

Question: Beyond renewable energy generation, how likely do you see investments being made in 2011 in the following areas?

M&A activity (industry consolidation)



Source: Ernst & Young analysis

The future prospects for renewable energy financing

Lenders, along with the rest of the sector, are going through a period of adjustment. Changes to tariff rates and policy structures, for example in the German and the UK markets, are affecting all renewable energy participants, including lenders.

The fundamental drivers of the renewable energy industry are still strong, as the sustainable supply of energy continues to be one of the fundamental challenges we face. Renewable energy has a key role to play in our energy future. The current global economic challenges are an opportunity for the renewable energy sector to prove its worth by providing long-term energy supplies without the risk of geopolitical instability.

Our survey has shown that the largest concerns within the lending community are macro based, rather than sector specific, namely foreign exchange rates and the ongoing debt crisis in Europe and the US.

Regarding sector specifics, lenders see that the fundamental drivers for renewable energy have improved following the credit crisis, though policy risk remains a major concern in Asia. Stable and transparent policy is as critical now as in the past to enhance the borrowing characteristics of the renewable energy sector.

Onshore wind still remains the technology of choice for lenders, with ground-mounted solar also well accepted by many.

Indications from lenders are that demand for future lending will be strongest from utilities seeking to expand their portfolios. The generally healthy cash position of the utilities sector, relative to private development companies, offers lenders greater security and a resulting greater willingness to lend. Most lenders are confident that activity over the next 12 months in the supply chain will be the result of M&A rather than single name financing.

Overall, indications are that lender confidence toward renewable energy is returning and that smaller deals, in the right market and technology, can be completed - provided the fundamentals are solid and a carefully crafted investment thesis is presented well. Lending conditions remain in choppy seas, while the prospect of calmer waters is on the horizon.

Contact:
Mark Porter
Tel: + 1 416 943 2108
Email: mark.porter@ca.ey.com

Do you need a chief capital officer?

An emerging solution for fast-growing cleantech companies in capital-intensive segments

Just as the world thirsts for clean energy, the companies striving to provide it thirst for capital. The CEO, CFO and treasurer of a cleantech company may know a good deal about capital formation, but such executives are already juggling significant calls on their time. Thus, cleantech companies are left facing some inescapable questions: are our capital formation requirements so omnipresent, so significant and so essential to strategy that they beg for focused attention and specialized skills? Do we, in fact, need a chief capital officer (CCO) to focus exclusively on capital formation and deployment?

An industry in need

For cleantech, capital formation is critical. Today's legacy energy technologies and infrastructures were financed with hundreds of billions of dollars in debt or equity financing. Sources included a range of public, private and governmental sources including project finance and tax equity. This same scale of investment is required now for early-stage development or commercialization of a range of cleantech technologies, not to mention large-scale infrastructure changes in the global grid, in fossil and bio-based fuels, and in battery-, gas-, diesel- or hybrid-powered transportation.

Demand for capital on this scale goes far beyond customary venture capital, IPO or other traditional sources of financing for high-growth companies. Financing of this magnitude typically calls for a project-financing approach. The challenge here, however, is that classic project financing tends to accrue only to ventures with proven technologies and secure cash flows. For the cleantech industry, this leaves a funding gap that will require focus, innovation and no small degree of determination to fill.

One obvious piece of the solution is government financing. Since it is in the public interest to put in place the engineering and infrastructure needed to fulfill the promise of cleantech, it is entirely appropriate that governments around the world provide support for such projects. But government grants, tax incentives, subsidies and regulatory inducements are only a partial solution. Moreover, in the wake of lingering budget deficits and a growing number of austerity programs, governments are finding it harder to produce additional financing.

For the capital-intensive sectors of cleantech to gain real traction, their development must be backed not only by governments, but also the private sector. Over the long term, financing renewable energy will involve a complex interplay among banks, international investors, corporations, legacy utilities and energy firms, and broad industry coalitions, as well as local, regional and national governments. Securing capital from one source will largely become dependent on securing financing from others as well. At the company level, orchestrating such a symphony will require a conductor of considerable talent.

But do we need a CCO?

So will cleantech companies need a C-suite executive whose sole purpose is to tend to the strategy and practice of capital formation and deployment? The immediate response may be to say no, as capital formation is the job of the CFO or CEO. That may well be so in much larger, well-developed industries and businesses.

But look again at the unique situation of cleantech companies, especially those in renewable energy segments, which tend to be young and fast growing. While the CFOs or CEOs of such companies may play an important role in financing, their talents are generally needed elsewhere. With the considerable financing needs of the industry, capital formation should in no way be viewed as a part-time job.

Given these realities, a growing number of cleantech companies are recognizing that they need an executive who can devote complete attention to the challenge of capital formation. Arguably, the role is best filled by someone who:

- Knows the markets. The CCO must have in-depth knowledge of global capital markets, offering experience, credibility and clout with investors and analysts.
- Understands counterparty needs. A CCO will recognize that satisfying a company's appetite for capital will mean attracting a wide range of investors, from pension funds to private equity, sovereign wealth, merger partners or governments. The CCO must know how to speak to each class of investor or partner in the most customized and compelling terms.
- Is creative. The ability to innovate is essential, as many of the templates and models for cleantech industry financing either have not yet been created or are not yet well understood.
- Understands corporate and project development. As cleantech evolves, its capital needs and future will be shaped by acquisitions, partnerships and alliances. The CCO must be experienced in navigating the ins and outs not only of M&A, but also of project finance, leverage, tax issues and cross-corporate boundary collaboration within extended commercial ecosystems.
- Knows financial modeling. Credible presentation of industry and company dynamics will be essential to gaining the confidence of a range of potential investors.
- Works well with bureaucracies. The CCO must be skilled in collaborating with government – detail oriented and able to comply with what is likely to be an array of complex requirements.
- Lives and breathes capital efficiency. The CCO will work full-time not only to secure capital but also to ensure that such a scarce commodity is always efficiently deployed.

Do you need a chief capital officer? (cont'd)

A discussion worth having

Such an executive will prove a relatively rare commodity. But just as important as finding the right person will be developing a way to incorporate the role into the existing managerial framework. Should such a position be mandated, it is likely to stir up a spate of bad feeling among executives such as the CFO or treasurer. Consequently, it is vital for these executives to participate in the discussions to evaluate the concept and, if appropriate, develop the job description.

For most cleantech companies, the mere consideration of the role of the CCO should prove a powerful strategic exercise. Some may find the concept intriguing, but impractical. However, given the significant capital needs of the cleantech industries, we believe the starting point should be less "Do we need this position?" and more "Why don't we have this position already?"

Contact:

Jay Spencer
Tel: +1 617 585 1882
Email: jay.spencer@ey.com

Achieving Scotland's green energy ambitions

In May 2011, the Scottish Government revised its 2020 target for the amount of electricity sourced from renewable energy from an already ambitious 80%, the highest in the EU, to 100%. This reflects First Minister Alex Salmond's confidence in securing Scotland's place as the "green energy powerhouse of the continent of Europe."

To put Scotland's unprecedented goal into context, it vastly overshadows those of the most green energy-conscious countries in Europe. Sweden and Denmark, for example, have 2020 targets of 50% and 31%, respectively. Supporting Scotland's startling ambition is the physical abundance of natural sources of green energy owing to its geography: an estimated one-quarter of Europe's total potential wind and tidal energy capacity and approximately one-tenth of its wave resource, amounting to a potential 60GW of generating capacity.

Scotland is well on its way to achieving its aim, with over 4GW of installed renewable capacity and a further 3.6GW under construction or consented across the country, exceeding its 31% interim target for 2011. Yet, early momentum will almost certainly slow. As one developer commented, "All the biggest sites will be built out by the end of the decade. Sites will then shift to repowering, building out the gaps. The scale of things will start to draw back."

Transmission constraints and costs

Even if there are enough sites available to build out, the cost to consumers of upgrading the transmission network will be substantial.

Scotland's ultimate goal is to exceed the 100% target, exporting excess generation to England. This is essential for shifting the high cost of a renewable energy build-out off the backs of Scottish consumers. However, with electricity connections across the border having hit full capacity, a significant upgrade is required. Investments have been made, such as an £80m (€89m) upgrade by National Grid Electricity Transmission and Scottish Power Transmission; yet, more is needed.

Under the Scottish Government's National Planning Framework, the aim is to increase renewable energy export capacity to 3.2GW by 2013. By 2020, an additional 11.4GW could be required. This equates to consumers funding an additional £183m (€210m) per GW to support renewable energy - a significant additional cost for a population of 5.2m.

The funding challenge

Costs cannot be borne entirely by Scottish consumers: neither politically, nor in terms of actual affordability. Scottish GDP rose 0.8% in Q4 2010, compared with an overall UK increase of 1.4%. Total GVA (Gross Value Added, a measure of GDP at basic prices) was £103m (€115m) in 2009 compared with £1,059m (€1,179m) for England. These figures highlight the importance of power exports to the English economy as a cost-sharing mechanism.

In addition to the quantum of investment needed, competition for capital to fund renewable energy capex is intense. Of a total £199b (€222b) in investment required for British energy infrastructure by 2020, £85b (€95b) of this is needed to reach the renewable energy generation target.

With all of this investment occurring simultaneously, for a nation that will rely heavily on third-party capital, the aspirations of the Scottish Government policy-makers present a significant funding challenge. To complicate matters, £191m (€213m) of funding due to be paid by the UK government under the Fossil Fuels levy will now be used to fund the Green Investment Bank, which is not due to be operational for at least two years, requiring other funding sources to be sought in the meantime.

Private finance has provided additional support already to help fill the funding gap. For example, a cleantech fund of £50m (€56m) has been established by Royal Bank of Scotland and Natwest Bank for small-scale solar and wind projects on Scottish farms. This type of investment fund may provide further financial support, if hurdles such as operational track record, regulatory risk, technology risk and deal size can be overcome. The latter challenge could, for example, be overcome through funds that pool renewable assets.

At present, however, private finance is insufficient (for further discussion on this, see article "Funding renewable energy in a capital constrained world" in CAI issue 29). Corporate-level funding is constricted due to historically high leverage and credit rating pressures. Project finance is active, yet insufficient in comparison to the mountain of investment that is required. Ultimately, more needs to be done to attract new sources of investments, such as institutional equity.

Achieving the goal

Scotland can bridge its funding gap, but only with creativity and flexibility. The benefits are clear. A surge in offshore wind installation alone could contribute over £7b (€8b) to the economy, creating nearly 30,000 jobs and a further 20,000 indirectly.

Yet it is unlikely that targets will be met by the market alone, requiring some form of support beyond the quasi-direct subsidization that FITs imply and beyond the direct subsidies available (for example, £700m (€779m) allocated under this year's Scottish budget for Scottish Water renewables projects until 2015).

Achieving Scotland's green energy ambitions (cont'd)

The Scottish Government must, therefore, be more creative in attracting capital. It has a number of possible options:

- Procure new strategic infrastructure directly under a pseudo-PPP arrangement
- Act as guarantor or first-loss investor, to supplement the potential future UK Green Investment Bank role and help ensure risk-averse capital can flow to Scottish projects
- Facilitate securitization of consumer receivables to fund up-front investment
- Provide inbound investment incentives to attract equity from supply chain participants

If strategic options such as these were pursued through stable and predictable frameworks, the overall cost of capital deployed in the Scottish renewables sector is likely to be lowered, potentially reducing the overall cost to consumers.

Scotland has plentiful sources of renewable energy. But to harness the real benefits of this resource and meet its ambitious goals, the Scottish Government will have to come up with innovative ways to attract an unprecedented wave of private investment, beyond anything accomplished in the regional Scottish economy in recent decades.

Contact:

Ben Warren
Tel: + 44 (0)20 7951 6024
Email: bwarren@uk.ey.com

Andy Boak
Tel: +44 131 777 2194
Email: aboak@uk.ey.com

Anton Krawchenko
Tel: +44 (0)207 951 6395
Email: akrawchenko@uk.ey.com

M&A activity

Banco Santander SA expects the total value of mergers in the renewable energy market to increase this calendar year, up from US$55b (€38b) in 2010, as power companies look to expand into Eastern Europe and Latin America. According to Javier Sobrini, **Santander's** global head of energy takeovers, developing economies such as Brazil are opening up opportunities for investment in renewables that didn't exist before.

General

China's second largest wind producer, **China Datang Corp** formed a joint venture with Australian firm **CBD Energy Ltd** and another Chinese firm to develop wind and solar technologies in Australia. The venture titled **AusChina Energy Group** will most likely benefit from incentives offered by the Australian Government to encourage investment in renewable energy.

