

Renewable energy country attractiveness indices



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Global highlights

A two-point rise for China in this issue, together with a single-point fall for the US, brings the Asian giant into joint first position with the US. China invested almost twice as much in clean energy projects last year compared with the US, and has emerged as the world's market leader in installed wind power capacity in 2009. Meanwhile, the US has dropped a point due to the increasing likelihood that the much awaited climate and clean energy bill will not be passed before the November mid-term elections. The US near-term wind index also fell after the lowest installed capacity last quarter since 2007.

India has increased two points following the Government's injection of over US\$1b (€0.76b) into the green economy and the unveiling of plans for up to 4GW of wind capacity and 1GW of solar power to be installed in the short to medium term.

The UK has seen a two point increase following government plans to launch a £2b (€2.3b) “green investment bank” fund, and approval for a £1b upgrade to the UK's electricity network to boost renewable energy integration. A new planning regime has also been launched in a bid to speed up project approvals.

Greece, Spain and Portugal have all suffered negative score changes due to worsening capital markets and a downward revision of sovereign credit ratings by Standard and Poor (S&P). Q1 was also a difficult period for Australia, dropping two points following the delay in the planned emission trading scheme until after 2012.

The lead article in this issue discusses the fact that as economies “shift to green”, with renewables commanding a high share of the future energy mix, there is a responsibility to ensure that value for money is achieved on behalf of the consumer and taxpayer.

As the IPO and M&A markets recover, robust valuation of renewable assets and companies will be increasingly in demand. There is a special feature article describing different valuation approaches and methodologies.

Ernst & Young was ranked the leading project finance advisor in the Americas, Europe, Middle East and Africa between 2001 and 2009 by Project Finance International



Overview of indices: issue 25

The Ernst & Young country attractiveness indices 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 regular basis.

The main indices (all renewables and long-term wind) are referred to as the "long-term indices." The near-term wind index takes a two-year view with slightly different parameters and weightings (see right).

The country attractiveness indices take a generic view, and different sponsor/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 pages 25-26 when referring to the indices.

Long-term indices

The long-term indices are forward looking and take a long-term view, 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, it scores 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 – 68%
(comprising onshore wind index and offshore wind index)
2. Solar index – 15%
(comprising solar PV index and solar CSP index)
3. Biomass and other resource 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 10).

Technology factors

These provide resource-specific assessments for each country (see page 10).

Long-term solar index

This index is derived from scoring:

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

Long-term wind index

This index is derived from scoring:

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

Near-term wind index

The near-term wind index takes a forward-looking two-year view based on the parameters of most concern to a typical investor looking to make an investment in the near term. The index is based on separate scores for onshore and offshore wind. For parameters and weightings see pages 25-26.

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.

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“Shift to green” – Challenges for renewable support mechanisms

Jonathan Johns, Guest columnist

For the renewables industry, the recession has had the side effect of focusing attention on green jobs as a means of stimulating growth and ensuring that economies become low carbon orientated. Measures introduced to date have had mixed impacts but the desire for many economies to “shift to green” remains strong: with countries openly competing with each other for green jobs through stimulus measures and other support mechanisms.

In Europe, there has been competition for new investment in offshore wind, with the UK being particularly successful in attracting new investment – due to its relatively strong measures to create the market through the award of multi-GW Crown Estate leases, adjustments to the RO and direct support for new investment in manufacturing facilities. In Canada, relatively high feed-in tariffs (FiT) in Ontario, combined with strong local content rules, have been used to entice investment by Korean wind turbine manufacturers, with British Columbia set to follow. In Japan, the resumption of solar tariffs has provided stimulus for their strong local industry, contributing to the re-emergence of Sharp as the leading global manufacturer of PV panels by sales last year.

In the US, the stimulus package measures allowing operators to convert the Production Tax Credit (PTC) or Investment Tax Credit (ITC) into Treasury grants was vital in allowing pipeline projects to be completed in 2009 – especially those sponsored by majors. However it has been less effective in maintaining momentum into 2010 – with wind capacity installed falling in the first quarter, and at their lowest since 2007. This begs the question whether the ad hoc combination of individual state Renewable Portfolio Standards (RPS) and a still wounded PTC/ITC market (should Treasury grants not be maintained on expiry) is the appropriate combination of measures to allow the US to punch to its natural weight.

The economic impact of rising commodity prices, in particular oil and gas, in the preceding boom has been fresh in the minds of many, and when combined with perceived high levels of political risk in relying on imports, has led to the view that renewables are important not only as a tool of carbon reduction but also of energy security of supply – and as a hedge against future energy price rises. Difficulties in the US in the exploitation of deepwater oil have also brought up the prospect that replacement of fossil fuel reserves from this source may come later, with greater regulatory oversight and at higher cost than at first thought. This in part has stimulated the reintroduction of the Kerry-Lieberman bill which seeks to establish a federal cap and trade system for carbon and to radically decrease US carbon emissions in the longer term.

Indeed, there has been a broad acceptance that long-term carbon reduction targets need to remain a policy priority, with many jurisdictions increasing the contribution that renewables are expected to make. In Germany and Europe, papers have been tabled exploring the possibility of 100% renewable economies using international and indeed intercontinental interconnectors to manage demand, with 50% targets by 2050 becoming regarded more as a given than as a matter for debate. In the UK, the incoming Conservative/Liberal Democrat coalition has made it clear that they wish to increase the UK targets for renewables, and to make up for what they regard as ground lost by relatively poor exploitation to date of high levels of indigenous renewables resource.

However, the Greek credit crisis has brought home to all the fragility of the economic recovery. This has implications for renewables: concerns over sovereign debt could slow down the hesitant recovery in the availability of project finance, and the pressure for drastic public sector debt reductions in most western economies is likely to lead to an increased scrutiny of financial support for all sectors. In this regard it is interesting to note that, notwithstanding the fact that the EU Climate Change Commissioner raised recently the prospect of increasing cuts in carbon emissions by 2020 from 20 to 30%, it was felt by the Commissioner that the time was inappropriate to make such a change as dealing with the current financial crisis was the priority.

This does not only apply to countries where the cost is borne by the taxpayer direct. Even in jurisdictions where the cost of renewable support mechanisms is recovered from utility bills, increases in levies are often viewed by consumers with the same aversion as rising taxes. These costs are likely to be thrown into ever sharper relief as the share of renewables in the energy mix grows – and the impact on fuel poverty becomes greater.

Accordingly, as renewables are now expected to become a significant part of most developed countries' energy mix, there is likely to be an increasing focus on the cost-effectiveness of support mechanisms and continued pressure on technology manufacturers to reduce costs. In issue 21 (May 2009) of the CAI, the lead article discussed the likely shape of the recession, and this risk was pointed out – and if anything the impact is likely to be greater than anticipated at the time.

Countries with the greatest debt exposure in the eurozone – Italy, Spain, Portugal and Greece itself – could find their renewable programs more difficult to implement without further adjustments to current support mechanisms. Countries such as Germany have already concluded that solar tariffs in

particular should be reduced, to reflect the rapid reduction in costs that has occurred – causing a demand rush in the first half of this year as rooftops are colonized ahead of the reduction. Other countries have cut or are mooting cuts in tariffs, with even China reducing the prices awarded in its latest tenders for large-scale solar farms to roughly a quarter of the levels attained four years ago.

In Spain, strong debate is taking place over future tariffs, with the minister for energy indicating clearly that costs need to fall. In the UK, the introduction of large-scale FiTs are being mooted by the new administration, with the RO perhaps continuing for legacy projects.

Certainly, fixed FiTs have the advantage of providing a hedge for the consumer (or taxpayer funding renewables) against future rising energy prices, whether they are due to commodity prices or the indirect effect of rising carbon prices. They are also more easily fine-tuned than market-based mechanisms to deal with changes in the cost base, whilst providing automatic “grandfathering” to past projects.

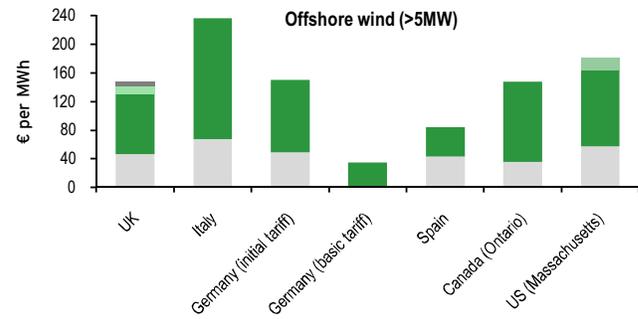
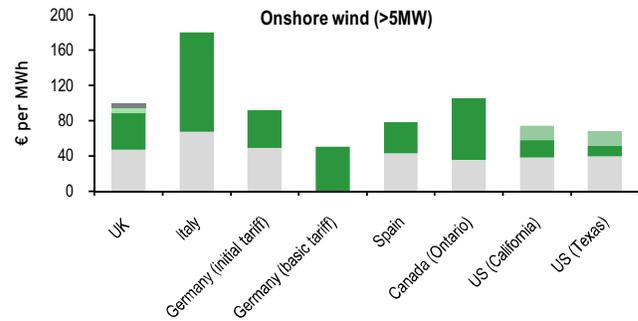
As the “shift to green” continues, the dilemma for policy-makers is how to maintain the rapid build-up of renewable capacity at a time of severe fiscal constraint and continued poor financial liquidity – and how this plays out in terms of technology mix, given that a portfolio of renewable technologies is likely to be necessary in most jurisdictions to provide grid stability and to exploit available resources fully. Especially as less well-established technologies (such as wave and tidal and advanced biomass technologies dealing with food waste chains, for example) will need nurturing through the early stages of their lifecycle, if they are to contribute their full potential in the coming decades.

There are radically different costs of investment and per kilowatt hour by technology - not always commensurate with carbon impact. Other factors that are likely to come into play include the need to place renewables in the built environment where carbon emissions on the whole remain high, particularly if engagement with the consumer/taxpayer funding the program is to be achieved - and to preserve and grow green jobs where resource and/or technology skills provide the required level of critical mass.

It is useful in this context to provide a comparison of some of the key support mechanisms in place for selected markets and their relative costs by technology compared with the average 12-month forward brown power energy price in each market: thus providing an indication of the relative cost of the “shift to green.” This data is presented in respect of wind and solar power in the charts and tables on the right.