NingXia YinXing Energy Co., a Chinese industrial equipment manufacturer, created a joint venture with **ECOM-ENERGY Co.** They will invest US$500m (€347m) to construct a 50MW wind farm and US$110m (€76m) to build a 30MW solar PV manufacturing plant, in a sign of further expansion in the supply chain.

Iberdrola Renovables shareholders agreed to a merger by absorption into its former parent company, **Iberdrola SA,** whereby **Iberdrola SA** will absorb the assets of its former subsidiary in exchange for a share deal. The deal is likely to value Iberdrola Renovables' shares at €2.978 per share. **Iberdrola SA** believes the transaction will improve its development plans in the renewable energy sector and help it achieve cost savings.

Wind

In order to consolidate its position in the Belgian offshore wind market, **Electrawinds NV** acquired a 50% share in a North Sea wind farm project from **Eneco Holding NV**, a Dutch utilities company. The farm is expected to cost US$1.7b (€1.2b) to construct and will have a capacity of 450MW.

Invenergy LLC, the US-based renewable power developer, acquired a 156MW wind park in Quebec, Canada, from **3Ci Wind Energy**, as it seeks to solidify a business relationship with the city of Quebec. The project, which is expected to commence operation in 2013, will enter into a PPA with **Hydro-Quebec**, the government owned generator and distributor of power, to sell the power under a 20-year contract.

Italian energy firm, **Sorgenia SpA** has agreed to form a partnership with private equity firm, **Kohlberg Kravis Roberts & Co. LP**. The entity will comprise of various wind parks in France and has an estimated enterprise value of US$338m (€235m).

Velocita Energy Development, the new European wind power business created by US private equity firm, **Riverstone Holdings**, has acquired a French 750MW development portfolio from E.ON. This is the first acquisition for **Velocita** and will provide it with around 20 onshore projects across France with options on the land to develop farms ranging from 20MW to 90MW. **Veolicita** expects over half of the 750MW to gain permits in the next 12 to 24 months. The sale is part of a broader divestment of energy assets by E.ON, which is looking to raise €15b through disposals by 2015.

Infinis Plc, a British renewable energy firm, acquired three wind farms, with a total capacity of 10MW, from the UK's second-largest power supplier, **Scottish and Southern Energy Plc. The US$284m (€197m)** acquisition has more than doubled **Infinis'** wind portfolio.

First Wind Holdings LLC, a Boston-based energy developer, and two Canadian utilities, **Algonquin Power & Utilities Corp** and **Emera Inc.** will form a joint venture that will construct and operate wind farms in the Northeast US. **First Wind** will transfer its existing operations into the entity and have a 51% share. The Canadian firms will create a separate entity, **Northeast Wind**, which will own the remaining share. This transaction aligns with **First Wind's** strategy to expand across the US.

Infigen Energy, an Australian wind farm owner, has agreed to sell its portfolio of German assets in order to reduce its debt burden. The assets, amounting to 128.7MW across 12 wind farms, will be sold to an unnamed European-based renewable energy fund for €154.6m, subject to approval by the German anti-trust authority.

EDP Renováveis SA has bought a stake in the **Timber Road II** wind farm in Ohio in exchange for US$116m (€81m) of equity financing. **Bank of America Corp.** and **BNP Paribas SA** will provide the debt financing to the renewable energy unit of the Portuguese utility company.

Nordex, the German wind turbine manufacturer, and Wisconsin-based **Way Wind** have entered a joint venture to build a 120MW wind farm in Nebraska. The project is set to cost around US$250m (€174m).

Solar

Diversified Indian firm, **Vikram Group,** entered into a joint venture with Spain-based **Proener Renovables** to construct various solar power projects across India. **Vikram** expects the entity to generate INR1b (€0.02b) per year for the next three years.

Terra Firma private equity firm purchased 13 solar PV power plants in Italy, with a capacity of 19MW, from **Sorgenia SpA** for US$138.8m (€96.5m). The sale is part of **Sorgenia's** strategy to focus investments in distributed generation, with the aim of installing 55MW by 2016.

French private equity firm, **Antin Infrastructure Partners S.A.S.** acquired three solar projects in Italy from **Kinexia SpA**. The PV solar parks with a total of 28.3 MW capacity sold for approximately US$146m (€101m).

This is a sample of the main global M&A transactions in the renewables sector over the past quarter.

Sources

All information relating to M&A activity in the sector is obtained from publicly available sources.

IPO activity

Following trends in the first quarter, renewables IPO activity was limited in the second quarter. Many believe investor confidence is low due to the uncertainty surrounding government policies that encourage the production and use of renewable energy.

When first introduced in various countries, FITs helped spark production of solar and wind technologies. Many firms were achieving 'higher than predicted' rates of return and, as a result, investment flowed into the sector. Governments are reaching the point where this level of subsidy support is no longer sustainable and have resorted to reducing incentives, especially for solar power.

Revenue streams are no longer as predictable and investors are , therefore, more cautious. Looking forward, IPO activity should pick up in those countries that can achieve long-term stability in their renewable energy policies.

Wind

In June, the China wind developer **Huaneng Renewables**, a subsidiary of the **Chinese Huaneng Group,** raised US$800m (€556m) from a Hong Kong initial public offering. The IPO, which was delayed from December, was priced in the lower half of the expected range at HKD2.50 (€0.2) per share, thus valuing the company at 14.3 times its projected earnings. A majority of the shares went to a select group of institutional investors including **China Investment Corporation, Temasek Holdings**, and **Standard Chartered Private Equity**. **Huangeng** plans to use the funds to expand their wind capacity from 3.5GW to 5.1GW.

After going public, the **Huaneng Renewables'** shares immediately tumbled, most likely because China agreed to abandon a government subsidy program for wind energy manufacturers.

In June, Chinese wind turbine producer, **Guodian United Power Technology Co. Ltd.,** announced plans for an IPO on the Hong Kong exchange. The offering will be paired with the environmental and renewable energy units of its parent, **Guodian Technology & Environment Group Co.** At the date of publication, the timeline and pricing ranges have yet to be released.

Solar

In June, US solar inverter manufacturer, **Enphase Energy Inc.,** registered to list its common stock on the Nasdaq Global Market Exchange. The company, which is expanding rapidly, plans to raise at least US$100m (€69m) in the public offering and will use the proceeds raised to help fund operations and expansion during the next 12 months.

In May**, PLG Power Ltd.,** the firm building one of India's largest solar plants, filed for listing on London's Alternative Investment Market. **PLG** aims to raise up to US$100m (€69m), which will be used to expand its solar manufacturing capacity. **PLG** has also indicated it may raise additional public funds if the first IPO is successful.

Geothermal

Nobao Renewable Energy Holdings Ltd., a Chinese geothermal heat pump producer, shelved its IPO with the US Securities and Exchange Commission for the second time in late May. The firm claimed that the market conditions were not suitable for the transaction.

This is a sample of the main global global IPO transactions in the renewables sector over the past quarter.

Sources

All information relating to M&A activity in the sector is obtained from publicly available sources.

All renewables index at August 2011

Rank[1]		Country	All renewables	Wind index	Onshore wind	Offshore wind	Solar index	Solar PV	Solar CSP	Biomass/ other	Geo-thermal	Infra-structure[2]
1	(1)	China	71	77	79	70	61	67	47	59	51	76
2	(2)	USA[3]	67	67	70	56	75	74	78	62	68	62
3	(4)	Germany	64	68	64	77	49	68	0	64	56	67
4	(3)	India	62	63	70	42	64	69	52	58	44	63
5	(6)	UK	58	65	61	77	36	51	0	57	37	67
5	(5)	Italy	58	59	62	51	56	61	43	54	63	61
7	(7)	France	56	59	60	55	49	56	30	57	34	58
8	(9)	Canada	53	60	65	46	34	47	0	50	35	64
9	(8)	Spain	52	53	57	39	59	58	62	46	30	47
10	(11)	Sweden	50	54	55	53	32	45	0	56	35	55
11	(12)	Brazil	49	51	55	39	42	46	32	50	23	48
12	(16)	Australia	47	46	50	36	52	52	53	41	55	43
12	(14)	Poland	47	53	57	42	31	43	0	42	23	48
14	(18)	Belgium	46	52	50	58	31	42	0	39	28	52
14	(14)	Ireland	46	53	53	52	23	32	0	44	24	49
16	(12)	Portugal	45	46	50	34	46	51	35	39	25	38
16	(16)	South Korea	45	46	45	50	45	52	27	40	34	40
16	(21)	Romania	45	49	52	38	32	44	0	43	38	43
19	(18)	Netherlands	44	50	49	53	32	44	0	39	21	42
19	(18)	Japan	44	44	46	38	51	61	25	36	39	48
21	(22)	Denmark	43	47	44	56	29	40	0	45	32	51
21	(10)	Greece	43	44	48	33	47	52	33	34	26	32
23	(23)	Mexico	42	42	43	40	45	47	40	39	54	39
23	(24)	Norway	42	48	48	46	22	31	0	45	30	51
23	(30)	Finland	42	46	48	39	21	29	0	52	26	47
26	(27)	South Africa	41	44	47	35	39	36	46	36	33	45
26	(24)	Egypt	41	42	45	33	44	43	45	35	25	36
26	(27)	New Zealand	41	47	50	37	24	33	0	35	52	47
29	(24)	Turkey	39	41	44	33	38	41	29	34	41	38
29	(27)	Morocco	39	38	42	26	48	48	49	33	21	43
31	(30)	Taiwan	38	42	43	37	31	43	0	31	34	38
32	(33)	Austria[4]	36	32	40	0	39	54	0	48	34	51
33	(32)	Bulgaria	35	37	41	25	33	46	0	33	35	43
34	(34)	Chile	32	33	36	25	31	36	19	27	35	40
35	(35)	Czech[4]	29	31	38	0	24	34	0	28	23	46

Notes:

Source: Ernst & Young analysis

1. *Ranking in Issue 29 is shown in brackets.*
2. *Combines with each set of technology factors to produce the individual technology indices.*
3. *This indicates US states with RPS and favorable renewable energy regimes.*
4. *Technology weightings have been adjusted for landlocked countries to reflect the lack of offshore potential.*

The ongoing debt crisis within the Eurozone and recent tensions over US sovereign debt have led to a re-benchmarking of the access to finance parameter. Sovereign credit ratings and sovereign credit default swaps have been incorporated to provide a quantitative component to reflect the risk of investing in the CAI countries.

The development of grid infrastructure in China has not kept pace with the exponential growth in onshore wind developments, despite **China Southern Power Grid Co.** recently committing US$61m (€42m) to expand the transmission network. In order to address this, capacity quotas have been allocated, which are based on each province's market conditions and aim to regulate the combined production of wind farms. After months of discussion, China agreed to terminate its "Special Fund for Wind Power Manufacturing" program after complaints filed to the **World Trade Organization (WTO).** This is likely to erode the profit margins of manufacturers, who may take a twin approach of seeking export-led growth, as well as to potentially increasing prices, pushing up the overall costs of wind power developments. This has led to China falling one point in the All renewables index.

The US has had a relatively subdued quarter as it remains unclear if the Clean Energy Standard advocated by President Obama and the Democrats will receive enough votes to clear the Senate Committee. Solar and onshore wind developers continued to receive loan guarantees and Treasury grants from the Department of Energy, although with the September and December 2011 end dates in sight, there are questions as to the nature of future incentive mechanisms for renewables.

.

All renewables index at August 2011 (cont'd)

Germany climbed two points to regain third position as the Bundestag announced the cessation of nuclear power, with the last power station due to go offline in 2022. This was seen as a positive announcement for the renewables industry, which also experienced mostly beneficial changes to the FIT mechanism under the German Renewable Energy Act (EEG).

India has fallen a point in the All renewables index as a result of the access to finance benchmarking.

Italy has fallen two points as a result of the access to finance benchmarking. However there was positive news for the world's second-largest solar market as Industry Minister, Paolo Romani, confirmed that there will be no further FIT cuts for solar PV. This has been met with relatively positive sentiment in the industry, especially from **Enel Green Power,** who has set out a strategy of making a significant investment in solar plants, as well as a panel factory, as part of a €1b wider global investment strategy.

After months of waiting in the UK, the Department of Energy and Climate Change confirmed that the Electricity Market Reform (EMR) will implement a Contract for Difference FIT. Medium-term uncertainty still exists as developers analyze the economics between the RO and the FIT in the interim period before the FIT becomes obligatory for renewables projects. Freedom of Information data shows that half of all onshore wind farms in England and Wales are rejected at the planning stage, raising doubts as to whether the UK will reach its 2020 renewables target. This, combined with medium-term uncertainty with the EMR, has led to the UK falling a point in the index.

Despite the French Government reaffirming its support for nuclear power, France is static in the index as the Government released the long-awaited 3GW offshore wind tender with specifications published on 11 July. A number of partnerships have been formed in this sector, in particular that of **Areva Wind, GDF Suez** and **Vinci SA** to take advantage of this opportunity.

Spain has fallen two points as a result of the Eurozone debt crisis contagion and the continued suspension of subsidies for solar power projects. The regulator has suspended a total of 1,919 projects for failing to provide evidence that they followed rules to gain 'above market' rates for solar PV.

Brazil has gained a point in the All Renewables Index as the regulator, **Agência Nacional de Enérgia Eletrica**, provided clarity over pricing as it set the ceiling price for the next onshore wind auctions at Reais139 (€62) and Reais146 (€65) per MWh.

The Romanian wind sector could be set for a future of progressive growth after the European Commission approved its Green Certificate program. The scheme, which provides a bonus to renewable energy produced from 'high efficiency' plants, creates a platform for Romania to achieve its mandatory 2020 renewable energy targets. As a result, Romania has climbed five places in the index.

Greece has fallen significantly in the index as a result of the access to finance benchmark as it struggles to alleviate its heavy debt burden. However, at the end of July, there were positive signs for the industry as Guenther Oettinger, European Commissioner for Energy, said that European authorities may promote solar power as part of the country's debt relief plans.

South Africa has climbed a place in the index after the Department of Energy issued its request for proposals, which invites sponsors to bid on renewable energy projects under the country's Renewable Energy Feed In Tariff (REFIT) program.

Bulgaria emulated its European neighbors by reducing the subsides for wind and solar. The President signed a new renewables law that will fix incentives for the two technologies, while reducing the number of years the tariff is available from 25 years to 20 years for solar, while wind projects will be limited to 12 years. The tariffs can be reduced on an annual basis with no clarity over the subsequent year's rate. According to industry stakeholders, this regulatory uncertainty, combined with a lack of grid infrastructure, could potentially put a hiatus on investment.

Wind indices at August 2011

Rank[1]		Country	Wind index	Onshore wind	Offshore wind
1	(1)	China	77	79	70
2	(2)	Germany	68	64	77
3	(2)	USA[2]	67	70	56
4	(2)	UK	65	61	77
5	(5)	India	63	70	42
6	(8)	Canada	60	65	46
7	(6)	Italy	59	62	51
7	(7)	France	59	60	55
9	(11)	Sweden	54	55	53
10	(10)	Ireland	53	53	52
10	(11)	Poland	53	57	42
10	(9)	Spain	53	57	39
13	(13)	Belgium	52	50	58
14	(16)	Brazil	51	55	39
15	(14)	Netherlands	50	49	53
16	(18)	Romania	49	52	38
17	(19)	Norway	48	48	46
18	(19)	Denmark	47	44	56
18	(22)	New Zealand	47	50	37
20	(23)	Australia	46	50	36
20	(16)	Portugal	46	50	34
20	(19)	South Korea	46	45	50
20	(25)	Finland	46	48	39
24	(14)	Greece	44	48	33
24	(23)	Japan	44	46	38
24	(25)	South Africa	44	47	35
27	(28)	Mexico	42	43	40
27	(28)	Egypt	42	45	33
27	(28)	Taiwan	42	43	37
30	(25)	Turkey	41	44	33
31	(31)	Morocco	38	42	26
32	(32)	Bulgaria	37	41	25
33	(33)	Chile	33	36	25
34	(34)	Austria	32	40	0
35	(35)	Czech	31	38	0

Source: Ernst & Young analysis

Notes:

1. *Ranking in Issue 29 is shown in brackets.*
2. *This indicates US states with RPS and favorable renewable energy regimes.*

The rapid growth of installed wind capacity in China has exceeded the rate of development of the electricity grid in some regions, as developers take advantage of ambitious government targets of 100GW of installed capacity by 2015. Developers are still forging ahead, as **China Huadian** announced that it plans on spending US$3b (€2b) on wind farms totaling 1.2GW in the province of Gansu. However, there was a salient moment for the industry in June, as China agreed to terminate its "Special Fund for Wind Power Manufacturing" program following complaints filed by the US at the **WTO.** The Fund provided subsidies to wind equipment manufacturers and individual grants were as much as US$22.5m (€15.6m). As a result, China has fallen a point in the wind index.

In order to stimulate the expanding offshore wind industry in Germany, the **Federal Ministry for the Environment** and **KfW Development Bank** launched a €5b program to provide financial incentives to offshore wind projects. In a further sign that investors are turning to this sector, a consortium of 16 commercial banks and the **European Investment Bank** have agreed to provide €1b in financing to build a 400MW wind farm in the North Sea, which is scheduled to be completed in 2013. As a result, Germany has increased two points in the wind index.

Installed capacity figures for the US in Q1 were more than double that of Q1 2010. However, relatively inexpensive shale gas remains a challenge to those developers looking to secure power purchase agreements for their unbuilt projects.

The UK has fallen a point in the wind index as newly released Freedom of Information data revealed that nearly half of all onshore wind farms are rejected at the planning stage. Coupled with this, many industry stakeholders believe that the RO banding review is likely to reduce incentives for onshore wind farms, creating a period of uncertainty.

The wind sector in Romania is set to take advantage of the newly affirmed green certificate scheme, with installations expected to increase to 1GW by the end of 2011, up from 469MW at the end of 2010, according to the Economy Minister. Romania has climbed two places in the wind index as a result.

Australia has gained a point in the wind index as an expected AU$28b (€21b) of investment in large-scale utility projects, such as wind, is expected to flow into the sector.

The wind industry in Bulgaria was given a shock in April, when the Government passed a new law affecting the revenue certainty of onshore wind projects. According to the **Bulgarian Wind Energy Association**, this may stop about US$4.45b (€3.09b) in projects as transparency over the tariff will only be available once the project is commissioned. As a result, Bulgaria has fallen two points in the wind index.

Solar indices at August 2011

Rank[1]		Country	Solar index	Solar PV	Solar CSP
1	(1)	USA[2]	75	74	78
2	(2)	India	64	69	52
3	(3)	China	62	67	47
4	(3)	Spain	59	58	62
5	(5)	Italy	56	61	43
6	(8)	Australia	52	52	53
7	(7)	Japan	51	61	25
8	(9)	France	49	56	30
8	(12)	Germany	49	68	0
10	(9)	Morocco	48	48	49
11	(6)	Greece	47	52	33
12	(9)	Portugal	46	51	35
13	(14)	Mexico	45	47	40
13	(13)	South Korea	45	52	27
15	(15)	Egypt	44	43	45
16	(16)	Brazil	42	46	32
17	(17)	Austria	39	54	0
17	(19)	South Africa	39	36	46
19	(17)	Turkey	38	41	29
20	(20)	UK	36	51	0
21	(22)	Canada	34	47	0
22	(21)	Bulgaria	33	46	0
23	(26)	Sweden	32	45	0
23	(22)	Netherlands	32	44	0
23	(24)	Romania	32	44	0
26	(26)	Chile	31	36	19
26	(26)	Poland	31	43	0
26	(24)	Taiwan	31	43	0
26	(29)	Belgium	31	42	0
30	(30)	Denmark	29	40	0
31	(31)	Czech	24	34	0
31	(33)	New Zealand	24	33	0
33	(32)	Ireland	23	32	0
34	(34)	Norway	22	31	0
35	(35)	Finland	21	29	0

Source: Ernst & Young analysis

Notes:

1. *Ranking in Issue 29 is shown in brackets.*
2. *This indicates US states with RPS and favorable renewable energy regimes.*

The US has gained a point in the solar index as the PV industry continues to grow with Q1 2011 solar PV figures double that of the same period in 2010. This growth has been driven by billions of dollars of loans guaranteed by the Department of Energy. However, there are concerns over the future of support mechanisms as the program is set to expire in September.

China has announced the introduction of a fixed FIT in order to increase participation and profitability in the sector. There has also been investment in the supply chain to take advantage of ambitious targets, with **Anwell Technologies** announcing that it secured CNY700m (€75m) in municipal funding to expand the capacity of its solar manufacturing plant in the city of Anyang and about US$77m (€54m) in municipal funding for the construction of a manufacturing plant in the city of Dongguan.

After the shock of the Queensland floods and the subsequent reduction in solar subsidies, the Australian Government awarded AU$788m (€580m) to two solar projects under the Solar Flagships Program. One of the companies, **Fotowatio Renewable Ventures,** won a AU$324m (€239m) contract to develop a 150MW plant in New South Wales, as it seeks to expand in a market that it has identified as having significant future potential. Australia has increased a point in the solar index as a result.

France has dropped a point in the index after the Government published a new decree that caps annual installations at 500MW, while also setting a limit of 100kW on projects that can receive the FIT. Projects over this size will qualify for a tender mechanism.

Germany has gained a point in the solar index after the Government relinquished its support for nuclear, while also halting the cuts to solar PV tariffs as the installed capacity fell short of the expected levels. The next reduction is planned for January 2012 and may exceed 18%, depending on the installation rate between October 2010 and September 2011.

The announcement of the REFIT program in South Africa combined with a US$365m (€254m) loan **Eskom** received from the **African Development Bank** for wind and solar projects are a positive sign for the solar industry. The REFIT program has outlined ambitions of 3.5GW for solar by 2020. As a result, South Africa has gained a point in the solar index.

Bulgaria has reduced the incentives it pays for solar power by 13% to 31%, depending on six outlined project categories. The tariff for projects larger than 200kW will reduce from BGN699.11/MWh (€357.46/MWh) to BGN485.60/MWh (€248.28/MWh), to reflect the decrease in solar prices. As a result, Bulgaria has fallen a point in the solar index. The FIT entered into force on 1 July 2011 and will expire on 1 July 2012.

Country focus – China

Investment required in new grid capacity

Ranking	Issue 30	Issue 29
All renewables index	1	1
Wind index	1	1
Solar index	3	3[1]

[1] *Joint* Source: Ernst & Young analysis

Policy

In June, China agreed to terminate its "Special Fund for Wind Power Manufacturing" program following complaints filed by the US at the WTO. The Fund provided subsidies to wind equipment manufacturers and individual grants were as much as US$22.5m (€15.6m), although the US claims that these could have reached several hundred million dollars since 2008.

This decision is likely to hurt manufacturers, which may have to increase prices, potentially resulting in higher costs for developers. Additionally, the latest five-year plan shifts policy away from targeting just capacity to targeting grid-connected capacity. These two effects could result in higher exports by Chinese turbine manufacturers to replace this potential drop in domestic demand.

An early example of this trend is the deal announced by Chinese manufacturer **Sinovel** in July 2011 to sell 1GW of turbines to **Mainstream Renewable Power**, a global wind developer.

Grid infrastructure

In order to improve grid reliability and transmission access for wind turbines in remote locations, Chinese transmission companies are investing heavily in grid infrastructure.

For example, **China Southern Power** announced that it plans to invest roughly US$61b (€42b) in network operations in the southern region of China. **State Grid Corporation**, the largest utility in the world, aims to improve grid connections in North, East and Central China by investing approximately CNY2.55b (€270b) between 2011 and 2015.

Onshore wind

The rapid growth of wind capacity (with 18GW added in 2010 alone) has exceeded capacity of electricity grids in some regions, which have not been able to absorb all energy generated by wind farms. In order to address this, China has allocated quotas that are based on each province's market conditions and aim to regulate the combined production of wind farms.

In order to meet China's goal of 100GW of wind installed capacity by 2015, developers are continuing to invest actively in farms across the country. **China Huadian** announced that it plans on spending US$3b (€2b) on wind farms totaling 1.2GW in the province of Gansu.

GD Power Development Co. announced that it plans to develop approximately 1GW of capacity in the province of Heilongjiang and **China Datang Corp.** plans on building 400MW of capacity in Inner Mongolia, as well as a 150MW wind farm in the province of Hebei, by spending US$216m (€150m).

Offshore wind

In 2011–12, China will hold a tender for offshore wind projects with a total capacity of up to 2GW, in an attempt to reach its goal of 5GW of installed capacity by 2015. This goal to continue increasing offshore wind capacity has prompted firms to start planning future activity, with **China WindPower** announcing that it aims to build 1GW of offshore wind farms, and that it signed agreements with the provinces of Hainan, Jiangsu, Guangdong and Shandong.