Wind

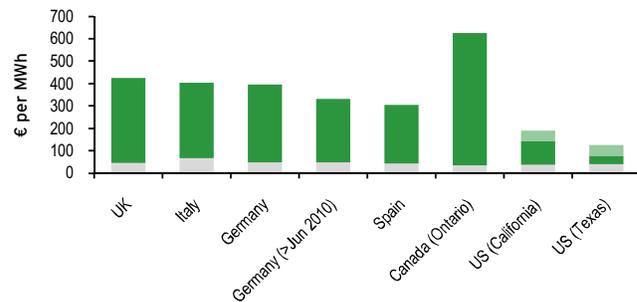
MW installed in 2009	UK	Italy	Germany	Spain	Canada	US
Onshore wind	793	1,114	1,887	2,459	950	9,996
Total / Brown Power (%)	213%	268%	187% (initial) 102% (basic)	181%	297%	196% (California) 173% (Texas)
Offshore wind	284	0	30	0	0	0
Total / Brown Power (%)	315%	352%	305% (initial) 71% (basic)	195%	418%	312% (Massachusetts)



■ Wholesale brown power ■ ROC / FIT / REC ■ ROC recycle ■ LEC ■ PTC

Solar

	UK	Italy	Germany	Spain	Canada	US
Solar MW installed in 2009	10	730	3,800	69	41	477
Solar resource (kWh/m ² /annum)	1,100	1,360	1,200	1,760	1,356 (Ontario)	2,000 (California)
Total / Brown Power (%)	912%	600%	807% (initial) 677% (basic)	712%	1,763%	499% (California) 321% (Texas)



■ Wholesale brown power ■ FIT / REC / PBI ■ ITC

Note: Where FIT rates are shown, brown power price is given for information only as it does not form part of the revenue stream.

Sources: Data sources are provided at the end of the article on page 4.

Clearly some measures have radically different cost profiles from others; even allowing for variations in resource quality in terms of wind speed or irradiation. Market-based mechanisms in Italy and the UK remain more expensive (even though wholesale electricity prices are relatively low due to the recession), and also offer no protection against energy price rises. The exception in the UK is the level of support for offshore wind which at the recently extended double Renewables Obligation Certificate (ROC) level remains broadly consistent with the German FiT, although there is currently no certainty as to ROC levels for offshore wind projects that are granted full accreditation after March 2014.

The US PTC system combined with individual state RPS reflected in the price of the Renewable Energy Certificate (REC) is effectively a premium FiT without the cap and collar provided by the Spanish system and offers the most value for money for the consumer/taxpayer. However, historically, it has led to stop/go deployment and although wind manufacturers are anticipating some recovery in volumes towards the end of 2010, it begs the question whether the level of support is sufficient to lead to the relative level of renewable deployment sought in Europe, or to meet the roadmap to targets of 20% electricity from wind by 2030 published by the Department of Energy. In the US, exposure to wholesale electricity prices has had a detrimental effect on the industry, given the relatively shallow protection provided by the REC and PTC – not only due to the recession but also due to low gas prices as new shale sources in the US come on stream.

After the US, the German FiTs remain the best value for money for the consumer and have provided consistently effective stimulation for the industry, albeit that the recent downward readjustment to the solar tariff has brought some protests. In onshore wind, the two-stage nature of the tariff has the added advantage that Germany has successfully built up a mature portfolio of contracts now providing wind electricity at or below current wholesale electricity prices, as many have now entered the lower tariff period.

In the case of domestic solar (UK), the most expensive technology but the most viable for widespread introduction in the built environment, there is a relatively even playing field with arguably scope for further reductions in some markets. The recently introduced UK small-scale FiT has started at a relatively high level, justifiable on the basis of the immature nature of that market and the lack of economies of scale and also the low levels of irradiation compared with Spain or Italy, for example.

Overall, it is interesting to note that those countries providing the highest rewards and those favouring market-based mechanisms rather than FiTs (either fixed or premium) have not necessarily always achieved the highest levels of renewables penetration nor indeed green jobs.

Other factors such as permitting, grid connection and priority of dispatch (i.e., which generation source has priority in the case of excess capacity) do come into play, but the nature of the support mechanism does appear to have had a significant effect.

Given the current climate of fiscal constraints, the value for money of a particular support mechanism in terms of cost per kWh and the extent to which it protects the consumer against future rises in energy prices is likely to be a major consideration in policy evaluation, with the industry needing to plan for tariffs to follow a continued downward trend, where cost reductions can occur. Increased competition from Asia, in wind as well as solar, makes cost reductions likely, with bottlenecks more quickly filled by new entrants than occurred in the past – a recent example being the response of Chinese inverter manufacturers to western manufacturers' restricted capacity; albeit that, more recently, cost reductions have tended to be much more modest in wind.

As tariffs come under increased scrutiny, tensions are likely to occur. In Spain, lively debate has occurred within the wind and solar industries in relation to their respective tariffs as compared with those in neighbouring jurisdictions. It is likely that there will be an increased expectation from legislators that manufacturers' prices are more similar on a regional basis, rather than being influenced by the levels of tariffs themselves, as has occurred in the past.

The industry also needs to accept that energy efficiency measures, with their relatively short paybacks, are likely to have a significant call on the restricted pot of financial support; and may well be combined with small-scale renewables in programs designed to assist the fuel poor. This could well be an opportunity for a new cross-technology installer-led industry to emerge.

The increased acceptance that economies will “shift to green”, with renewables commanding a high share of the future energy mix, brings with it not only opportunity but also responsibility: to ensure that value for money is achieved on behalf of the consumer / taxpayer while appropriate levels of returns are achieved for the industry. That way true sustainability lies.

Sources

Wind 2009 installed capacities - *GWEC Global Wind Report 2009*

Solar 2009 installed capacities - *EPIA Global Market Outlook to for Photovoltaics until 2014*

Italy incentives- *GSE (Gestore dei Servizi Energetici)*

Germany incentives - *EEG 2009*

Canada incentives and brown power - *Ontario Power Authority and IESO*

US brown power - *Energy Administration Information*

European brown power - *Nomura Europe*

All other data - *BTM, GWEC, MAKE, EWEA, EPIA*

Valuing renewables

Introduction

One of the most notable developments within the international energy industry over recent years has been the increasing number and size of corporate and institutional investments in the renewable energy sector. The increasing scale of renewable energy investments has been evident at almost every stage in the asset lifecycle, from projects entering the planning and construction phase through to the ever larger transactions involving these assets once they have become operational.

The characteristics of growth

Overall activity

The level of market activity in the renewable sector can be quantified and assessed in various ways. However, whether this is done by considering total investment levels or the number and size of transactions after allowing for the effects of the current recession, the long-term trend shows sustained and significant growth.

Acquisitions of renewable projects (wind, biofuels, biomass, geothermal, solar, marine, and small-scale hydro sectors only) have also displayed rapid growth, with a compound annual growth rate (CAGR) in deal value of 68% over the period 2000 to 2009. Following a broadly similar pattern to corporate M&A activity, total deal activity by value reached a peak in 2008 at US\$24.5b (€18.5b), falling back slightly in 2009 to US\$21.8b (€16.5b) (Source: Bloomberg New Energy Finance).

These levels of overall growth may be attributed to a number of factors including the maturing of certain renewable technologies, falling costs and favorable subsidies, which have resulted in significant levels of primary investment and secondary market activity. Meanwhile the strong and stable cash flows these investments generate mean that they have continued to be attractive throughout the recent recession, when investors have increasingly been focusing upon cash return metrics to optimize their use of capital.

Valuation methodologies

The need for robust valuations

In the current economic environment, investors are increasingly focusing upon upgrading their investment appraisal processes and rigorously stress testing projects before committing investment capital. Given the large amounts of investment in the renewable energy sector and the significant level of transaction activity, being able to value portfolios of assets or renewable companies in a consistent and robust manner has therefore never been more important, and specialist knowledge and skills are often required.

Valuations of assets or companies can be required for a whole range of different purposes including commercial valuations for transactions, impairment testing and purchase price allocation for financial reporting purposes, or within a regulatory or dispute context.

Often the basis of value can be different depending on the purpose of the valuation being performed. A number of different valuation approaches are available:

Income approach

The income approach focuses on the income-producing capability of the business or asset. This approach assumes that the value is measured by the present worth of the net economic benefit to be received over the asset's life. The discounted cash flow (DCF) methodology is usually adopted.

A financial model is developed to generate forecast cash flows using input assumptions for capital and operating expenditure, fuel costs (where applicable), FIT, or electricity price, governmental policy support, output utilization and taxation. The resulting cash flows are then discounted at a rate which reflects the overall risk of the project.

For fully operational renewable projects, 100% of the projected cash flows are included in the valuation. However, "pipeline" renewable projects (i.e. those projects still in development phase) present a more complex problem as the realization of these cash flows depends upon multiple factors impacting their successful development. One potential solution is to risk weight the cash flows depending upon the development stage of the asset in question. As the project moves through the various stages, value accumulates over time following a 'value accretion curve'. The shape of the curve will depend on the technology and location of the project under consideration.

Market approach

The market approach measures value based on the current pricing statistics for assets and companies similar to those being analyzed.

A market-based value is normally determined by making comparisons with actual third-party acquisitions of comparable assets/companies and with the performance of quoted comparable companies. The ratio of the price paid (or current share price) per megawatt (MW) installed is one key valuation metric for the renewable sector, but other common measures include the price paid (or share price) per unit of earnings (price/earnings or PE ratio) and the ratios of the enterprise value (EV) to either sales, earnings before interest and tax (EBIT), or earnings before interest, tax, depreciation and amortization (EBITDA).

Traditional (T) vs. Renewable (R) energy	EV/sales				EV/EBITDA				EV/EBIT				PE multiple			
	2007	2008	2009	2010	2007	2008	2009	2010	2007	2008	2009	2010	2007	2008	2009	2010
Median (T)	2.3x	1.8x	1.8x	1.7x	8.5x	7.8x	7.2x	7.0x	13.3x	11.9x	11.8x	10.6x	13.7x	12.6x	11.8x	11.3x
Average (T)	2.6x	2.2x	2.1x	2.0x	9.8x	9.2x	8.5x	7.9x	13.4x	12.8x	12.1x	11.3x	13.9x	14.0x	13.4x	12.7x
Median (R)	2.5x	2.0x	1.2x	1.3x	20.3x	10.9x	10.0x	8.5x	19.7x	15.3x	15.1x	12.6x	20.3x	16.0x	21.0x	18.9x
Average (R)	5.1x	3.2x	3.0x	2.6x	17.7x	10.4x	11.0x	10.1x	22.4x	14.7x	16.2x	15.3x	25.4x	18.5x	22.6x	20.5x

The table above compares European companies which specialize solely in the supply of renewable energy with those that predominantly supply energy sourced from “traditional” sources (such as gas and coal).

It is clear that in general the multiples for renewable energy specialists are higher than for the more traditional energy companies, suggesting that the market currently believes that the potential for future growth in the renewable energy arena is greater than in the traditional energy sector. In addition, the valuations of the renewable energy specialists are likely to be affected by a significant number of pipeline projects.

Cost approach

This approach relies upon the principle of substitution, which proposes that a prudent investor will pay no more to acquire an asset/business than the cost incurred in replacing it with a new identical unit. It can be seen as possibly a minimum value.

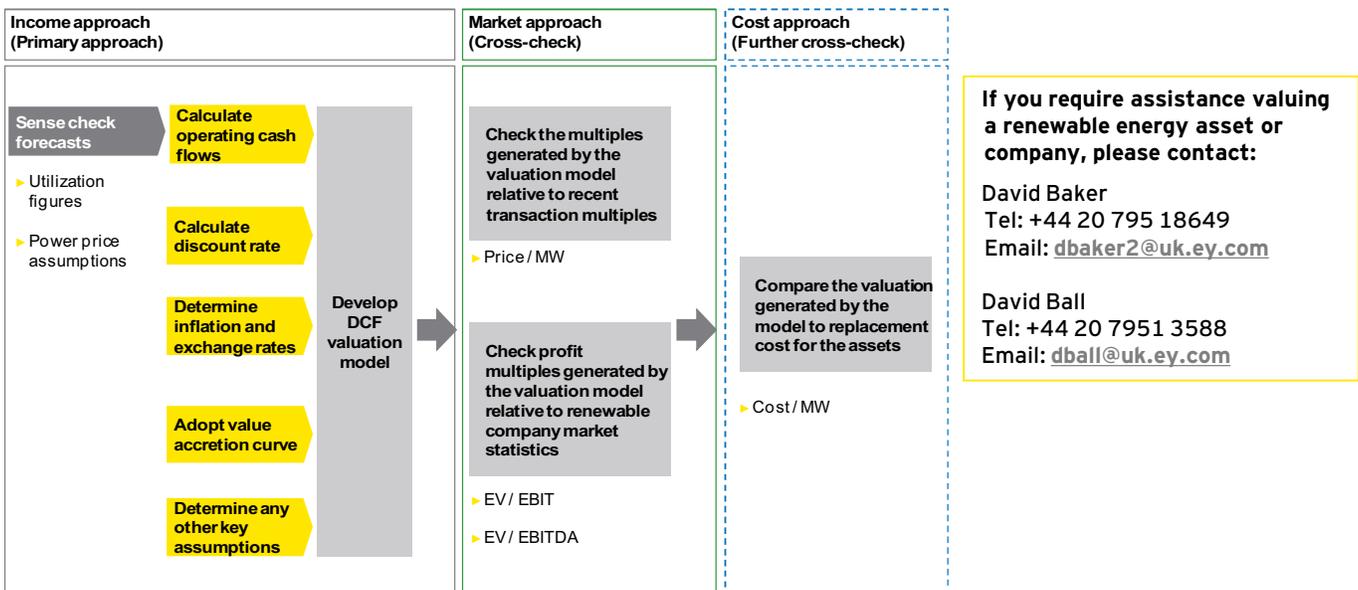
Account would need to be taken of the cost of direct replacement and also the greenfield cost of providing identical capacity. Any significant movements in materials and construction costs would also affect replacement cost estimates, as would related interest charges.

Bearing in mind that the physical existence of a working asset is the first barrier to entry for a prospective market participant, the cost approach is likely to be an important consideration in any valuation of a renewable asset/business.

Factors to consider when valuing a renewable project

Deriving a robust and supportable valuation for a renewable project is a complex process, which needs to draw upon a range of valuation techniques and recognize the wide range of factors that may be relevant to that project. These factors include the technology and country in which the project will be undertaken and the stage of development of the project.

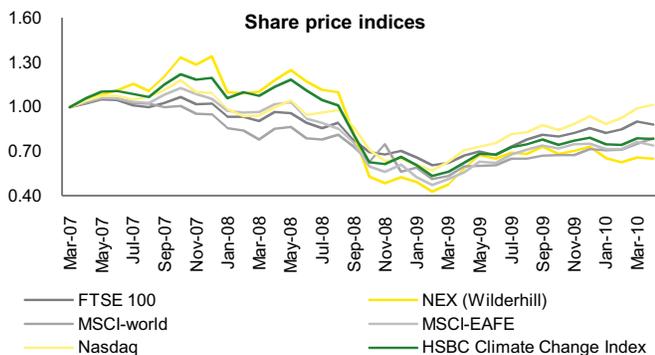
Based upon our experience, when sufficiently detailed forecasts are available, the most appropriate primary approach is typically the “income approach” (DCF). We would then consider the “market approach” with regard to transaction and market multiples. Finally, the “cost approach” can often be usefully employed as a final sense check, by determining the premium in the price over and above cost of development. Any purchaser must then decide if the premium above cost is justifiable given the risks surrounding the project and their strategic and tactical objectives. The valuation process is presented in the diagram below.



Issue highlights - equity

Public equity markets

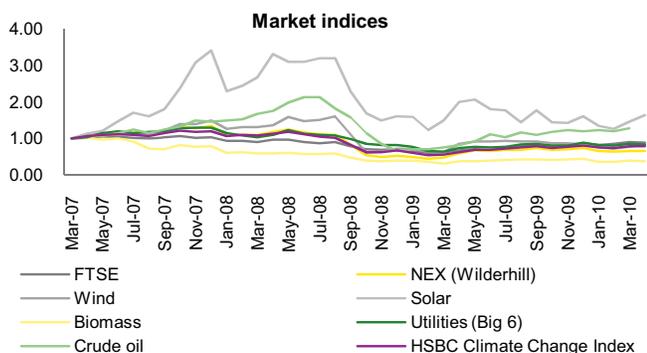
In the first four months of 2010, global stock markets continued a slow but unsteady rise in value; for example, the NASDAQ recovered 15% between the end of January and the end of April. However, renewable markets remained flatter with both the NEX and HSBC indices falling slightly in February and then rising again in April.



Source: Ernst & Young

Although the state of the global economy has improved markedly in a year, public equity markets are still fragile. Coupled with legislative uncertainty for the renewable sector in countries such as Spain and Italy, several flotations have recently been delayed, such as **O2 Vind, Renova Energia, T-Solar and Engyco**. Meanwhile **Renovalia and Renewable Energy Corporation** have delayed issuing new equity. **Enel** is still planning to complete an IPO for its Enel Green Power subsidiary later this year. The \$4b (€3b) listing is likely to be one Europe's largest listings this year, reducing Enel's debt burden considerably. Other IPOs are also in the pipeline for 2010, including **First Wind, Arise Windpower, Sinovel Wind, and Solyndra**, indicating that the IPO market may well now be opening after being severely restricted for a couple of years.

First quarter new equity issuance totalled \$2b (€1.5b), up from \$0.3b (€0.2b) in the same period last year but down from \$5.8b in the fourth quarter of 2009, which was boosted considerably by the IPO of **Longyan Power**.



Source: Ernst & Young

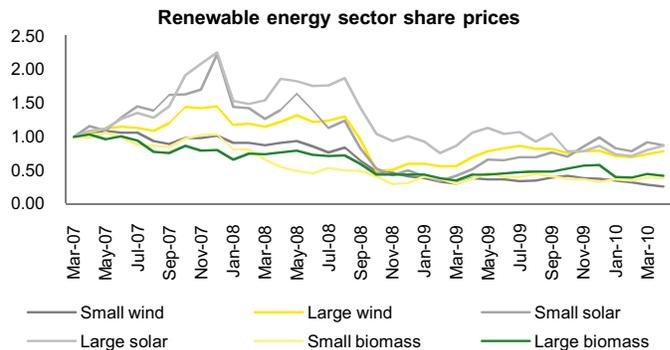
Share price performance by renewable sector

While oil prices continue to rise, the relative attractiveness of renewable energy sources improves - but share prices are responding differently to this driver (and others) according to sector and company size.

Since before the credit crunch first took hold, the wind sector outperformed the wider market until a sharp downwards correction in late 2008. During the first half of 2009, larger wind firms recovered before reaching a price plateau. Smaller firms appear less fortunate, with a slight but steady downward trend, which could result in M&A consolidation later this year.

The solar sector peaked during 2007 and 2008 (notably driven by a booming Spanish market) before sharp falls in late 2008. The smaller firms appeared to be hit first and hardest but then rebounded well during 2009. In the last six months, the sector does not appear to have shown differential performance between large and small companies but does still show more volatility from month to month. Of the three sectors, the solar sector exhibits the most volatility, probably due to its high dependence on fickle legislation dictating the incentives critical for commercial viability.

The biomass sector steadily lost approximately half its value during 2007 and 2008, but since then performance has remained relatively stable, though still suppressed.



Source: Ernst & Young

Private equity and venture capital markets

Venture capital (VC) provided significantly more money into renewable energy in the first quarter compared with the same time a year ago. In the first quarter, VC investment in clean technologies totalled \$733m (€552m), an increase of 68% from \$436m (€329m) a year ago. Solar technology companies alone raised a combined \$160m (€121m) in the first quarter. The total investment by PE and VC during the first quarter of this year was \$2.9b (€2.2b), an improvement on \$1.6b (€1.2b) last year. More significantly, this was also an improvement on the fourth quarter last year, \$1.7b (€1.3b), in contrast to the global clean energy investment total which fell 14% between the last two quarters.

M&A activity

Wind

Vestas announced it has secured the largest deal in its history, signing an agreement to provide Portuguese wind power firm **EDP Renovaveis** with a minimum of 1.5GW worth of turbines.

EDP has purchased an 80% stake in a 520MW wind power development pipeline in southern Italy. EDP has paid €12m as a down payment but around €700m is thought necessary to build out the portfolio which is expected to be fully authorized by the end of 2010.