Guangdong Electric Power Development Co. also announced that it received board approval to invest an additional US$22m (€15m) in its 48MW Xuwen offshore wind project in the province of Guangdong. **China Longyuan Power Group Corp** has announced that it plans on building 1GW of offshore wind farms by 2015, with as much as 200MW of wind farms every year.

Solar

The Chinese Government has announced the introduction of a FIT, opting for the non-competitive mechanism to increase participation and profitability in the sector. Developers will earn CNY1.15 (€0.13) per kWh for projects approved before 1 July or completed by the end of 2011. Projects approved after 1 July will receive CNY1 (€0.11). The tariffs are a lot higher than China's previous competitive tenders.

There has been activity in the manufacturing side of the sector, with companies such as **Anwell Technologies**, which announced that it secured CNY700m (€75m) in municipal funding to expand the capacity of its solar manufacturing plant in the city of Anyang, and about US$77m (€54m) in municipal funding for the construction of a manufacturing plant in the city of Dongguan.

A decrease in solar costs, coupled with an increase in energy demand, as well as manufacturing capacity and the new solar FIT, will likely result in more project developments across the country. Taking advantage of this opportunity is **GD Power Development Co.**, which announced that it has partnered with three companies to build projects totaling 100MW in Dunhuang that will cost US$280m (€195m), and should be completed by October.

Contact:

Ivan Tong
Tel: + 86 10 58153373
Email: ivan.tong@cn.ey.com

Ben Warren
Tel: + 44 (0)20 7951 6024
Email: bwarren@uk.ey.com

Country focus – US

End in sight for loan guarantee program

Ranking	Issue 30	Issue 29
All renewables index	2	2
Wind index	2	2[1]
Solar index	1	1

[1] *Joint* Source: Ernst & Young analysis

Policy

Although President Obama and Congressional Democrats continue to advocate for a Clean Energy Standard (CES), it remains unclear if any such legislation will receive enough votes to clear the Senate Committee. A CES would mandate the procurement of power by utilities from a variety of low-carbon generating sources including renewables, natural gas, nuclear power, and coal plants with CCS technology.

The Department of Energy (DOE) continued to approve loan guarantees for renewable energy projects during the second quarter, despite pressure from Republican lawmakers to cut funding. However, in mid May, the DOE announced that it will no longer be accepting new applications, with the program set to expire in September 2011. A majority of the loan guarantees awarded in the second quarter went to large-scale solar projects.

Solar PV

Solar has continued to experience strong growth in the US, with Q1 2011 installations nearly double that of Q1 2010 (252MW versus 152MW). Cumulative installed PV capacity in the US exceeded 2.3GW, and after a year of flat pricing, PV components have begun to fall in price again. Module prices are down approximately 7% to an average of US$3.09 (€2.15) per watt.

In June, the DOE awarded a US$275m (€191m) conditional loan guarantee to **Calisolar Inc**. Unlike many of the other guarantees that are provided for solar generating plants, this was awarded to support construction of a factory that produces silicon for solar cells at half the market price. Additionally, a US$150m (€104m) loan guarantee facility was provided to **1366 Technologies**, a Massachusetts-based silicon wafer manufacturer

Solar CSP

Although the expiration of the 1705 Loan Guarantee Program looms, the DOE continued to support concentrated solar thermal projects with substantial loan guarantees under that program, guaranteeing US$1.2b (€0.8b) in debt to the Mojave Solar project being developed by **Abengoa Solar SA** in San Bernardino County, CA, as well as US$682m (€474m) to the Genesis Solar project being developed by **NextEra** in Riverside County, CA.

Onshore wind

The first quarter of 2011 was relatively positive for the wind industry. Installed capacity was more than double that of Q1 2010, with 1.1GW of capacity. However, it still remains well behind the record pace of 2009, as inexpensive natural gas remains a challenge to those developers looking to secure power purchase agreements for their unbuilt projects.

Notably, **Google Inc**. and Japanese companies **ITOCHU Corp**. and **Sumitomo Corp**. agreed to invest US$500m (€347m) in the Sheperds Flat Wind Farm near Arlington, Oregon. The 845MW project was considered attractive because of its size and advanced technology supplied by **General Electric**. The farm is also being sustained by a US$1.3b (€0.9b) loan that is 80% guaranteed by the DOE.

A dangerous precedent was set for all renewables in the US when the **Bonneville Power Administration (BPA)** curtailed over 75,000MWh of wind energy generation in favor of increased hydropower output. Such practice threatens the financeability of power purchase agreements for all renewable energy projects, as developers may have a harder time convincing lenders that PPAs are guaranteed contracts with power offtakers such as the BPA. The owners of the affected wind facilities have united to file a complaint with the Federal Energy Regulatory Commission (FERC).

Offshore wind

Siemens AG, the contracted turbine supplier for Cape Wind, has publically agreed to provide some, or all, of the debt and equity for the 468MW Cape Wind project. However, until the members of Cape Wind find a PPA for the remaining 50% of the project's output, construction will not proceed. Federal officials view the Cape Wind approval as a milestone in developing renewable energy sources in the US The Government plans to continue reviewing new offshore proposals and hopes to approve a project off the coast of Atlantic City, New Jersey, in the near future.

In a seemingly public protest of Congress's inability to extend the 1705 Loan Guarantee Program, **NRG** announced the delay of its **Bluewater Wind** project off the coast of Delaware, citing a lack of federal support, both from the absence of the 1705 Loan Guarantee and the scheduled expiration of the 1603 Treasury grants at the end of 2011. The Production Tax Credit, which is set to expire for wind projects on 31 December 2012, has not yet been extended. This lack of clarity for available incentives beyond 2012 is negatively affecting the planning of offshore projects, which incur extended development time frames.

Contact:

Michael Bernier
Tel: + 617 585 0322
Email: michael.bernier@ey.com

Dorian Hunt
Tel: + 617 585 2448
Email: dorian.hunt@ey.com

Country focus – Germany

Offshore wind set for promising future

Ranking	Issue 30	Issue 29
All renewables index	3	4
Wind index	2	2
Solar index	8[1]	12

[1] *Joint* Source: Ernst & Young analysis

Policy

The Federal Government reacted to the Fukushima catastrophe by announcing that the last nuclear power station will go offline in 2022, while also making some positive changes to FITs for renewable energy.

Energy utilities do not currently have to pay the EEG surcharge, which is a levy charged to customers to finance FITs, if at least 50% of the electricity delivered is from renewable sources and the power delivered was marketed directly, rather than receiving the EEG tariff. The Renewable Energy Law 2012 (EEG 2012) stipulates that, from 1 January 2012, exemption from the surcharge for companies using the green electricity privilege will be limited to 2010 EEG surcharge levels.

Onshore wind

The EEG 2012 includes various new or changed stipulations, generally reducing incentives for onshore wind:

- For plants commencing operations in 2012, the onshore wind FIT will be €8.93ct/kWh in the first five years and €4.87ct/kWh in the years thereafter (representing a reduction on current levels).
- The degression for FITs has been increased from 1% (EEG 2009) to 1.5% and will be effective from 2013 onward.
- The termination of the additional system service bonus, available when wind turbines meet certain technical requirements of €0.48ct/kWh, has not been considered in EEG 2012 and will only be available for new installations until 31 December 2014.
- A Contract for Difference rule has been introduced, which compensates operators when merchant prices are below FITs.

Industry commentators believe that these measures, coupled with €5b incentives for offshore wind, will result in a less attractive onshore wind sector.

Offshore wind

A €5b program was launched by the Federal Ministry for the Environment and KfW Development Bank and aims to provide financial incentives to offshore wind projects.

As at the end of June 2011, Germany's offshore wind installed capacity was 198MW.

The first commercial offshore wind farm in the Baltic Sea, Baltic 1, with 48.3MW of installed capacity, became fully operational in May. The farm is owned by **EnBW** and is located off the German coast. Baltic 2, with a planned operational start date of 2013, and Borkum West 2, with a combined capacity of 488MW, are also in the pipeline.

The EEG announcements also extended the offshore FIT to 2018.

A consortium of 16 commercial banks and the European Investment Bank have agreed to provide €1b in financing to build a 400MW wind farm in the North Sea, which is scheduled to be completed in 2013.

Solar

After data from March to May 2011 showed that domestic PV installations would reach the equivalent of 2.8GW per annum (versus the expected 3.5GW), the Government decided to scrap its plan to cut solar FITs in July 2011.

The next FiT reduction is planned for January 2012 and is expected to exceed 18%, as it is likely that, between October 2010 and September 2011, more than 5.5GW will be installed. This level would trigger an additional 9% reduction on top of the base reduction of 9% planned for January 2012. If the market exceeds 6.5GW installed, the reduction will be 21% rising to 24% if more than 7.5GW are installed. The range of currently feasible outcomes will mean that, in 2012, plants larger than 1MW will receive between €c16.39 and €c18.33 per kWh; small roof-top installations (<30kW) will receive between €c21.84 and €c24.43 per kWh. With retail electricity prices at around €c23 to €c25 per kWh, grid parity will be reached in the rooftop segment.

Biomass

The FITs in EEG 2012 range from 14.3ct/kWh down to 6ct/kWh. The EEG 2012 also stipulates that only biogas plants qualify for FITs when 60% of the generated heat is supplied by CHP.

Industry associations are concerned that this level of heat may increase the risk that the biogas plant does not qualify for the FIT in all years of operation. As a result, financing of new biogas plants is currently seen as challenging.

Storage

The new EEG has introduced the concept of "storage gas" to the law. It generally stipulates that various forms of renewable methane fed into the natural gas network keep renewable attributes. The intent of lawmakers is to open up the 200TWh of existing natural gas storage for renewables. By comparison, pumped storage in Germany has a capacity of 0.04TWh.

In the past, instances of negative wholesale electricity prices and emergency shutdowns of renewable generating capacity have been becoming more frequent on sunny or windy days with low load factors. Using excess renewable electricity to create renewable methane would allow the storage of energy for later use.

Contact:

Dr. Frank J. Matzen
Tel: + 49-6196-996-25259
Email: frank.matzen@de.ey.com

Dr. Florian Ropohl
Tel: + 49-40-36132-16554
Email: florian.ropohl@de.ey.com

Country focus – UK

EMR White Paper confirms CfD FIT

Ranking	Issue 30	Issue 29
All renewables index	5[1]	6
Wind index	4	2[1]
Solar index	20	20

[1] *Joint* Source: Ernst & Young analysis

Policy

Electricity Market Reform (EMR) White Paper

Subsequent to the release of the EMR consultation document, as reported in Issue 28, in July the Government released the long-awaited EMR White Paper providing more clarification on the future of the UK's electricity industry.

The Government aims to finalize the policy by the end of this year and intends to reach the statute book by early 2013, so the first projects can be supported as of 2014. The proposed timetable for implementation of the Carbon Price Floor is early 2013, followed by the Emissions Performance Standard system in late 2013, the Contracts for Difference (CfD) FIT in 2014 and the Capacity Mechanism by 2015.

Also addressed was the future of the Renewables Obligation (RO) program. Existing accreditations will be grandfathered and new accreditations accepted up to 2017, after which the FIT system will take over.

According to Ben Warren, Head of Environmental Finance at Ernst & Young LLP, "This comprehensive reform of the UK electricity market, while coming at a difficult time, is fundamentally designed to provide a robust regulatory framework to enable the UK market to compete for scarce capital required for new energy infrastructure."

Renewables Roadmap

Alongside the EMR, the Government released its Renewables Roadmap for the technologies it envisages as cost-effective in delivering the country's low-carbon energy mix in the future.

The eight technologies are onshore wind, offshore wind, marine energy, biomass electricity, biomass heat, ground source and air source heat pumps and renewable transport.

Visibly absent from this list is solar technology, although the Government recognizes that solar PV may play an important role in the future, as the cost of solar PV modules decreases over time.

Onshore wind

There is currently 4GW of onshore wind installed capacity in operation with another 11GW in the pipeline, of which 5GW is awaiting or under construction. The goal for 2020 is for onshore wind installed capacity to reach up to 13GW.

Freedom of Information data from July 2011 shows that nearly half of onshore wind farm applications in Wales and England are being rejected, creating a hurdle in meeting the 2020 target. Combined with fears in the industry that the RO banding review will provide less support to the onshore wind sector and the popularity of the offshore wind sector, industry stakeholders believe that the sector is facing a period of uncertainty.

Triodos Renewables is looking to raise up to £15m (€17m) to invest in new onshore wind projects. **Triodos** currently has 19.1MW in the pipeline, of which 2.4MW is under construction and 16.7MW is ready to be built.

Offshore wind

As per DECC's Renewables Roadmap, the UK has approximately 1.3GW of existing offshore wind capacity and 6GW in the pipeline, of which 4GW is awaiting approval or is under construction. The goal is for future installed capacity of 18GW.

The UK Government sees offshore wind as the largest contributor to the renewable energy mix in 2020 and has £30m (€33m) of direct support planned for R&D, in hopes to reduce technology costs to £100/MWh (€111/MWh).

In June, **DONG Energy** and **ScottishPower Renewables** – in a joint partnership - announced the construction of the West of Duddon Sands, a 389MW offshore wind farm in the Irish Sea. Total construction costs amount to £1.6b (€1.8b), which include the cost of offshore transmission infrastructure.

Upon construction completion, the assets will be sold to a transmission operator, as required under the 3rd EU Directive (which requires unbundling of transmission networks from electricity generation). Costs of the transmission infrastructure will be recovered by the joint partnership.

Solar

In early June, the Government confirmed the proposed new FIT levels for the solar sector for technologies of 50kW and above, which remain unchanged from the first announcements in March 2011. The new tariffs take effect in August 2011.

A group of solar companies originally requested a judicial review hearing, which was granted by a UK High Court. Although the group hoped for the hearing to occur prior to August 2011, the earliest available hearing date was in October 2011; therefore, the companies involved have decided not to proceed.

Conergy AG completed the UK's largest solar farm before the 71% FIT reduction took place on 1 August 2011. The 5MW solar farm, located in Nottinghamshire, was connected to the grid in July. Also connected to the grid in July 2011 was **Lightsource Renewable Energy**'s 1.4MW solar farm, located in Cornwall.

Contact:
Ben Warren
Tel: + 44 (0)20 7951 6024
Email: bwarren@uk.ey.com

Country focus – Italy

Italy abandons reintroduction of nuclear

Ranking	Issue 30	Issue 29
All renewables index	5[1]	5
Wind index	7[1]	6
Solar index	5	5

[1] *Joint* Source: Ernst & Young analysis

Policy

A referendum on 13 June rejected the reintroduction of nuclear power plants in Italy. The Prime Minister, Silvio Berlusconi, admitted that his Government would have to abandon its nuclear construction program, which would have seen a quarter of the nation's energy sourced from nuclear plants. Ninety-four percent of voters opposed plans to restart Italy's nuclear energy program, which was abandoned following a referendum in 1987. Many hope that this will result in a plan to encourage the production of renewable energy, although Berlusconi has stated that he does not intend to invest heavily in renewable energy production.

Access to finance

The **European Investment Bank** (EIB) announced in April that it has partnered with **Banca Monte dei Paschi di Siena** (BMPS) and will make available €200m to help finance various renewable energy and energy efficiency projects in Italy. The EIB will cover up to 50% of the cost of projects coursed through BMPS, which will be in charge of managing the funds.

Enel Green Power, a subsidiary of Italy's largest utility company, has announced an investment of €6.4b in the construction of power plants, led by hydro, geothermal and solar, due for completion by 2015.

Infrastructure

In June, national grid operator **Terna S.p.A.** announced the construction of the new power line Sorgente-Rizziconi between Sicily and Calabria in mainland Italy, which is scheduled to be completed by the end of 2013. The power line is due to connect Sicily's grid to a rapidly growing number of renewable power plants on the island. This offers the opportunity to export over 700MW of renewable power (mainly wind and solar PV power) from Sicily to mainland Italy and allows for greater efficiency in managing the electricity flows from the power plants located in southern Italy.

Terna also confirmed a €1.5b investment in future grid lines by 2015, of which €1.3b will be dedicated to southern Italy for connecting new renewable plants.

Onshore wind

At the end of 2010, Italy had 5.7GW of onshore wind installed capacity and, based on forecasts by the National Renewable Energy Action Plan (NREAP), the technology could reach up to 12GW of installed capacity by 2020.

Although **Enel Green Power** reported that approximately 44% of its energy generation in the first quarter came from wind energy, they ruled themselves out of bidding for wind farms and other assets constructed by the Spanish firm **Actividades de Construcción y Servicios. Enel Green Power** is expected to focus more on hydroelectric, geothermal and solar power in the coming years, which may cause the proportion of their energy sourced from wind power to diminish.

Solar

With 237,000 PV plants and nearly 7.8GW of capacity, Italy is now the world's second-largest solar energy market.

Enel Green Power has set out a strategy for making a significant investment in solar plants, as well as a panel factory. The company set aside €1b for an ambitious expansion of production in Italy, across Europe and as far as North Africa and the Middle East.

On 8 July, Italy's largest PV plant opened in Cantania, eastern Sicily. The €200m plant, a joint venture between **Enel Green Power, Sharp** and **STMicroelectronics**, began operations with a capacity of 160MW, although this output could rise sharply to 480MW in the next few years.

The fourth phase of Conto Energia, in force from June 2011, has set rules and subsidies for new PV plants until 2013. Preliminary analysis of the new market conditions show that investments in large PV plants are not as attractive as small to medium-scale plants, due to lower subsidies and the lack of security on incentives for multi-MW ground plants.

Various sources report that the price of PV solar components has dramatically decreased over the last months, primarily due to the low tariffs of the new incentive scheme and oversupply in the market. It is expected that new PV plants will have to decrease significantly their price to remain attractive in the next two to three years.

Biomass

Italy is considered to be one of the more promising markets for biomass production, which should reach 19% of all power produced in the country from renewable technologies in 2020.

Taking advantage of this opportunity, on 6 June, **Enel Green Power** announced that they had acquired 15% of **Terrae**, a beet and sugar processor. CEO Francesco Starace confirmed that he considers Italy's biomass sector to be potentially valuable and intends to develop locally sourced biomass in the future.

Contact:
Roberto Giacomelli
Tel: + 39 331 6744229
Email: roberto.giacomelli@it.ey.com

Country focus – France

New solar subsidies unlikely to stimulate demand

Ranking	Issue 30	Issue 29
All renewables index	7	7
Wind index	7[1]	7
Solar index	8[1]	9

[1] *Joint* Source: Ernst & Young analysis

Solar

In March, the French Government published an order setting out a new solar PV FIT scheme further to the suspension of the power purchase obligation and the consultation that took place in early 2011. The new scheme limits installed capacity to 500MW per annum.

Key features of the new scheme are:

1. **Solar PV FIT scheme limited to plants installed on buildings with capacity < 100kW**

The FIT scheme only applies if capacity is less than 100kW, while the annual installation capacity target has been set at 200MW.

The tariffs will be applicable to plants with grid connection applications filed between 1 July and 30 September 2011.

The FIT changes are:

- €0.4255/kWh to €0.3674/kWh for building integrated plants (BIP) used mainly for residential, health or education purposes
- €0.3185/kWh to €0.1168/kWh for BIP installed on other types of buildings (e.g., offices, industrial, commercial)
- €0.2746/kWh to €0.2609/kWh for "simplified" BIP
- €0.1168/kWh for ground plants

The tariffs are adjusted quarterly on the basis of grid application volume made during the previous quarter.

For plants with capacity over 100kW, two types of tender process apply depending on the capacity and type of the plants. The Government has circulated draft tender specifications, which note that bidders would have to work only with certified subcontractors and panel manufacturers, and would have to give warranties on the recycling and dismantling of the plants. The two tender processes consist of:

i. **Simplified tender process (for plants installed on buildings with capacity between 100kWc and 250kWc)** - bidders would only be selected based on a 100% weighting for the power purchase price (PPP) they offer.

The first invitation to tender is expected to be launched on 1 August 2011 for a total of 240MW to be installed until 2014.

According to industry participants, this tender will favor projects that use cheap components and are located in the South of France.

ii. **Full tender process (ground plants, regardless of capacity and plants installed on buildings with capacity > 250kW)** - the PPP offered by the bidders would account for a 40% weighting of their final tender score. The first invitation to tender will be accepted in September.

Industry participants consider that the new scheme does not compensate for the effects of the suspension, and that the limited volume of installed capacity expected will not enable the industry to develop sufficient economies of scale subsequent to the suspension.

Offshore wind

On 5 July, the French Government officially launched the long-awaited 3GW offshore wind tender and published the specifications on 11 July. Prior to the official launch, a number of partnerships had been announced in the sector.

In particular, **Areva Wind**, a wind turbine manufacturer, has partnered with **GDF Suez** and **Vinci SA**, to bid together for as much as 1.75GW of the offshore wind farms. **Areva** has also recently signed an agreement with **Iberdrola** to bid on two out of the five zones being offered in the tender.

EDF EN will lead a consortium with **Alstom**, **DONG Energy**, and developers **wpd offshore**, **Poweo ENR** and **Nass&Wind Offshore** to respond to the offshore tenders. **Alstom** will supply the turbines and plans to build an industrial and technological hub in France if the consortium wins sufficient volumes.

Biogas

In May, France boosted its biogas policy with the adoption of a new tariff for electricity production. In methanation facilities, the basic tariff was raised by between 5% and 12% according to the generation capacity. The incentive for energy efficiency was maintained and an incentive for the treatment of agricultural effluents has been created. The tariff can reach almost €0.20/kWh in the best conditions. The existing support for landfill biogas has not been modified.

A new decree is expected this summer that would create a tariff and regulatory framework for network biogas injection installations. This would significantly improve biogas development.

Contact:

Jean-Christophe Sabourin
Tel: +33 1 55 61 18 55
Email: jean.christophe.sabourin@ey-avocats.com

Alexis Gazzo
Tel: +33 1 46 93 63 98
Email: Alexis.gazzo@fr.ey.com

Country focus – Canada

Industry calls for Federal energy strategy

Ranking	Issue 30	Issue 29
All renewables index	8	9
Wind index	6	8
Solar index	21	22

[1] *Joint* Source: Ernst & Young analysis

Policy

Calls for a national energy strategy have been increasing from political and industry parties following the recent federal election and the formation of a majority government. Such a strategy is seen by many as necessary for Canada to become an energy superpower in the 21st century.

Provincial policy developments saw Nova Scotia open a public consultation period on proposed amendments to the Renewable Electricity Regulations, which would require, among other things, 40% renewable electricity supply by 2020. Additionally, rates were announced for its community-focused FIT (ComFIT), providing:

- Onshore wind (0kW – 50kW): CA$452/MWh (€322/MWh)
- Onshore wind (50kW +): CA$139/MWh (€99/MWh)
- Biomass CHP: CA$156/MWh (€111/MWh)
- Tidal: CA$652/MWh (€464/MWh)
- Run of river hydro: CA$140/MWh (€100/MWh)

The ComFIT program will be reviewed within 18 months of implementation.

In Quebec, the long-awaited cap-and-trade system is expected to be passed into law later this year. Quebec's goal for 2020 is to reduce its emissions by 20% of 1990 levels by allocating emission limits for companies emitting at least 25,000 tonnes of carbon dioxide annually. Any emissions above this cap must be offset by credits issued by the Government.

In Ontario, the **Ontario Power Authority** began formal consultations to update the province's Integrated Power System Plan, which will provide long-term planning regarding load forecast, conservation, supply and transmission.

The Albertan Energy Minister decisively stated that the province would not be deploying a FIT mechanism to support renewable energy as he believes FITs are uneconomical and distort the market. Alberta, the only liberalized market in Canada, has seemingly come under pressure to deploy a FIT mechanism, following the examples of other provinces. It is questionable whether a green certificate mechanism would be more suitable in a liberalized market such as Alberta.

Infrastructure

The 180km Bruce to Milton 500kV transmission line project is scheduled for completion by the end of 2012. The line will open up capacity for 25 new renewable energy projects with over 1GW of total capacity.

Meanwhile, **Alberta Electric System Operator** has revised transmission budgets and reduced transmission expansion plans by CA$1b (€0.7b) when compared with its 2009 budget. Alberta is forecast to need an additional 13GW of new generation capacity within 20 years.

Wind

Acciona Energy's fourth wind farm in Canada was put into commercial service in May. The 45MW farm brings Acciona's wind energy installed capacity in Canada to 181MW. **NB Power** will purchase the power generated under a long-term purchasing contract.

Gaz Métro Inc. and power generator **Boralex Inc.** started construction of a 272MW wind power project near Quebec City. The first phase is expected to be completed in late 2013 and will cost more than CA$700m (€498m).