Cosmo Oil has announced that it will make a major push into the wind power generation business by taking over **EcoPower**. Cosmo will acquire a 98.8% equity stake in the subsidiary of Ebara for just ¥1 while taking over the wind power firm's debts worth some ¥15b (€120m), provided Ebara injects ¥4.85b (€40m) worth of capital into EcoPower. Through the acquisition, Cosmo will gain control of the firm's 25 wind farms in Japan.

The **European Bank for Reconstruction and Development** (EBRD) is acquiring a 25% stake in **Iberdrola Renovables'** subsidiaries in Hungary and Poland via a €125m equity investment. The deal will double the Spanish renewable company's presence in Eastern Europe.

Iberdrola Renovables agreed in February to buy Spain's largest wind facility from turbine manufacturer **Gamesa Energía** for €320m. The facility has a capacity of 244MW across seven wind farms. The acquisition follows the framework agreement for the sale of wind farms in Andalusia signed by Iberdrola Renovables and Gamesa Energía in 2005, a deal encompassing a total of 600MW.

British wind turbine manufacturer **Clipper Windpower** has raised £126.5m (€145.8m) in new equity through the sale of 84.3m new ordinary shares to United Technologies Corporation, which now has a 39.3% stake in the UK firm.

Solar

California-based **SunPower** announced in February that it will pay US\$277m (€209m) to acquire Italian solar specialist **SunRay Renewable Energy** in a deal that will significantly bolster its presence in Europe and the Middle East. SunPower will also benefit from SunRay's pipeline of solar PV projects totalling more than 1.2GW of capacity in Italy, France, Israel, Spain, the United Kingdom and Greece.

The world's largest nuclear plant builder, **Areva SA**, is diversifying into solar power with the aim of becoming an industry leader. It completed the 100% acquisition of US-based

solar thermal player **Ausra** in March for an undisclosed sum. This deal reflects Areva's strategic objective to be a world leader in concentrated solar power (CSP) and will further strengthen and diversify its renewables portfolio.

Meyer Burger AG and **3S Industries Ltd**, a Swiss PV module manufacturing equipment supplier, are set to merge in an all share deal worth around CHF300m (€209m). Meyer claims that the combined technology portfolio will cover the core competences along the value chain in the production of solar energy systems, making the entity a provider of fully integrated systems solutions in the solar sector.

Solar panel manufacturer **First Solar** announced recently that it has agreed to purchase solar project developer **NextLight Renewable Power** for approximately US\$285m (€215m). NextLight has a total of 570MW worth of solar projects underway, with an additional 530MW in various development stages, according to First Solar. The transaction represents another strategic step in First Solar's expansion in the US utility-scale power market, which began in 2007 with the acquisition of Turner Renewable Energy and continued with the acquisitions of solar project pipelines from OptiSolar in 2009 and Edison Mission Group in 2010.

GCL-Poly Energy Holdings is set to acquire a 70.2% stake in **Konca Solar Cell**, a China-based PV wafer manufacturer, for a consideration of around CNY854m (€95m). The acquisition allows the GCL Group to expand its wafer business and enhance its competitiveness.

Sources

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

IPO activity

Enel is planning to complete a €4b IPO for its **Enel Green Power** renewable energy unit in early October. The move is likely to be one of the biggest European IPOs of the year and is primarily designed to tackle Enel's debt, expected to reach around €45b by the end of the year.

Media reports in February claimed that **China Huaneng Group Corp**, China's largest power producer, is planning to float its wind energy division on the Hong Kong stock exchange later this year in an IPO worth at least US\$1b (€760m). The IPO is expected to fund the continued expansion of Huaneng Group's wind energy subsidiary; however, the company has since announced that the transaction remains undecided and that it is continuing to study the plan.

Rival energy firm **China Datang Corp** also appears to be planning a US\$1b (€760m) Hong Kong IPO for its own renewable energy division. According to China Wind Energy Association, Datang boasted 1.5GW of wind energy capacity at the end of 2008, making it the country's second largest provider of wind energy.

If either transaction goes ahead, it will be following in the footsteps of China's largest wind energy producer, **China Longyuan Power Group Corp**, which completed a US\$2.6b (€1.96b) IPO in December 2009. It was the world's second largest renewable energy IPO since 1999.

Jersey-based solar firm **Engyco** is seeking to become the first listed specialist solar power utility in Europe. It plans to raise up to €1b via a listing on the London Stock Exchange, with a view of buying up €853m worth of operating solar assets, approximately 300MW (about 10% of the Spanish PV sector). Engyco has announced that it remains determined to complete the IPO, despite recent reports that there could be further subsidy cutbacks in Spain.

Sources

All information relating to IPO activity in the sector is obtained from publicly available sources.

All renewables index at May 2010

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)	US ³	69	70	75	57	73	72	75	63	67	65
1 (2)	China	69	74	77	66	59	66	40	57	51	74
3 (3)	Germany	64	65	64	70	59	72	23	64	55	63
4 (4)	India	63	64	72	42	66	67	63	57	44	63
5 (5)	Italy	61	61	64	53	64	66	59	56	65	66
5 (6)	UK	61	67	64	75	38	51	0	58	38	69
7 (8)	France	58	60	61	55	53	63	24	58	29	61
8 (6)	Spain	57	58	63	43	64	64	67	50	33	55
9 (9)	Canada	53	60	65	46	32	44	0	49	34	62
10 (10)	Portugal	51	54	58	42	48	57	22	45	32	56
10 (11)	Ireland	51	58	58	57	26	36	0	47	28	61
12 (11)	Greece	49	51	55	40	54	59	41	40	32	50
12 (11)	Australia	49	49	53	40	53	56	45	45	58	50
12 (14)	Sweden	49	53	53	53	32	43	0	55	34	51
15 (15)	Netherlands	48	53	52	58	35	47	0	41	22	44
16 (16)	Poland	45	50	53	42	31	43	0	41	22	46
16 (17)	Belgium	45	52	50	57	28	38	0	37	28	52
16 (19)	Brazil	45	46	50	34	40	44	29	47	21	43
19 (17)	Denmark	44	47	44	56	29	40	0	45	32	51
19 (19)	Norway	44	45	48	39	22	52	25	35	40	49
21 (19)	Japan	43	48	49	45	45	30	0	44	30	49
22 (22)	New Zealand	41	46	50	35	23	31	0	33	49	41
22 (23)	Turkey	41	43	45	35	39	43	28	36	43	44
24 (23)	South Africa	40	43	46	34	37	34	44	34	31	41
25 (26)	Austria	37	34	46	0	40	54	0	49	34	52
26 (25)	Czech	34	33	44	0	40	54	0	38	31	43
26 (27)	Finland	34	35	34	37	19	26	0	49	23	37

Notes:

1. Ranking in Issue 24 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

Source: Ernst & Young

This issue sees China catching up with the US following a two-point increase, having invested a total of US\$34.6b (€26.1b) into its clean energy projects last year (almost double that of the US) and emerging as the world's market leader in installed wind power capacity in 2009. Meanwhile, the US has dropped a point due to the increasing likelihood that the much awaited climate and clean energy bill will not be passed before the November mid-term elections.

India has increased two points following the Government's injection of over US\$1b (€0.76b) into the green economy and the unveiling of plans for up to 4GW of wind capacity and 1GW of solar power to be installed in the short to medium term. Framework rules for a REC market enabling inter-state trade have also been published this quarter.

The UK has seen a two-point increase following government plans to launch a £2b (€2.3b) green investment bank fund, and Office of the Gas and Electricity Markets' (OFGEM) approval for a £1b (€1.15b) upgrade to the UK's electricity network to boost renewable energy integration. A new planning regime has also been launched in a bid to speed up project approvals.

Greece, Spain and Portugal have all suffered negative score changes based on worsening capital markets and a downward revision of credit ratings by S&P. Spain's two-point fall is also due to government plans to reduce PV solar premiums by up to 40% as early as July.

Q1 was also a difficult period for Australia, dropping two points following the delay in the planned emission trading scheme until after 2012. REC values slumped 40% when the market was flooded with new certificates for small-scale installations at the end of 2009.

Wind indices at May 2010

Rank ¹		Country	Wind index	Onshore wind	Offshore wind	Near-term wind
1	(1)	China	74	77	66	81
2	(2)	US ²	70	75	57	77
3	(4)	UK	67	64	75	52
4	(3)	Germany	65	64	70	50
5	(5)	India	64	72	42	55
6	(6)	Italy	61	64	53	46
7	(6)	Canada	60	65	46	45
7	(9)	France	60	61	55	46
9	(6)	Spain	58	63	43	48
9	(10)	Ireland	58	58	57	41
11	(11)	Portugal	54	58	42	38
12	(11)	Netherlands	53	52	58	37
12	(14)	Sweden	53	53	53	35
14	(16)	Belgium	52	50	57	37
15	(13)	Greece	51	55	40	39
16	(16)	Poland	50	53	42	39
17	(15)	Australia	49	53	40	40
18	(18)	Norway	48	49	45	33
19	(19)	Denmark	47	44	56	34
20	(20)	New Zealand	46	50	35	32
20	(22)	Brazil	46	50	34	36
22	(21)	Japan	45	48	39	27
23	(23)	South Africa	43	46	34	32
23	(23)	Turkey	43	45	35	32
25	(26)	Finland	35	34	37	23
26	(27)	Austria	34	46	0	31
27	(25)	Czech	33	44	0	27

Notes:

1. Ranking in issue 24 long-term wind index is shown in brackets
2. This indicates US states with RPS and favorable renewable energy regimes

Source: Ernst & Young

In April, Wind Barriers (a project coordinated by the European Wind Energy Association (EWEA)) published part of its findings on consent times for onshore wind project applications across Europe. Utilizing this data, we have undertaken a benchmarking exercise and adjusted scores where a more or less favorable planning regime is indicated.

Despite remaining low in the overall index, Finland and Austria received a score uplift based on impressive consent times of 8 and 10 months respectively, while the UK also scored well at 26 months compared with the EU average of 42. Spain was subject to a score decrease, being one of the worst performers in the EU at 58 months, while Germany's 30 months also warranted a small score cut.

This was in contrast to the increase in Germany's offshore potential score following the commissioning of the Alpha Ventus project and the announcement of plans to have 25GW of installed capacity by 2030.

The UK's score benefited from news that investments are being made in UK wind turbine manufacturing plants by companies such as GE, Siemens, Clipper and Mitsubishi. Further, the UK's new green investment bank will initially focus on funding for offshore wind projects.