Solar

Political uncertainty in Ontario is reducing investor confidence, a reality being felt most keenly by the solar supply chain. During the last quarter, solar manufacturer **Siliken** reported that uncertainty reduced orders at its new Windsor plant and drove the plant to lay off two shifts.

Biomass

Private equity investor **ONCAP**, in partnership with senior management and founders, acquired **Pinnacle Renewable Energy Group**. The Group manufactures and distributes biomass wood pellets to the global energy market, including utility customers in Europe and Asia.

Geothermal

A new study from **National Resources Canada** indicates that Canada has significant geothermal resources and potential for baseload power. The report highlighted the role this could play for northern communities striving to reach energy independence.

Contact:
Mark Porter
Tel: + 1 416 943 2108
Email: mark.porter@ca.ey.com

Country focus – Australia

Carbon Pricing Plan unveiled

Ranking	Issue 30	Issue 29
All renewables index	12[1]	16
Wind index	20[1]	23
Solar index	6	8

[1] *Joint* Source: Ernst & Young analysis

Policy

The Carbon Pricing Plan, unveiled by Australian Prime Minister Julia Gillard, is currently at the heart of Australian energy policy. On 10 July, the Labor leader reversed her previous position, made during last year's election campaign, by announcing an emissions tax on around 500 businesses from July 2012. There will be a fixed carbon price until July 2015 when the Government will introduce an emissions trading program. The price is set to start at AU$23 (€17) per tonne of carbon dioxide equivalent (CO2-e) in the first year, and will increase by 2.5% per year during the fixed price period. In order to offset increased household utility prices that will result from the carbon tax, the Government plans to provide individuals with new tax cuts.

Australia has set a target of generating 20% of its electricity from renewable energy by 2020. Seb Henbest, the leader of **Bloomberg New Energy Finance**'s Sydney-based research team, believes that these targets, together with plummeting costs of clean energy, will encourage strong levels of investment. He doesn't expect annual renewable energy investment in Australia to fall below AU$4b (€3b) from 2012 until the end of the decade, with the country's new policies attracting a total of at least AU$36b (€27b) investment in the development of renewable energy projects by 2020.

Wind

Of this anticipated AU$36b (€27b) of investment, close to AU$28b (€21b) is expected to be spent on large-scale utility power projects such as wind farms, which have experienced renewed development and financing activity over the past quarter. One such project, Australia's largest single stage wind farm, has begun producing electricity for household use. The 206MW Collgar wind project, developed by **UBS** and the **Retail Employees Superannuation Trust,** will almost double the level of renewables grid capacity in the South West Interconnected System to 9%.

In June, **Leighton Holdings Ltd.**, Australia's largest project development group, and **General Electric Co.**, won a AU$138m (€102m) contract to construct a 55MW wind farm in Western Australia. The project, which is expected to be completed in November 2012, is expected to power about 35,000 homes.

Australia's largest gas infrastructure business, **APA Group**, announced in late June that it will acquire an 80MW wind farm in Western Australia. **APA Group** also acquired an adjacent 130MW development site. The company plans to finance the AU$171m (€126m) investment through a combination of an institutional placement and organic growth of its energy infrastructure portfolio.

Solar

Despite ambitious targets of 1GW of solar power by 2020, following the flooding in Queensland, many of the Government incentives and subsidies for solar energy development have come under review. In May, the Australian Government announced that funding for the Solar Flagships Program will be cut by AU$239m (€176m) over the next two years. Introduced in 2009, the Program is a AU$1.5b (€1.1b) project that supports the development of four large grid-connected solar power stations.

Despite policy pressures, the Australian Government did award a total of AU$788m (€580m) from the Solar Flagships Program to two solar projects during the second quarter.

BP Plc's partner, **Fotowatio Renewable Ventures** won a AU$324m (€239m) Flagships grant to construct the 150MW Moree Solar project in the state of New South Wales. The plant, which will commence construction in early 2012, will be one of the biggest in the world and cost an estimated AU$923m (€680m). **Fotowatio** has publicly stated that the Australian market is an attractive area to invest in and will continue to pursue projects there in the near future.

A consortium consisting of the French energy company, **Areva SA**, UK firm **Wind Prospect Group Ltd** and Queensland firm **CS Energy**, won a grant for AU$464m (€342m) from the Federal Government under the Solar Flagships Program, while the Queensland State Government contributed a further AU$75m (€55m). The consortium plans to build a power plant that can use either solar thermal or natural gas. The AU$1.2b (€0.9b) plant is expected to generate close to 250MW of power and may be the largest facility in the world to use both technologies together. **Areva** plans to couple the grant with debt and additional equity financing.

Silex Systems, Australia's only solar-panel manufacturer, has welcomed the forthcoming carbon tax and renewable subsidy programs, but fears that frequent government changes to solar subsidies, and attempts to reduce or cap FITs, has introduced volatility in the solar industry.

Contact:

Geoffrey Rumble
Tel: + 61 29248 5496
Email: Geoff.Rumble@au.ey.com

Jomo Owusu
Tel: +61 2 9248 5555
Email: jomo.owusu@au.ey.com

Country focus – Japan

Japan revises the future of energy policy

Ranking	Issue 30	Issue 29
All renewables index	19[1]	18
Wind index	24[1]	23
Solar index	7	7

[1] *Joint* Source: Ernst & Young analysis

The 2011 Tōhoku earthquake, also known as the Great East Japan Earthquake, was a magnitude 9.0 undersea megathrust earthquake off the coast of Japan. The earthquake triggered extremely destructive tsunami waves of up to 38.9 meters (128ft) that struck Japan, crippling its infrastructure. In addition to loss of life, the tsunami caused a number of nuclear accidents, primarily the ongoing level 7 meltdown at the reactors at the Fukushima I Nuclear Power Plant complex. This has led the Government to rethink its energy strategy.

As the Government examines the aftermath, it has revised real GDP growth for 2011 down to 0.2% from 1.5%, given the anticipated shrinkage of consumer spending and corporate production and the predicted overall damage cost of US$300b (€208b).

Impact on electricity supply

Several nuclear and conventional power plants went offline after the earthquake. **Tokyo Electric Power Company (TEPCO),** which normally provides approximately 40GW of electricity, announced capacity constrained to roughly 30GW, as 40% of the electricity used in the greater Tokyo area had been generated by reactors in the Niigata and Fukushima prefectures. The reactors at the Fukushima I and Fukushima II plants were automatically taken offline when the first earthquake occurred and have sustained major damage due to the earthquake and subsequent tsunami. As a result, rolling blackouts began on 14 March due to power shortages, affecting the greater Tokyo area.

Tōhoku Electric Power (TEP), whose power plants were also damaged, cannot provide the Kanto region with additional power. **Kansai Electric Power Company (KEPCO)** and other central and western Japanese utilities cannot share electricity, due to a transmission frequency imbalance (KEPCO operates at 60hz, while **TEPCO** and **TEP** operate at 50hz), while there is a limited interconnect capacity of only 1GW. With damage to so many power plants, it may be years before generation capacity in eastern Japan returns to pre-quake levels.

Prime Minister Naoto Kan's announcement to scrap plans for new nuclear development will make it a challenge to continue on a trajectory of low carbon development. Some industry commentators have called for Japan to focus efforts on energy efficiency to stem the demand for electricity and invest in natural gas to meet short-term needs. Without it, Japan may potentially fall short of meeting greenhouse gas emission targets under the Kyoto Protocol.

Impact on Japan's energy mix

Prior to the earthquake, in June 2010, the Japanese Government established the latest Basic Energy Plan, which set an ambitious target of increasing power generation from renewables to over 20% by 2030, and from nuclear to 50% by 2030. However, following the Tohoku earthquake and Fukushima nuclear accidents, Prime Minister Kan announced on 10 May 2011 that the 2010 Basic Energy Plan will be superseded by a new plan to reduce the reliance on nuclear power. It is thought that a draft of the new Plan will be prepared by the end of 2011 or the beginning of 2012.

Revised FIT legislation

Under current legislation, there is a Renewable Portfolio Standard (RPS) and FIT off-take is only available for solar power. Following the earthquake, and in order to meet the ambitious renewable energy targets, new legislation is proposing FITs for electricity generated from all renewables (including solar thermal, wind, mini-hydro, geothermal and biomass).

The legislation consists of the following two Bills:

- The Bill on Special Measures Concerning Procurement of Renewable Energy Sourced Electricity by Electric Utilities aims to introduce a broader FIT scheme for renewable energy in order to increase the use of renewable energy.
- The Bill to Partially Amend the Electricity Business Act and the Gas Business Act aims to rationalize utility regulations in a manner that helps spread and increase the use of renewable energy. It provides for the establishment of procedures for rate revision, such as the imposition of a surcharge under the FIT scheme for renewable energy, due to external factors or cost changes.

Accompanying documentation disclosed by the Ministry of Economy, Trade and Industry (METI) indicated that technologies, excluding solar, would receive JPY15 to JPY20/kWh (€0.1 to €0.2/kWh), for 15 to 20 years. There is no clear mention of FIT levels for solar power in the accompanying documentation, but the METI Committee Report indicated that "it would be appropriate that FITs in the new regulation would be in line with current fixed tariff regulation."

It is expected that the current RPS law will be replaced by the new regulations.

Contact:
Takashige Saito
Tel: +81 3 4582 6701
Email: takashige.saito@jp.ey.com

Country focus – South Africa

Government issues Request for Proposals

Ranking	Issue 30	Issue 29
All renewables index	26[1]	27
Wind index	24[1]	25
Solar index	17[1]	19

[1] *Joint* Source: Ernst & Young analysis

Policy

As the global renewable energy industry focuses on the next round of climate talks in Durban in December, the South African Government has ended months of waiting by issuing a Request for Proposals (RFP) under the REFIT program, inviting developers to bid for renewables projects. Developers will sell the power in an off-take agreement to an agreed counterparty, which, at the time of publication, had yet to be confirmed.

According to the energy regulator, **NERSA**, bids are likely to be based on initial non-price criteria such as the location of the project and the Black Economic Empowerment Act. If developers meet these requirements, the projects will be selected on the lowest price. The initial procurement, consisting of five bidding windows, is likely to be for 3.5GW of projects, expected to be operational before 2016.

However, after cuts to the original published FIT rates for renewables in 2009, there is still uncertainty over the final tariff levels of the REFIT.

The source of South Africa's energy is particularly prominent at present as total demand has already returned to pre-recession levels and the need for a reliable supply of energy has never been more acute.

According to the Integrated Resource Plan, South Africa expects the country's energy mix to be composed of 16% wind energy (9.2GW) and 9.4% solar PV in 2030, with CSP and hydropower also playing a vital role in renewable energy provision.

The Solar Energy Africa Conference in September will assemble industry experts, together with private investors, to consider investment opportunities in African renewables to help meet these targets, and to mitigate against the power cuts of recent years.

Eskom

As Africa's leading electricity producer with 40GW of generation capacity and provider of around 95% of the electricity used in South Africa, state-owned **Eskom** has been a focal point of the country's renewable energy debate.

On 1 April, **Eskom** established a new renewable energy division, called **Eskom Renewables Business.** The **African Development Bank** has loaned US$365m (€254m) to Eskom to finance their wind and solar projects, which will each produce 100MW. Although the company has expressed an interest in developing further solar projects, many believe that they are not doing enough as more than 80% of their current production still comes from coal-fired plants.

A mere 1% of South Africa's energy mix currently comes from renewable sources at a time when **Eskom** is in the process of constructing two further coal-fired power stations in Kusil and Medupi. **Greenpeace** feel that the Government target of 23% of electricity from renewable sources by 2030 (as set out in the Integrated Resource Plan 2010) is not ambitious enough. **Eskom**, however, anticipates that over 42% (17GW) of new power will come from renewable energy over the next 20 years, in line with the Integrated Resource Plan.

Solar

The potential of solar energy in the Northern Cape is huge according to a study published in June by **Stellenbosch University**. The Government is planning a 5GW solar park near Upington in the Northern Cape and the study reveals that long-term average direct normal irradiation (DNI) of 2816kWh/m^2 is greater than typical DNI values in Spain and the US.

The Government has set aside ZAR18m (€2m) for the solar park, and the Central Energy Fund conducted a feasibility study along with **Fluor** (completed at the end of July).

Hydro

The US Department of Energy (DoE) believes that South Africa has the potential for greater hydroelectric development. The DoE estimates that there are 6,000 to 8,000 sites that could be used for smaller scale hydroelectric projects. The most attractive are in the provinces of KwaZulu-Natal and Eastern Cape.