Substantial growth potential has been identified in India where only 20% of the estimated 48GW capacity has been harnessed. In January, the Government also announced a new generation-based incentive (GBI) scheme for up to 4GW of wind.

Sweden's ranking has improved following an announcement by the Government that it will build 1,000 new turbines over the next 10 years, generating an additional 10TWh in total.

Brazil has also jumped two places in the index as it prepares for the next round of its national wind power auction, offering approximately 10GW of capacity across 399 projects. Brazil has also extended tax exemptions for wind energy development until December 2012.

Near-term wind index at May 2010

Rank ¹		Country	Wind index
1	(2)	China	81
2	(1)	US ²	77
3	(3)	India	55
4	(4)	UK	52
5	(5)	Germany	50
6	(5)	Spain	48
7	(7)	Italy	46
7	(7)	France	46
9	(9)	Canada	45
10	(10)	Ireland	41
11	(10)	Australia	40
12	(10)	Greece	39
12	(13)	Poland	39
14	(13)	Portugal	38
15	(15)	Netherlands	37
15	(15)	Belgium	37
17	(17)	Brazil	36
18	(17)	Sweden	35
19	(19)	Denmark	34
20	(19)	Norway	33
21	(21)	South Africa	32
21	(21)	Turkey	32
21	(21)	New Zealand	32
24	(26)	Austria	31
25	(24)	Czech	27
25	(25)	Japan	27
27	(27)	Finland	23

Notes:

1. Ranking in Issue 24 is in brackets
2. This indicates US states with RPS and favourable renewable energy regimes.

Source: Ernst & Young

Importantly, this quarter sees China overtake the US as leader of both the near-term and long-term wind indices. China now has more than 25GW of installed capacity, 14.4GW of which was installed in 2009 compared to 9.9GW in the US in the same period. China's position has also improved following plans to standardize grid connection procedures for wind power projects in a bid to promote the development of large-scale, internationally competitive wind power projects.

The gap between China and the US has been widened further by a relative weakening in the strength of the US's near-term outlook, showing a more steady growth compared to China's boom experience in 2009. The near-term wind index calculation is partly determined by the benchmarking of countries relative to the top ranking country's installed capacity. The US's position has therefore weakened as it is no longer the base country, but rather is assessed as a proportion of China's near-term wind power prospects.

Austria has jumped two places in the wind index as a result of FiT increases. Wind power projects have been guaranteed a rate of €0.097/kWh, up from €0.075/kWh, and the amendments heavily indicate that the Austrian Government favors wind projects over solar and biomass which both received tariff cuts.

Spain's near-term wind prospects have been adversely affected by the anticipated cut in wind tariffs. Investment in renewable projects, including wind, is also expected to be hit in the short term by the downgrading of the country's credit rating from AA+ to AA by S&P.

The Czech Republic has lost a point following reports that the capacity of wind and solar energy projects approved in the country is nearly four times what can be safely fed into the electricity grid.

Country focus - US

Energy legislation uncertainty

Ranking	Issue 25	Issue 24
All renewables index	1 ¹	1
Long-term wind index	2	2
Near-term wind index	2	1

Source: Ernst & Young
1. Joint

The US has dropped a point and is now tied with China in the top ranking position.

Policy

Despite claims by the Obama Administration that it remains committed to a proposed 45% increase in clean energy spending in the 2011 budget proposals and that it still wants energy and climate legislation passed before the November mid-term elections, it appears unlikely that the cap and trade bill will pass through Congress this year.

The much awaited Kerry-Graham-Lieberman bill was expected to be unveiled in April but has been postponed following claims by Republican Senator Lindsey Graham that he has lost confidence that there will be a serious commitment to energy legislation this year. This emerged after immigration appeared to force its way to the top of Obama's legislative agenda.

The legislation would have capped utility sector emissions upon implementation and later been expanded to cover industrial emissions. The indefinite postponement of a detailed bill may jeopardize the country's ability to demonstrate a genuine commitment to comprehensive climate change reform, as well as further complicating international efforts to reach a deal on global warming.

Access to finance

In January, President Obama announced the awardees of the US\$2.3b (€1.7b) tax credits (48C) authorized by the American Recovery and Reinvestment Act 2009 (ARRA) for qualified investments in advanced energy projects.

This round was more competitive than many initially thought. Approximately 500 applicants responded to the 48C program, of which 187 received an award of tax credits equal to 30% of the qualifying costs associated with their planned manufacturing facilities. While the current allocation round has been exhausted, the program may be extended and receive additional allocation authority.

The Security in Energy and Manufacturing Act was recently introduced which, if passed, would provide an additional US\$5b (€3.8b) in allocation authority as well as make the 48C eligible to be converted into a cash grant.

In its fiscal 2011 budget proposal, the US Interior Department set out its aims to permit 9GW of new wind farms, solar facilities and other renewable energy projects on public lands and waters by the end of next year. To help meet this objective, it has proposed spending US\$73m (€55.2m) to speed up the approval process, a US\$14.2m (€10.7m) increase on the 2010 budget.

Offshore wind

Federal regulators have approved the country's first offshore project, a US\$1b (€0.76b) wind farm off the coast of Massachusetts. The Cape Wind facility will have a capacity of 468MW.

In a bid to spur the construction of US offshore wind farms, a group of senators have introduced legislation that would extend the PTC for offshore wind energy until 2020. The PTC, valued at US\$0.021 (€0.015)/kWh, has undergone several short-term extensions but is currently set to lapse at the beginning of 2012. The successful extension to 2020 could give investors the certainty required to make longer-term plans.

Solar

Spanish company GA-Solar plans to invest US\$1b (€0.76b) in the construction of a large 300MW solar power PV plant in New Mexico. The governor hopes that this major investment will help New Mexico become the centre of the North America solar industry.

Regulators in California have finally recommended approval of a 392MW solar thermal power project to be built by BrightSource Energy Inc. The US Government has already guaranteed US\$1.37b (€1.04b) in loans for the three solar projects. It is the largest single backing of a renewable project using America's stimulus funding.

There is concern that large-scale solar projects will miss the 2010 construction deadline to receive funds under the ARRA's 1603 grant scheme. Delays in planning approval for large solar and transmission projects have caused bottlenecks and jeopardized eligibility for many. At this stage, Congress does not seem eager to extend the deadline.

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Country focus – China

Onshore wind capacity

Ranking	Issue 25	Issue 24
All renewables index	1 ¹	2
Long-term wind index	1	1
Near-term wind index	1	2

Source: Ernst & Young
1. Joint

China has increased two points to joint first place with the US, having emerged as the global leader in installed wind capacity. This is the first time in the history of the CAI (since 2003) that China has reached the top position.

Policy

Despite an overall decline in the growth rate of China's government spending, the Finance Ministry's 2010 budget report sets out a 20% increase in spending on environmental protection, signalling China's commitment to a low carbon economy.

China became the 2009 green investment leader having ploughed US\$34.6b (€26.1b) into the clean energy economy, nearly double US expenditure of US\$18.6b (€14.1b). In the near term, China is planning to unveil a draft 10-year clean energy plan detailing how the country will achieve its target share of 15% of energy from hydro, new renewables and nuclear by 2020.

Grid and planning

In March, it was announced that China's National Energy Administration (NEA) is planning to standardize grid connection for wind power projects in the country. The commission will work towards standardization across six areas including wind farm development planning, construction and installation, operation and maintenance, and grid connection as well as machinery and electrical equipment.

The NEA has also drafted a separate framework for wind power standards which are expected to promote the development of large-scale, global wind power equipment enterprises. The Chinese Government recently drafted guidelines aimed at excluding small firms from wind turbine manufacturing in a bid to remain globally competitive.

However, China's rapid growth does pose a challenge. More than a third of China's wind turbine factories are idle because of overproduction: There were at least 130 turbine and blade producers in China at the end of 2009, but as much as 40% of their production capacity is currently at a standstill, according to the vice president of the Shanghai Electric Group.

The NEA has also said that wind farm development and turbine

production are racing far ahead of accompanying developments in grid infrastructure. The China Electricity Council reported that just 64%, or 9GW, of the capacity added in 2009 had been connected to the grid by the year-end.

Onshore wind

In 2009, China officially became the world's largest wind market with more than 25GW of installed capacity, over half of which (14.4GW) was added last year alone. China appears to be on track to achieve its ambitious target of 30GW of installed wind capacity by 2020.

Offshore wind

The rapid expansion in onshore wind capacity has naturally led China to look to its offshore potential, estimated to be more than 750GW, around three times the onshore potential. In January, the country's National Energy Bureau (NEB) jointly implemented a policy with the State Oceanic Administration to oversee the details and implementation of offshore wind power development.

In February, Hong Kong Electric Holdings announced that it is proposing to develop a 100MW offshore wind farm worth up to HK\$2b (€0.19b) in the Southwest Lamma Channel.

Biomass

As an agricultural country there is huge development potential in biomass. In December 2006, the first Chinese national biomass power generation plant was established with a capacity of 25MW. The country's biomass energy output is expected to reach 5.5GW by 2010 and 30GW by 2020.

However, the development of biomass in China is somewhat hindered by the shortage of straw and other agricultural raw materials and increasing raw material prices. Furthermore, the profitability of biomass power plants is relatively low: It is expected that the Chinese Government will announce incentive plans for biomass power generation in the near future.

Corporate news

China Resources Power Holdings Co Ltd intends to invest a total of US\$1.5b (€1.1b) in the country's renewable energy industry within five years. The Hong Kong-listed firm hopes to increase its wind power installed capacity from 400MW to 5GW by the end of 2014.

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Country focus – Germany

Solar tariff cuts vs. offshore potential

Ranking	Issue 25	Issue 24
All renewables index	3	3
Long-term wind index	4	3
Near-term wind index	5	5 ¹

Source: Ernst & Young
1. Joint

Germany has maintained its third place position. The country's offshore potential has been counter-balanced by the cuts in its solar FiT to leave its score of 64 unchanged in the All renewables index.

Solar

The ruling coalition in Germany was not successful in obtaining approval for the suggested cuts to the solar FiT in the German Federal Assembly. According to the current proposal, from 1 July 2010 there will be no support for projects on farmland, 16% lower support for rooftop projects, and 11% less support for projects on brownfield sites. These reductions are in addition to the subsidy's annual 9%-11% depreciation that took effect on 1 January 2010. While the changes are still pending final approval by the German Federal Assembly, it is understood that only slight changes would be made to the planned reductions. However, with the latest election loss in Northrhine-Westfalia, the ruling coalition in Germany has lost its majority in the German Federal Assembly, it is still unclear how and when the cuts on solar FIT will be approved and come into effect.