Biomass

British-based energy company, **ENER-G Plc**, constructed the first of five waste-to-energy plants in Johannesburg. The site is expected to start generating energy as early as October 2011 and **ENER-G** hopes to sell the power to **Eskom Holdings Ltd**. through power purchase agreements.

Contact:
Norman Ndaba
Tel: +27 11 772 3294
Email: norman.ndaba@za.ey.com

Commentary – guidance notes

Long-term index

As stated on page 1, the individual technology indices, which combine to generate the All renewables index, are made up as follows:

- Renewables infrastructure index – 35%
- Technology factors – 65%

These guidance notes provide further details on the renewables infrastructure index and the technology factors.

Renewables infrastructure index

The renewables infrastructure index is an assessment by country of the general regulatory infrastructure for renewable energy. On a weighted basis, the index considers:

- Electricity market regulatory risk (29%) – markets that are fully deregulated score higher, as they have experienced the "market shock" on underlying wholesale prices that this transition may exert. While this may not affect current projects, these effects are particularly important when considering long-term investment prospects.
- Planning and grid connection issues (42%) – favorable planning environments (low failure rates and strong adherence to national targets) score highly. Grid connection scoring is based on the ease of obtaining a grid connection in a cost-effective manner. The score also takes account of the degree of grid saturation for intermittent technologies.
- Access to finance (29%) – a market with a mature renewable energy financing environment, characterized by cheap access to equity and good lending terms, will score higher. The access to finance parameter incorporates sovereign credit ratings and sovereign credit default swaps in conjunction with qualitative analysis.

This generic renewables infrastructure index is combined with each set of technology factors to provide the individual technology indices.

Technology factors

These comprise six indices providing resource-specific assessments for each country, namely:

1. Onshore wind index
2. Offshore wind index
3. Solar PV index
4. Solar CSP index
5. Geothermal index
6. Biomass and other resources index

Other renewable energy resources include small hydro, landfill gas, and wave and tidal technologies. Energy from waste is not considered. Each of the indices consider, on a weighted basis, the following:

1. Power offtake attractiveness (19%) – this includes the price received, the potential price variation and length of PPAs granted. Higher scores are also achievable if a government guarantees the power offtake rather than merchant offtakers.
2. Tax climate (11%) – favorable, high-scoring tax climates that stimulate renewable energy generation can exist in a variety of forms and structures. The most successful incentives and structures have been direct renewable energy tax breaks or brown energy penalties, accelerated tax depreciation on renewable energy assets and tax-efficient equity investment vehicles for individuals.
3. Grant or soft loan availability (9%) – grants can be available at local, regional, national and international levels, and may depend on the maturity of a technology as well as the geographical location of the generating capacity. Soft loans have historically been used in pioneering countries of renewable energy technologies to kick-start the industry. High scores are achieved through an array of grants and soft loans.
4. Market growth potential (18.5%) – this considers current capacity compared with published targets. Higher scores are given if ambitious targets have been set and policy framework is in place to accelerate development. The realism of targets is taken into account as well as the seriousness with which they are being pursued (e.g., penalties in place for non-compliance).

   It should be noted that the market growth potential score is based on a view taken of a range of business analysts' forecasts and Ernst & Young's own market knowledge. There is significant variation between analysts' views on each market and the forecasts used are a market view only – the scores in no way guarantee that the forecast capacity will be built.
5. Current installed base (8%) – high installed bases demonstrate that the country has an established infrastructure and supply chain in place, which will facilitate continued growth and, in particular, encourage the repowering of older projects.
6. Resource quality (19%) – for example, wind speeds and solar intensity.
7. Project size (15.5%) – large projects provide economies of scale and a generally favorable planning environment, which facilitates project development financing.

For more details on the CAI and previous issues, please visit www.ey.com/CAI

Company index

Company index (cont'd)

Glossary

Abbreviation	Definition
BMPS	Banca Monte dei Paschi di Siena
b	Billion
BPA	Bonneville Power Administration
CO2-e	Carbon dioxide equivalent
CCO	Chief Capital Officer
CEO	Chief Executive Officer
CFO	Chief Financial Officer
CES	Clean Energy Standard
CHP	Combined heat and power
CSP	Concentrated Solar Power
CfD	Contracts for Difference
CAI	Country Attractiveness Indices
DOE	Department of Energy
DECC	Department of Energy and Climate Change's
DNI	Direct normal irradiation
EMR	Electricity Market Reform
EEG	Erneuerbare Energien Gesetz
EIB	European Investment Bank
EU	European Union
FERC	Federal Energy Regulatory Commission
FIT	Feed-in tariff
GW	Gigawatt
GIB	Green Investment Bank
IPO	Initial Public Offering
JV	Joint Venture
KEPCO	Kansai Electric Power Company
kW/kWh	Kilowatt/Kilowatt hour
MW/MWh	Megawatt/Megawatt hour
m	Million
METI	Ministry of Economy, Trade and Industry
NERSA	National Energy Regulator of South Africa
NREAP	National Renewable Energy Action Plan
PV	Photovoltaic
PPA	Power Purchase Agreement
PPP	Power Purchase Price
PURPA	Public Utility Regulatory Policies Act
REFIT	Renewable energy feed-in tariff
RPS	Renewable Portfolio Standards
RO	Renewables Obligation
RBS	Royal Bank of Scotland
TWh	Terrawatt hour
TEP	Tōhoku Electric Power
TEPCO	Tokyo Electric Power Company
t	Trillion
WTO	World Trade Organization

Ernst & Young services for renewable energy projects

Ernst & Young Renewable Energy Group

With a dedicated team of over 100 international advisors operating from our globally integrated team, Ernst & Young's Renewable Energy Group helps clients to increase value from renewable energy activity.

Technologies we cover

Established

- Onshore and offshore wind
- Solar PV and CSP
- Biomass and CHP
- Hydro and geothermal
- Biofuels
- Landfill gas

Emerging

- Wave
- Tidal
- Small hydro
- Carbon capture and storage

Transaction Advisory services offering

Commercial and financial analysis

- Strategic entry and business strategy
- Financing strategy
- Valuation modeling
- Commercial contract review
- Benchmarking analysis
- Scenario analysis

Feasibility and improved efficiency

- Financial structuring
- Taxation structuring – cross-border professionals
- JV advice
- Asset-backed finance solutions
- Capital allowances
- Structured leasing

- End-to-end project finance solutions – debt and equity
- Assist competitive tender process
- Due diligence
- Data room preparation
- JV negotiations
- Public offerings
- Commercial modeling support

- Market analysis
- Competitive sales processes
- Bid review and negotiations
- Commercial modeling support
- Valuation and deal structuring
- Targeted pool of potential investors and acquisition targets
- Preparation for IPO

Contacts

For further information on our services and points of view, please visit our websites www.ey.com/renewables or www.ey.com/CAI or contact:

Ben Warren
Partner, Head of Environmental Finance, Ernst & Young LLP
bwarren@uk.ey.com

Andrew Perkins
Partner, Ernst & Young LLP
aperkins@uk.ey.com

CAI production supported by:

Phil Dominy
Senior Executive
pdominy@uk.ey.com

Rob Hayward
Assistant Executive
rhayward@uk.ey.com

Ana Gilmour
Assistant Executive
agilmour@uk.ey.com

Also assisted by **Mohit Jain** (Analyst) and **Divya Jaitly** (Senior Analyst)

To be added to the soft copy distribution list of the CAI, please contact:

Olivia Russell
Marketing
orussell@uk.ey.com
+44 (0) 20 7951 5559

Cleantech Team contacts

Gil Forer
Global Cleantech Center Leader
New York, NY, USA
gil.forer@ey.com

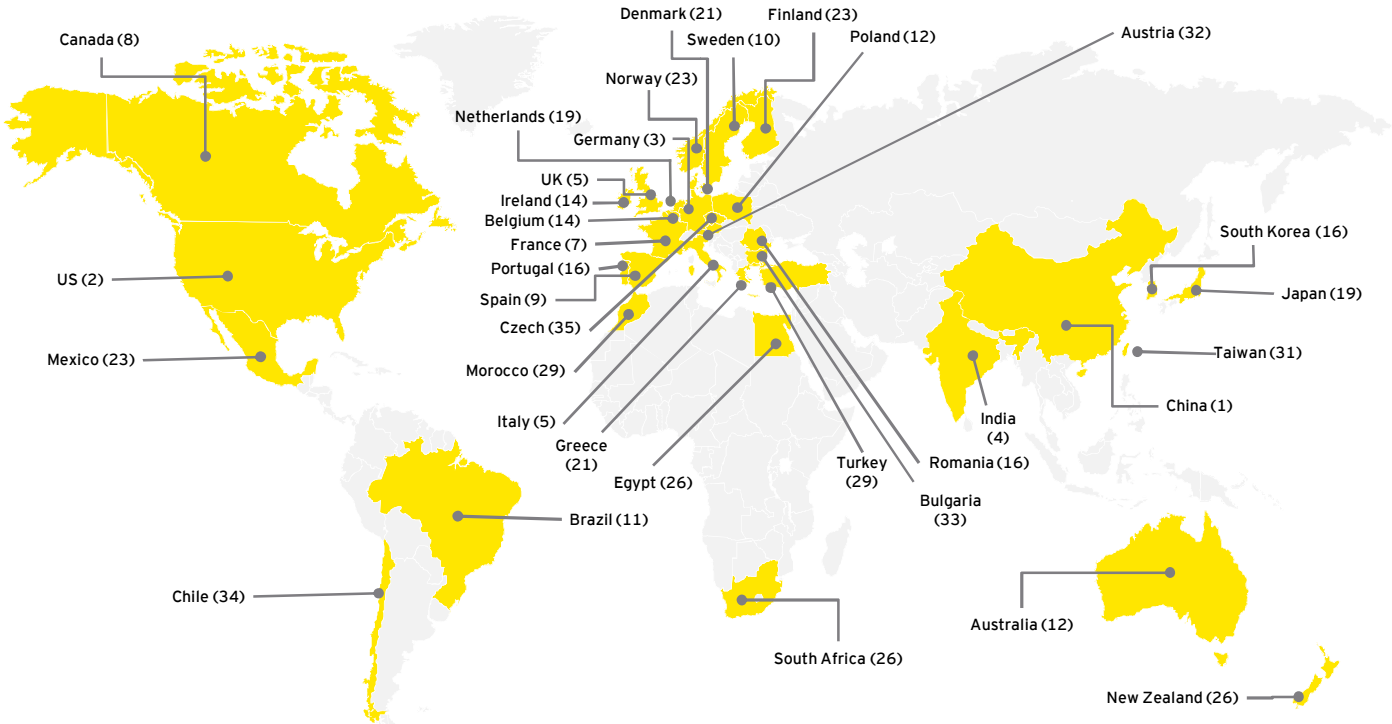
Scott Sarazen
Global Markets Leader
Boston, MA, USA
scott.sarazen@ey.com

John de Yonge
Director of Account Enablement
New Jersey, USA
john.de_yonge@ey.com

Jay Spencer
Americas Cleantech Leader
USA
jay.spencer@ey.com

Robert Seiter
Europe/Middle East/Ireland/Africa Cleantech Leader
Germany
robert.seiter@de.ey.com