The Government will deduct another 1% off the FiT if total installed capacity in Germany this year exceeds 3.5GW, and a further 1% if capacity exceeds 4.5GW, which it is expected to do.

Germany's generous FiT has been the engine of growth for the global solar industry in recent years, accounting for more than half of the €12b market in 2009. However, there is general acknowledgement, despite the controversy, that cuts are required to make the sector's growth more sustainable in the medium to long term.

Installed solar capacity in Germany rose more than 60% last year from 6.0GW to 9.8GW, according to the federal grid agency BNetzA.

Offshore wind

Germany's first offshore wind farm, the Alpha Ventus project, was formally commissioned in April by a consortium comprising EWE, E.ON and Vattenfall Europe, which have invested a total of €250m.

The project represents the first offshore wind farm of its kind in Germany's Economic Exclusive Zone. The wind farm will also serve as a test bed for research projects aided by the Federal Ministry for the Environment, and will provide invaluable knowledge regarding the utilization and further development of offshore wind power off Germany's coast.

Following the launch of the Alpha Ventus project, Germany's environment minister, Norbert Röttgen, announced that the Government hopes to achieve an installed capacity of 25GW by 2030.

Germany's federal shipping authority, Bundesamt für Seeschifffahrt und Hydrographie (BSH), has granted permits to two more offshore wind farm projects in the German North Sea. One of the projects will enable energy company EnBW to add 39 turbines to its offshore windfarm, *Hochsee Windpark He dreiht*, creating a total of 119 turbines, generating 595MW upon completion.

With the permit for *Deutsche Bucht*, the second project was awarded to Eolic Power and will be developed by Bard Engineering, which aims to install 42 BARD 6.5MW turbines by 2013, generating 273MW.

BARD has also announced the start of construction of BARD Offshore 1 which shall be completed by mid 2011. BARD will use its own developed 5.0MW turbine. So far, BARD has only one installed wind turbine, BARD VM, 500m off the harbour in Hooksiel near Emden. After Alpha Ventus, BARD Offshore 1 will be the second operational German offshore windfarm.

In January, German developer RWE Innogy announced that it has decided to build its €1b Nordsee Ost offshore wind farm in the German North Sea, located around 30km from the island of Helgoland. After the pilot phase, it plans to install a total of 170 wind turbines, and given the recently announced framework agreements with RePower, these will most likely RePower turbines. RWE plans to commission the project by 2013, and will receive a €50m EU subsidy.

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Country focus – India

Investment in renewable energy

Ranking	Issue 25	Issue 24
All renewables index	4	4
Long-term wind index	5	5
Near-term wind index	3	3

Source: Ernst & Young

India has retained its fourth place ranking but was awarded a one-point score increase on account of the Government's renewed investment in national renewable energy policies and the introduction of a GBI scheme.

Policy

The Indian Government has taken the first step to implement its new carbon intensity target in 2010-11, injecting over US\$1b (€0.76b) into the green economy. A new Clean Energy Fund has been established, financed by a tax of 50 rupees (€0.85) per ton of coal produced domestically or imported. Approximately 30b rupees (€0.5b) could be collected for the fund in 2010-11 based on expected consumption of 600m metric tons of coal. A large part of the fund is expected to be used for the National Solar Mission.

In February, the Central Electricity Regulatory Commission (CERC) published framework rules for the operation of a REC market. CERC hopes the move will create a nationwide market for green energy and boost renewables development across more states. While renewables accounted for 9.5% of Indian power generation capacity in July 2009, they only accounted for 3.5% of power sold. Electricity will be priced at the average power purchase cost of the distribution, with RECs awarded for each MWh injected into the grid. The regulations also stipulate that CERC will set floor and ceiling prices for REC trading.

Wind

India's wind energy potential remains significantly under-exploited, with only 10.9GW of wind power generating capacity currently installed. It is estimated that onshore wind energy potential is around 48GW (for a 20% loan factor), mainly concentrated around the western states of Gujarat and Rajasthan. India appears to be on track to meet its target of 10.5GW of wind power by 2012, and is now looking to its medium-term target to double wind power generation capacity to more than 20GW by 2022.

The Indian Government has announced a new GBI for up to 4GW of wind capacity to be installed in the next 27 months. Under the GBI, producers of wind power from new projects will receive 0.50 rupees (€0.008)/kWh for power fed into the grid and sold at regulated tariffs, currently ranging between 3.39 and 4.50 rupees (€0.05-0.07)/kWh. The new GBI scheme will seek to attract large independent power producers (IPP) and foreign direct investment into India's wind power sector.

Solar

Q1 saw the Ministry of New and Renewable Energy call for tenders for the installation of 1GW of grid-connected solar capacity under the first phase of the Jawaharlal Nehru National Solar Mission which aims to feed a total 20GW to the grid by 2022. Priority will be given to solar thermal, which is to account for 60% of total capacity compared with 40% for PV.

As part of the Government's new carbon intensity target, PV and solar thermal equipment has received a 5% excise duty exemption.

The government of the northern Indian state of Punjab said it will collaborate with US firms SunPower and Enterprise Business Solutions to set up 1GW of solar power projects by 2012. SunPower and EBS have been asked to set up demonstration projects on rooftops of government buildings initially.

Indian-based company, Airvoice Green Energy, announced in February that it would launch "the world's largest green energy project." It has proposed to set up 10GW of solar PV power and 3GW of wind power in the southern state of Karnataka. The PV plant would be the largest solar plant in the world and would be undertaken in five stages, including an initial 100MW pilot phase.

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Country focus - Italy

Solar installed capacity and project size

Ranking	Issue 25	Issue 24
All renewables index	5 ¹	5
Long-term wind index	6	6 ¹
Near-term wind index	7 ¹	7 ¹

Source: Ernst & Young
1. Joint

Italy has received a one-point score increase, leaving it in joint fifth position with the UK in the All renewables index. This score increase reflects plans to build Europe's largest solar PV plant, and also the country's relatively strong onshore wind planning consent time of less than 20 months and its impressive installed solar PV capacity of 1.2GW. Score uplifts were awarded following a series of benchmarking exercises.

Policy

Italy's feed-in premium for PV plants connected to the grid is due to end in December 2010; however, the Italian Ministry of Economic Development along with the Ministry for the Environment, Land and Sea, are currently developing a proposal to renew incentive rates for PV systems from 2011 to 2015, due to be presented at the end of May. The FiT was introduced in July 2005 and has already enabled the installation of 71,650 PV plants with a capacity of 1GW since 2007,

It is likely that the new tariff will be reduced in 2011 by up to 20% compared with the 2010 rate, and it is anticipated that this reduction will act as an incentive for investors to install PV systems by the end of 2010. However, the Italian legislature hopes that a smooth reduction of the FiT by four-monthly periods will ensure a better assessment of investments and a reduction in the risk of a year-end rush and simultaneous grid requests.

The director of Italy's energy service management body (GSE) has indicated that by the end of 2010, a total of 130,000 solar plants will be installed in Italy with a capacity of 2.5GW and an annual production of around 2TWh.

Planning

National guidelines for renewable energy are due to be discussed at the next State-Regions Conference in May, with the aim of harmonizing the regulatory authorization framework across the entire national territory. At present, each region has different planning and permit procedures and it is hoped a national framework will help speed up the authorization process.

At the same time, however, Italy's constitutional court has cancelled the simplified authorization procedure that has made Puglia the region with the highest installed PV capacity

in the country. To date, PV plants up to 1MW could be authorized through a simplified "start of works" declaration (DIA) as opposed to the longer more expensive Autorizzazione Unica (AU) required elsewhere. This new ruling means that from now on, PV projects in Puglia over 20kW will need the AU.

Solar

It is likely that Italy will play host to the largest solar PV park in Europe by the end of the year. In the Rovigo province in northeast Italy, Banco Santander and SunEdison have invested in a solar PV park with a peak capacity of 72MW, due to come online by the end of 2010. The plant will overtake Spain's 60MW Olmedilla solar park (currently the largest); however, SunRay's 85MW project at Montalto di Castro is a fierce contender for the title if it is completed by the end of the year as planned.

The Government's tax allowance in respect of thermal solar systems is due to expire at the end of 2010 and no decision about the continuation of this incentive into 2011 has yet been announced. The tax allowance amounts to 55% of total expenditure and has led to a considerable increase in the installation of thermal solar systems.

A pilot CSP plant with a generating capacity of 40MW has been installed in Sicily and will be in operation by summer 2010. The project has been developed by Enel in collaboration with the Italian National Agency for New Technologies, Energy and Sustainable Economic Development.

Enel Green Power has also recently joined the Desertec Project, which is focusing on the installation of CSP and wind plants in Northern Africa in order to supply electricity to Europe, Africa and Middle East.

Wind

The total onshore wind power installed in Italy has increased by 30% in 2009, with 1.1GW of new power capacity installed and a total cumulative wind power capacity of 4.8GW by the end of 2009.

Offshore wind power is expected to experience strong growth in Italy during the next few years: the coast suitable for wind development covers 11,700 km² and has the potential to achieve 500MW in the next five years and 2GW by 2020. The first offshore plant (90 MW) has been authorized in Puglia and larger plants are currently under development.

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Country focus - UK

Access to finance and turbine manufacturing

Ranking	Issue 25	Issue 24
All renewables index	5 ¹	6 ¹
Long-term wind index	3	4
Near-term wind index	4	4

Source: Ernst & Young
1. Joint

The UK has received a two-point score increase and has improved its ranking in the long-term wind index.

Access to finance

In his annual budget, the Chancellor announced plans to create a green investment bank. This includes a £2b (€2.30b) fund to bridge the "equity gap" in the funding of offshore wind projects. Half will come from the sale of UK infrastructure assets such as the Channel Tunnel Rail Link with the other half expected to come from private investment. The Chancellor has also pledged around £60m (€69.1m) to develop ports in support of offshore wind turbine manufacturers.

The potential impact on the UK's renewable energy policy as a result of the newly formed Conservative/Liberal Democrat coalition will be assessed in the next issue of the CAI.