Map highlighting CAI countries and their respective Issue 30 rankings



Global contacts

EMEIA		
Austria		
Elfriede Baumann	+ 43 121170 1141	elfriede.baumann@at.ey.com
Belgium		
Marc Guns	+ 32 2774 9419	marc.guns@be.ey.com
Matthias Page	+ 32 2774 6146	matthias.page@be.ey.com
Bulgaria		
Diana Nikolaeva	+ 359 2817 7161	diana.nikolaeva@bg.ey.com
Sonya Vanguelova	+ 359 2817 7100	sonya.vanguelova@bg.ey.com
Czech Republic		
Stepan Flieger	+ 420 22533 5863	stepan.flieger@cz.ey.com
Lubos Kratochvil	+ 420 22533 5557	lubos.kratochvil@cz.ey.com
Denmark		
Kasper Trebbien	+ 45 5158 2645	kasper.trebbien@dk.ey.com
Kasper Vejgaard Christensen	+ 45 3078 2092	kasper.v.christensen@dk.ey.com
Egypt		
Shady Tarfa	+ 20 22726 0260	shady.tarfa@eg.ey.com
Rostom Tajdeen	+ 20 22726 0104	rostom.tajdeen@eg.ey.com
Finland		
Kari Pesonen	+ 35 840061 6202	kari.pesonen@fi.ey.com
Timo Uronen	+ 35 850436 2477	timo.uronen@fi.ey.com
France		
Jean-Christophe Sabourin	+ 33 1 5561 1855	jean.christophe.sabourin@ey-avocats.com
Alexis Gazzo	+ 33 1 4693 6398	alexis.gazzo@fr.ey.com
Germany		
Frank Matzen	+ 49 61969962 5259	frank.matzen@de.ey.com
Florian Ropohl	+ 49 40361321 6554	florian.ropohl@de.ey.com
Greece		
Georgios Smyrnioudis	+ 30 210288 6461	georgios.p.smyrnioudis@gr.ey.com
George Momferratos	+ 30 210288 6424	george.momferratos@gr.ey.com
India		
Sudipta Das	+ 91 336615 3400	sudipta.das@in.ey.com
Sanjay Chakrabarti	+ 91 224035 6650	sanjay.chakrabarti@in.ey.com
Ireland		
Maurice Minogue	+ 353 21480 5700	maurice.minogue@ie.ey.com
Italy		
Roberto Giacomelli	+ 39 028066 9812	roberto.giacomelli@it.ey.com
Angelo Era	+ 39 066753 5769	angelo.era@it.ey.com
Morocco		
Khalil Benhssein	+ 212 2295 7900	khalil.benhssein@ma.ey.com
Ahlam Bennani	+ 212 2295 7922	ahlam.bennani@ma.ey.com
Netherlands		
Diederik van Rijn	+ 31 88407 1000	diederik.van.rijn@nl.ey.com
Norway		
Lars Ansteensen	+ 47 2400 2780	lars.ansteensen@no.ey.com
Poland		
Kamil Baj	+ 48 22557 8855	kamil.baj@pl.ey.com
Przemyslaw Krysicki	+ 48 22557 7750	przemyslaw.krysicki@pl.ey.com
Portugal		
Jose Gonzaga Rosa	+351 21 791 2232	jose.gonzaga-rosa@pt.ey.com
Diogo Lucas	+ 351 21 791 2000	diogo.lucas@pt.ey.com

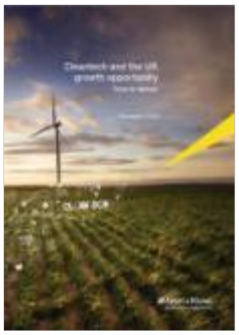
EMEIA		
Romania		
Cornelia Bumbacea	+ 40 21402 4034	cornelia.bumbacea@ro.ey.com
Andreea Stanciu	+ 40 21402 4120	andreea.stanciu@ro.ey.com
South Africa		
Norman Ndaba	+ 27 11772 3294	norman.ndaba@za.ey.com
Celeste Van Der Walt	+ 27 11772 3219	celeste.vanderwalt@za.ey.com
Spain		
Victor Manuel Duran	+ 34 91572 7690	victor.duranschulz@es.ey.com
Eva Maria Abans	+ 34 93366 3805	evamaria.abansiglesias@es.ey.com
Sweden		
Björn Gustafsson	+ 46 85205 9497	bjorn.gustafsson@se.ey.com
Niclas Boberg	+ 46 85205 9000	niclas.boberg@se.ey.com
Turkey		
Erkan Baykus	+ 90 312447 2111	erkan.baykus@tr.ey.com
Erdal Calikoglu	+ 90 212368 5375	erdal.calikoglu@tr.ey.com

Asia Pacific		
Australia		
Geoffrey Rumble	+ 61 2 9248 5496	geoff.rumble@au.ey.com
Jomo Owusu	+61 2 9248 5555	jomo.owusu@au.ey.com
China		
Ivan Tong	+ 86 105815 3373	ivan.tong@cn.ey.com
Paul Go	+ 86 105815 3688	paul.go@cn.ey.com
Japan		
Takashige Saito	+ 81 34582 6400	takashige.saito@jp.ey.com
Kentaro Nakamichi	+ 81 34582 6400	kentaro.nakamichi@jp.ey.com
New Zealand		
Simon Hunter	+ 64 9300 7082	simon.hunter@nz.ey.com
South Korea		
Young Il Choung	+ 82 23787 4221	young-il.choung@kr.ey.com
Won Ah Tak	+ 82 23787 6399	won-ah.tak@kr.ey.com
Taiwan		
Austen Tsao	+ 886 22720 4000	austen.tsao@tw.ey.com
James Wang	+ 886 22720 4000	james.wang@tw.ey.com

Americas		
Brazil		
Luiz Carlos Passetti	+ 55 112573 3434	luiz.c.passetti@br.ey.com
Luiz Campos	+ 55 212109 1710	luiz-claudio.campos@br.ey.com
Canada		
Mark Porter	+ 14 16943 2108	mark.porter@ca.ey.com
Chile		
Javier Vergara	+ 56 2676 1388	javier.vergara.M@cl.ey.com
Rafael Le Saux	+ 56 2676 1000	rafael.lesaux@cl.ey.com
Mexico		
Roberto Cuaron	+ 52 555283 8698	roberto.cuaron@mx.ey.com
Rodolfo Lopez	+ 52 551101 6419	rodolfo.lopez@mx.ey.com
US		
Michael Bernier	+ 617 585 0322	michael.bernier@ey.com
Dorian Hunt	+ 617 585 2448	dorian.hunt@ey.com

Recent Ernst & Young publications

Available at www.ey.com



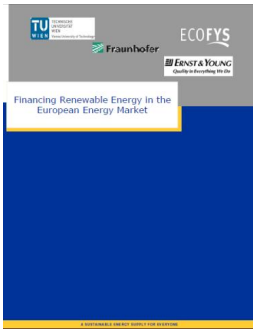
Cleantech and the UK growth opportunity

Ernst & Young interviewed over 300 key British cleantech stakeholders in government, growth companies, funds, large corporates and research institutes to understand first-hand their opinions of the market currently, how it will change in the future and what is needed now to establish the conditions for success.

MENA Assessment of the Local Manufacturing Potential For Concentrated Solar Power Projects

This study proposes roadmaps and an action plan to help develop the potential of locally manufactured CSP components in the existing industry and for new market entrants in MENA. Ernst & Young contributed to the findings of this report.

Published on the World Bank website.



Financing Renewable Energy in the European Energy Market

Joint report to the European Commission DG Energy on the status and outlook for financing renewable energy in Europe.

Utilities Unbundled – December edition

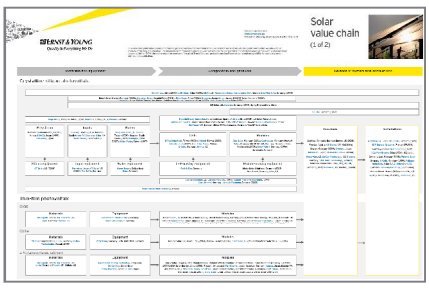
This issue of *Utilities Unbundled* explores the challenges of taking on 'first-of-a-kind.' Our main feature examines how some of our leading US and European utilities are balancing the risks and demands of major new investments to deliver capital-efficient results. We also look in depth at another 'great unknown' for the utility industry – the impact of electrified transport.

Technology minerals, The rare earth race is on!

The paper highlights the investment frameworks in development, the fundamentals driving the case for investment in rare earths exploration and production, and the financing and the available exit options to rare earths developers and investors.

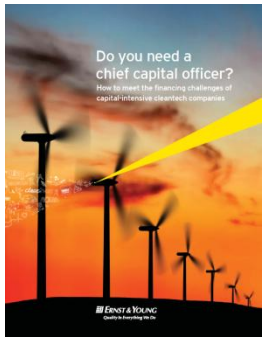
Global cleantech insights and trends report 2011

Annual publication providing insights into transformational growth strategies, incentives for clean technologies, financial benchmarks, key trend in cleantech value chains, electric vehicle adoption, solar energy and innovation, among others.



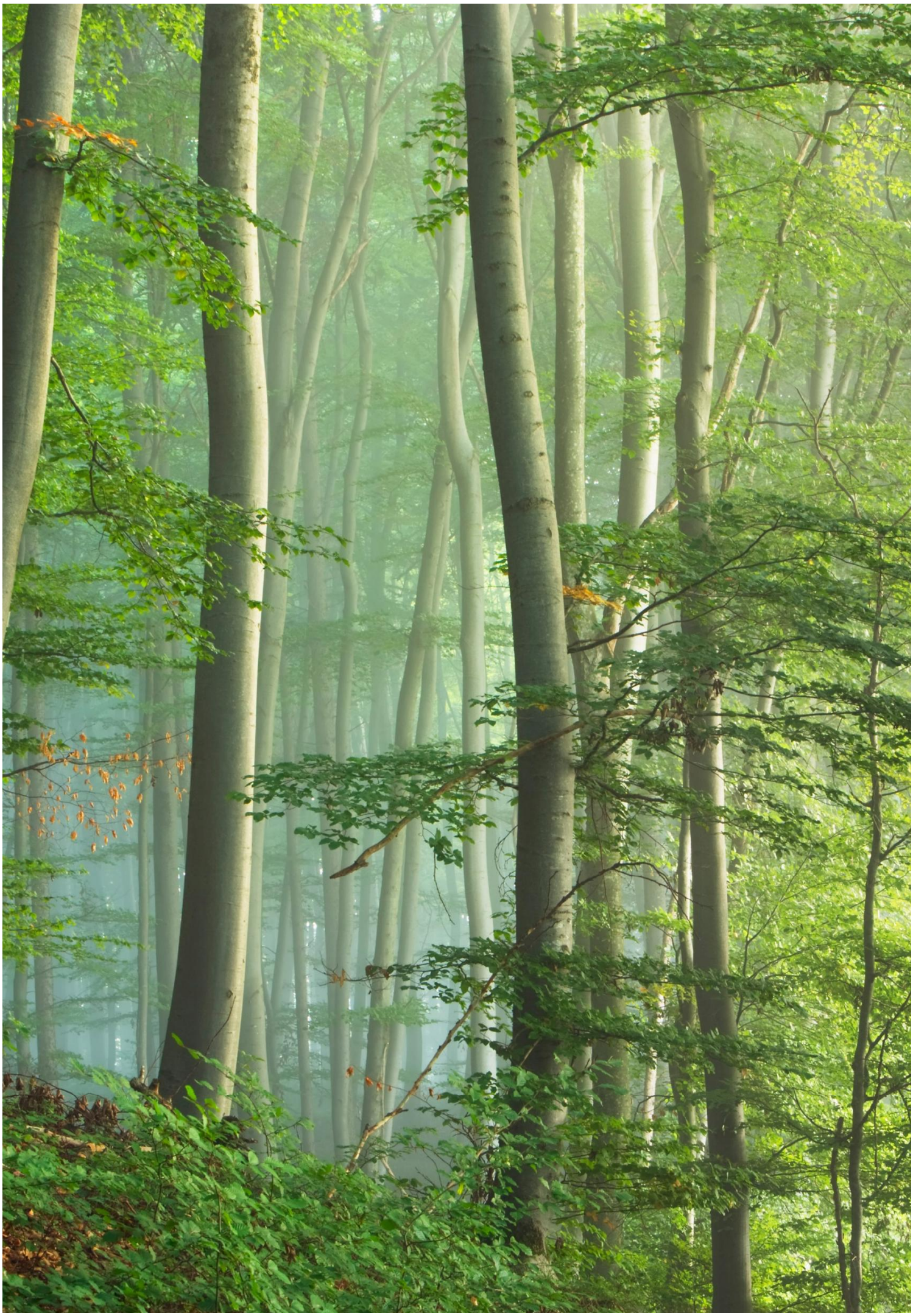
Solar value chain

Ernst & Young's newest value chain map, detailing various solar technologies and the respective players



Do you need a chief capital officer?

This publication examines the concept of creating a chief capital officer position to address the large financing needs of cleantech companies.



Ernst & Young

Assurance | Tax | Transactions | Advisory

About Ernst & Young
Ernst & Young is a global leader in assurance, tax, transaction and advisory services. Worldwide, our 141,000 people are united by our shared values and an unwavering commitment to quality. We make a difference by helping our people, our clients and our wider communities achieve their potential.

Ernst & Young refers to the global organization of member firms of Ernst & Young Global Limited, each of which is a separate legal entity. Ernst & Young Global Limited, a UK company limited by guarantee, does not provide services to clients. For more information about our organization, please visit www.ey.com

EYG No. DE0262

www.ey.com