Planning

On average, it takes nearly 26 months to get planning consent for an onshore wind farm in the UK, compared with the EU average of 42 months, making it the eighth quickest country in Europe. This is according to the findings of Wind Barriers, an EU-funded research project published in April. Renewable UK, the wind industry's trade body, has indicated that it is working to reduce this figure to only four months.

It is anticipated that the newly formed Infrastructure Planning Commission (IPC) will help speed up renewable energy project planning for large projects (>50MW). It brings together eight former planning systems into a single process with the aim of cutting the time taken to make decisions down from 100 weeks to less than a year and saving approximately £300m (€345.8m) per annum.

Grid

Energy regulator Ofgem has approved a potential £1bn (€1.15b) upgrade of the UK's electricity network in an attempt to boost the integration of renewable energy to the grid. Ofgem has already authorized the initial £319m (€367.7m) tranche for National Grid, Scottish Power and Scottish Hydro-Electric to begin upgrades from April 2010. The regulator will continue to assess the request for a further £764m (€880m) and if successful, construction on the remaining projects will begin by 2012. The £1b (€1.15b) package represents 20% of

the transmission companies' 10-year investment plan for network upgrades to facilitate the Government's 2020 carbon emissions target.

Offshore wind

The UK has surpassed the 1GW mark for installed offshore wind energy now that two more offshore wind farms have begun generating capacity. With E.ON's Robin Rigg wind farm and Dong Energy's Gunfleet Sands farms now online, the UK's total offshore capacity has risen to over 1GW.

Siemens has chosen the UK as the location for a new £80m (€92m) offshore wind turbine factory. This investment has particular significance because it demonstrates the UK can beat off competition from Denmark and Germany to house a plant capable of making a new generation of extra-large blades. The exact location of the factory will not be confirmed until after the Government provides further details of its port redevelopment scheme.

General Electric has also announced that it will invest €110m in establishing its offshore wind turbine manufacturing operations in the UK, while Mitsubishi has announced that it will invest £100m (€115m) in a research facility aimed at developing new turbines.

Biomass

Danish power company, Dong Energy, is planning to build a new 300MW biomass power plant in Hull, generating electricity for approximately 500,000 homes. The Department of Energy and Climate Change (DECC) has also approved construction of Heliuss Energy's 100MW Avonmouth Dock biomass power plant on the Bristol Channel.

Biomass continues to be an area of controversy, however, with the outcome of the double ROC grandfathering debate not expected until July. The UK's largest coal plant owner, Drax Group, has threatened to move its planned £2b (€2.30b) project to build three biomass plants abroad if the Government fails to improve the current subsidy regime on biomass.

Hydro

A study undertaken on behalf of the Scottish Government has revealed that the country's hydro-electric potential is nearly twice that previously estimated. As much as 1.2GW of hydro power could be harnessed across more than 7,000 sites in Scotland, compared with 657MW across 1,000 sites highlighted in a study two years ago.

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Country focus – France

FiT

Ranking	Issue 25	Issue 24
All renewables index	7	8
Long-term wind index	7 ¹	9
Near-term wind index	7 ¹	7 ¹

Source: Ernst & Young
1. Joint

France has climbed a place in the All renewables index to reflect the potential of GDF Suez's new solar array and an uplift in the country's solar PV installed capacity score following a benchmarking exercise. A similar exercise on average EU consent times for onshore wind farms has also provided a relative score increase.

Policy

The French Environment Ministry announced in January that green energy growth targets will see renewable energy production more than double from current levels by 2020. This ambitious target will require the country's renewable energy production to increase 50% by 2012 and 120% by 2020 if France is to meet EU climate change commitments of obtaining 23% of its energy mix from renewables.

Solar

The Ministry published new rates for solar PV projects with only minor variations to those announced last September. However, companies were surprised to see that applications for new projects filed since November 2009 are set to be cancelled, forcing companies to re-apply under the new rates.

The move comes as a reaction to rocketing applications for solar projects in the country, which surged to 4.5GW at the end of the year from just over 1.5GW in September, mostly for rooftop schemes benefiting from world-leading incentives.

FiTs for building integrated PV (BIPV) on housing, education or health buildings will remain the highest in the world at €580/MWh, while other existing buildings will receive €500/MWh. Meanwhile, rates for ground-based solar installations will go up slightly to €314/MWh for projects in sunny locations and to €377/MWh for less isolated regions, compared with the previous fixed rate of €300/MWh.

In February, GDF Suez, one of the world's largest independent energy providers, announced that it had signed an agreement to build France's largest solar PV power plant. The facility, based in the southeast of the country, will have a total installed capacity of 33MW, producing 43,500 MWh per year of renewable energy. The plant will receive a FiT of €377/MWh and commissioning is expected to take place in August 2011.

Biomass

Biomass tariffs for installations with a capacity of 5-12MW have almost doubled to 12.5 cent/kWh from 6.4 cent/kWh.

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Country focus - Canada

Provincial news

Ranking	Issue 25	Issue 24
All renewables index	9	9
Long-term wind index	7 ¹	6 ¹
Near-term wind index	9	9

Source: Ernst & Young
1. Joint

Federal

In March, the Federal Government decided not to extend the ecoENERGY tax credit, which provided a tax credit of US\$10/MWh from any renewable energy technology.

Ontario

Since our last issue, Ontario has seen considerable momentum, particularly centered around the solar sector, although other technologies are also showing strong growth with less media fanfare.

Driving a large part of this growth has been a number of communications from the Ontario Power Authority (OPA) releasing power purchase agreements (PPAs) for 694 projects, a capacity split as follows:

Total MW	<500kW*	>500kW
Onshore wind	1	1,229
Offshore wind	-	300
Solar PV	103.5	652
Bioenergy	6.6	50
Hydro-electric	0.9	192
Total	112	2,421

*Not including MicroFIT projects
Source: Ontario Power Authority

Those projects above 500kW require a full connectivity assessment and are subject to existing grid capacity constraints on the Ontario transmission system. Projects with a capacity below 500kW are exempted from this process and are expected to connect to the local distribution grid.

Beyond the OPA PPA announcements, we have seen projects breaking ground in Norfolk County under the renewable energy standard offer program contract (RESOP) system, through an 18MW ground-mounted solar PV development across two sites, backed by SkyPower Ltd and Sun Edison Ltd.

There is also considerable activity in respect of a wider drive towards increased solar domestic content in 2011. Toronto Stock Exchange listed Sustainable Energy Technologies, announced a venture with Germany's Bosch Solar Energy to manufacture modules and inverters which would be domestic content compliant. Additionally, Spanish module manufacturer Helios Energy Europe SL is providing equipment for sister company Heliene Inc to establish an 80MW production line in Sault Ste. Marie.

Prairie provinces

A 15% increase in Saskatchewan's installed wind capacity should be complete by early 2011 following the announcement by Algonquin Power & Utilities Corp (Algonquin Power) that phase I of their Red Lily wind farm will commence construction imminently. The 26.4MW project is forecast to cost CAD\$2.5m (€1.8M)/MW (equity and debt) and has the option to expand by a further 106MW under phase II.

Also in wind sector, Pattern Energy Group secured a 27-year PPA with Manitoba Hydro for 100% of the output from the 138MW St Joseph Windfarm. Manitoba Hydro also provided the wind farm with a 20-year construction loan to support project finance.

British Columbia

Since February, we have seen significant activity at both a project and legislative level on the Pacific coast. Starting in March, BC Hydro announced 19 projects would receive PPAs under the 2008 Clean Power Call for projects. In April, a further four projects were awarded PPAs under the same program.

These 23 projects are expected to boost British Columbia's renewable generation by 2,901GWh per year, which will be generated from the following sources:

Technology	Total expected output (GWh/year)
Onshore wind	1,528
Waste heat	46
Hydro-electric	1,327
Total	2,901

Source: BC Hydro

Work to date on construction budgets indicates a capital investment of over US\$3b (€2.3b) will be required to develop these projects. More recently, at the end of April, the BC Government passed into law the Clean Energy Act, which brought a level of security around the 2008 Clean Energy Act by stipulating the call will secure renewable energy generation of 5,000GWh per annum.

The same Clean Energy Act included provisions to establish a FiT, with the objective of "developing emerging technologies", which may give BC's emerging marine and clean tech sectors some much needed support. Details will be worked on in the coming months. The potential significance of this cannot be underestimated, as shown by the current boost in activity in Ontario.

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Country focus – Portugal

Access to finance

Ranking	Issue 25	Issue 24
All renewables index	10 ¹	10
Long-term wind index	11	11 ¹
Near-term wind index	14	13 ¹

Source: Ernst & Young
1. Joint

Despite positive policy reforms and new commitment to renewable energy in Q1, Portugal's credit rating downgrade has risked its ability to finance these ambitious projects and has resulted in a one-point score decrease.

Policy

The Portuguese Government has approved a renewables plan targeting 8.5GW in wind capacity, 1.5GW in solar projects and the kick-start of other technologies by 2020. This ambitious plan (*Plan Novas Energias*) seeks to source 60% of the country's electricity consumption from renewable sources and reduce national electricity imports by €2b by 2020.

Wind

In terms of wind power, it has been confirmed that new tenders will be issued to reach this target capacity, and plans to allow current wind projects to expand by a total of 400MW have been announced. Wind power already generates 14% of the country's electricity, and installed capacity totalled 3.5GW at the end of 2009, according to GWEC.

Solar

Portugal's installed PV solar capacity at the end of 2009 was only 100MW according to figures published by European Photovoltaic Industry Association (EPIA), reinforcing how ambitious the targets set out in the *Plan Novas Energias* really are.

Risks

Therefore, while Portugal's new focus on renewable energy reform is a step in the right direction, it is not yet appropriate to dramatically improve their attractiveness in the All renewables index. Historically, the country's handling of the allocated wind licenses has been sluggish, and grid problems have effectively blocked applications for PV projects in the last two years. Further evidence will therefore be required to support Portugal's ambitious energy targets before major score changes can be implemented.

Access to finance

The one-point score decrease is based on the downgrading of Portugal's credit rating by S&P, reducing the likelihood further that renewable energy projects will be able to raise the necessary funds.

While Portugal has less debt than Greece, economists have focused on it as the next possible victim if concerns over high levels of government debt in Europe spread. S&P has therefore downgraded its credit rating on Portugal amid mounting concerns about the country's ability to manage its debt load, claiming that the two-notch downgrade to A- reflects its view of "the amplified risks Portugal faces."

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Country focus – Ireland

National targets

Ranking	Issue 25	Issue 24
All renewables index	10 ¹	11 ¹
Long-term wind index	9 ¹	10
Near-term wind index	10	10 ¹

Source: Ernst & Young
1. Joint

There has been no score change for Ireland in Q1. The country is now in joint 10th place with Portugal, following the latter's one-point score decrease, leaving Ireland's overall ranking unchanged.

Policy

Ireland's national energy authority, Sustainable Energy Authority of Ireland (SEAI), has announced a new five-year plan that promises €6b in savings in addition to the creation of between 5,000 and 10,000 jobs per annum. The plan outlines targets for sustainable transport such as electric cars and the creation of a smart grid for electricity supply.

Under the new strategy, SEAI will serve as a central authority through which others in the public sector will pass, giving Ireland's green strategy a single focal point in respect of strategy and information relating to renewable energy. SEAI was formally known as Sustainable Energy Ireland (SEI).

It is possible that Ireland's new energy plan has been driven by the revelation at March's Irish Wind Energy Association conference in Dublin that the country is losing out to other EU members in securing investments in wind energy. A significant lack of cost-competitiveness on an international level and inadequate national support have, for example, led Scottish and Southern Energy (SSE) to turn down investment opportunities in Ireland as the returns are well below what can be achieved in other European markets.

Grid

The European Commission (EC) has awarded €110m for the construction of an electricity interconnector to link Ireland and Wales in an effort to speed up renewable energy development. The total cost of the project is estimated at €600m.

According to the project developed by Irish state-owned transmission company EirGrid, a 260km long high-voltage direct current cable link will span the two countries and carry 500 MW of power.

Corporate news

Irish-based renewable energy group, NTR, has announced that it has won a major contract with Boeing to develop new solar power technology. Stirling Energy Systems (SES), in which NTR has a controlling stake, and the Boeing Company have formed a strategic partnership to complete the commercialization and deployment of Boeing's XR700 high concentration PV (HCPV) solar power technology. Through a licensing agreement with Boeing, SES has acquired the exclusive worldwide rights to develop, manufacture and deploy the HCPV technology.

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Country focus - Brazil

National targets and wind

Ranking	Issue 25	Issue 24
All renewables index	16 ¹	19 ¹
Long-term wind index	20 ¹	22
Near-term wind index	17	17 ¹

Source: Ernst & Young
1. Joint

Brazil has committed to reduce its emissions by between 36%-39% below "business as usual" levels by 2020, which is considerably more ambitious than the UN's 15%-30% recommendation.

March saw Brazil launch its second four-year growth acceleration program (PAC 2), which envisages BRL11.8b (€5.1b) in renewable energy investment, including BRL1.1b (€0.47b) for 2m solar thermal devices to be installed in new houses. Projects registered in the program may stand to benefit from certain tax exemptions and could find it easier to secure financing from national development bank BNDES.

Some BRL959b (€417b) worth of infrastructure projects have been registered in the program so far, of which roughly BRL114b (€49.5b) of this is new power generation capacity. All 71 wind projects that secured power purchase agreements in last December's power auction were enrolled in the scheme, along with three biomass plants worth a combined 224MW. Together, the wind and biomass projects will require BRL9.7b (€4.2b) in investment.

Wind

ANEEL is preparing its second wind power auction for June this year. A total of 478 projects amounting to an aggregate potential capacity of 14.5GW have enlisted with Brazil's energy regulator to take part in an upcoming renewable energy tender. Of these 478 projects, 399 amount to a combined 10.6GW of wind capacity, while 61 are biomass projects and 18 are small hydro.

The first quarter of 2010 also saw the controversial results of the agency's first wind energy auction held at the end of 2009. While it involved 339 registered projects with a total energy capacity of almost 10GW, only 71 projects were awarded, totalling approximately 1.8GW.

Brazil has officially extended a tax exemption for wind energy development until 2012. The announcement in January was part of a wider package extending 151 tax breaks to the national economy.

Brazil's national development bank, BNDES, has approved financing of BRL838m (€364m) for the installation of 10 wind farms by Argentine engineering and renewable company IMPSA. The loan is the largest yet granted to a wind energy developer in South America. The farms will have a combined installed capacity of 222MW and will cost BRL1.2b (€0.52b) in total.

The Government anticipates that by 2013, wind power will represent 5% of total energy generated in Brazil, and 18% of the world's total wind power.

Biomass

Biomass thermal plants added 1GW of new capacity to the Brazilian grid in 2009, only marginally trailing behind conventional thermal plants. The country's largest sugar cane producers' association, UNICA, believe this level could have been even higher were it not for last year's financial crisis and still "insufficient" incentives for small and mid-sized energy generation.

Hydro

In April, a consortium of nine companies won the rights to build the Belo Monte hydroelectric dam on the Xingu River in the Amazon Basin. The 10-minute auction came after more than two decades of planning, protests and injunctions.

If completed, the US\$11b (€8.3b), 11GW dam would be the third largest in the world, after China's Three Gorges and Southern Brazil's Itaipu Dam. The Brazilian Government is pushing for Belo Monte to be operational in time for the World Cup in 2014. The auction was suspended twice by Brazil's electric energy agency ANEEL, in the week running up to the controversial event, but the second injunction was overturned at the last minute. The project will be financed by the main public bank in Brazil, BNDES, through a credit line that has been created specifically for this purpose.

Brazilian renewable energy developer, ERSA, announced in February that it plans to launch into operation eight small hydropower plants with a combined installed capacity of 108MW before the end of the year. The plants will cost over BRL600m (€260.9m) to build.

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Country focus – Czech Republic

Grid capacity

Ranking	Issue 25	Issue 24
All renewables index	26 ¹	25
Long-term wind index	27	25
Near-term wind index	25 ¹	24

Source: Ernst & Young
1. Joint

The Czech Republic has lost two points in the all renewables index amidst reports that its grid capacity is overstretched, even at current levels of installed capacity.

Grid

Despite an investment of CZK2.1b (€0.08b) in upgrades in 2009, the installed capacity of wind and solar energy projects approved in the Czech Republic is nearly four times what can be safely fed into the country's electricity grid. Installed capacity at the end of January was 8GW, relative to a grid overload limit of 1.6GW until 2012, corresponding to installed capacity of 2.2GW.

Solar

The Czech energy regulator is strictly monitoring the growth in output of new PV plants due to concerns that the accumulation of state subsidies will push consumer electricity prices too high. This monthly monitoring was introduced following last year's growth of installed PV capacity of nearly 1,200% from 40MW to 465MW. Growth is continuing this year and is expected to reach at least 1GW by the end of 2010.

This rapid expansion of the PV market has been caused by a favorable FiT with a payback period of six to eight years. A change in legislation is expected to reduce this level of unsustainable growth, allowing more significant changes to the FiT if the payback period falls below 11 years, beyond the current limit of 5%. Investors seeking to take advantage of the current FiT systems will need to begin construction in the next few months to ensure connection to the power grid by the end of the year. However, the recommendation of the local transmission system operator (CEPS) to stop new reservations of grid capacity has imposed pressure on speculative investors that the current projects will not be realized.

CEZ, the Czech Republic's largest utility, has gone further by proposing that its Government halve the current solar electricity FiT to levels comparable with those in force in neighbouring Germany.

From 1 April 2010, new legislation has also tightened conditions for new connections to the grid by requesting more stringent proof of the feasibility of the project. It is hoped that these steps should significantly limit speculative reservation of the grid capacity, already considered to be vastly overstretched.

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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.

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/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 to 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).
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 re-powering 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.

Commentary – guidance notes

Near-term wind index

As stated on page 1, the near-term wind index focuses on factors of most immediate concern to near-term investment in wind energy. The scoring follows the same methodology as for the long-term wind index, but with a more focused set of parameters and a tailored weighting. Therefore, the indices consider the following, on a weighted basis, for both onshore and offshore wind separately:

- ▶ Power offtake attractiveness - 27%
- ▶ Tax climate - 8%
- ▶ Resource quality - 14%
- ▶ Market growth potential (next two years) - 40%
- ▶ Project size - 11%

In the offshore near-term wind index, countries with no projects estimated to reach construction in the next two years are excluded.

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 within some markets, the variation is greater than in others. The forecasts used are a market view only and the scores in no way guarantee that the forecasted capacity will be built.

While comparisons have been made between scores in the long-term and near-term wind indices, it should be emphasized that, due to the different weightings and parameters used, these cross-comparisons are of a narrative nature only and by no means indicate any quantitative valuation.

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Glossary

Abbreviation	Definition
ANEEL	Brazilian electricity regulatory agency
ARRA	American Recovery and Reinvestment Act
b	Billion
BIPV	Building Integrated Photovoltaic
BNDES	Brazilian development bank
BSH	Bundesamt für Seeschifffahrt und Hydrographie
CAI	Country attractiveness index
CHP	Combined heat and power
CSP	Concentrated solar power
DECC	Department of Energy and Climate Change
DOE	Department of Energy
EBRD	The European Bank for Reconstruction and Development
EPIA	European PhotoVoltaic Industry Association
EWEA	European Wind Energy Association
FIT	FIT
GBI	Generation-based incentives
GW	Gigawatt
GWEC	Global Wind Energy Council
HCPV	High Concentration Photovoltaic
IPC	Infrastructure Planning Commission
IPP	Independent Power Producers
ITC	Investment Tax Credit
JI/CDM	Joint implementation / clean development mechanism
kW / kWh	Kilowatt / Kilowatt hour
LEC	Levy Exemption Certificate
m	Million
M&A	Mergers and acquisitions
MCE	Ministerial Council on Energy
MRET	Mandatory Renewable Energy Target
MW	Megawatt
MWh	Megawatt hour
NEA	National Energy Administration
NEB	National Energy Bureau
OEM	Original equipment manufacturer
OFGEM	Office of the Gas and Electricity Markets
PBI	Performance-Based Incentive
PPA	Power purchase agreement
PTC	Production Tax Credit
PV	Photovoltaic
REC	Renewable Energy Certificate
ROC	Renewables Obligation Certificate

Abbreviation	Definition
RPS	Renewable portfolio standard
SEI	Sustainable Energy Ireland
S&P	Standard & Poor
TSO	Transmission system operator
TWh	Terrawatt hour
VC	Venture capital

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