Senate Committee on Finance

Subcommittee on Energy, Natural Resources, and Infrastructure

International Perspectives on Alternative Energy Policy:

Incentives and Mandates and their Impacts

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Written Testimony of

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Mr Chairman and members of the Committee, I am Jonathan Johns, Partner of Ernst & Young LLP (E&Y) and head of Ernst & Young's Renewable Energy Waste and Clean Energy Unit in the United Kingdom. I appreciate your invitation and the opportunity to testify today on International Perspectives on Alternative Energy Policy. The purpose of this testimony is to discuss the key drivers that may be considered in setting an alternative energy policy, to describe the tools commonly used by countries to stimulate the market, to comment on their relative impacts and to provide commentary on Ernst & Young's Q4 2006 indices. I will use the term renewable energy to describe those technologies which do not consume a finite resource (eg solar, onshore/offshore wind, wave, tidal power, biomass and biofuels, hydro and geothermal). Other technologies which may also be relevant and which are often discussed under the wider banner of alternative/clean tech technologies include: energy from waste, landfill gas, fuel cells, hydrogen, landfill gas, and refuse derived fuel technologies.

E&Y is one of the world's leading business and financial advisors. E&Y has world-wide revenues of US$16.9 billion, 700 offices in 140 countries, 6,200 partners and over 107,000 employees globally, and 22 offices with 400 partners and over 7,000 members of staff across the UK.

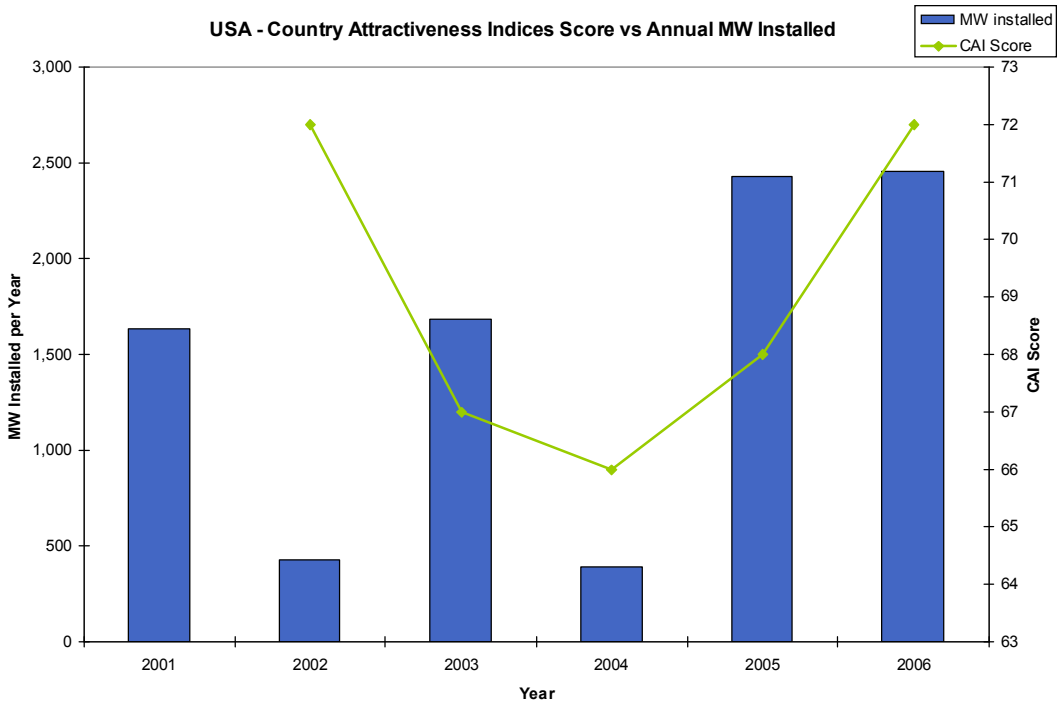
E&Y has had a corporate finance specialist unit focused on renewable energy, waste, clean energy and environmental issues since 2000. The driver behind the creation of the unit, which I lead, was the Kyoto Protocol. The unit, which has grown to some 45 dedicated professionals based in the UK also acts as one of several global knowledge centres for the firm and its private and public sector clients, liaising with a network of over 200 professional worldwide who act in the climate change space. Since 2003, the unit based in Exeter, UK has compiled the E&Y Renewable Energy Country Attractiveness Indices which score, on a forward looking basis, the attractiveness of 20 (soon to be 25) countries for investment purposes based on a number of factors including, regulatory, tariffs, incentives, planning and grid, access to finance, market size and resource quality. The Q1 2007 index is currently in the course of

preparation and will add a biofuels index to the current indices for wind, biomass and other, solar and regulatory infrastructure. At present biofuels are evaluated under the biomass category. I also provide the results from a webcast survey of 200 corporations, largely based in the US held in March 2007.

Summary of Key Recommendations and Observations

1. Renewable Energy Infrastructure represents a long term investment, and thus requires a long term consistent policy framework to ensure sustained development. Stop start mechanisms, or frequent changes in policy direction produce uncertainty in the investment community and have an adverse effect on corporate and individual behaviours. Climate change is a global issue and business is dealing with it on a global basis, the scale of the challenge means that at present there are in all probability insufficient resources in the supply chain to satisfy demand. Consequently, countries are effectively competing with each other for renewable energy resource and most importantly financial and corporate capital which rapidly flows to the most favourable investment climate.

   This is illustrated by the score of the US in the E&Y Country Attractiveness Indices over the past few years which has fluctuated as the production tax credit program (PTC) has been either renewed or not renewed and been reflected in subsequent levels of investment. Recently the score for Spain has declined due to regulatory uncertainty (as in the past has Germany's). In the UK, the Government has been at pains to announce an extension of the period of the renewable obligation incentive mechanism at the same time that it has announced the possibility of banding by technology type thus seeking to maintain investment flows in a period of regulatory debate.



Should legislative change occur, then it is desirable that past projects are protected by appropriate grandfathering mechanisms to ensure past investments are not undermined. Radical change in the suite of mechanisms used by a country does require thought as they do produce an investment hiatus, evolution may be preferable if annual increases in capacity are at satisfactory levels at the time of change.

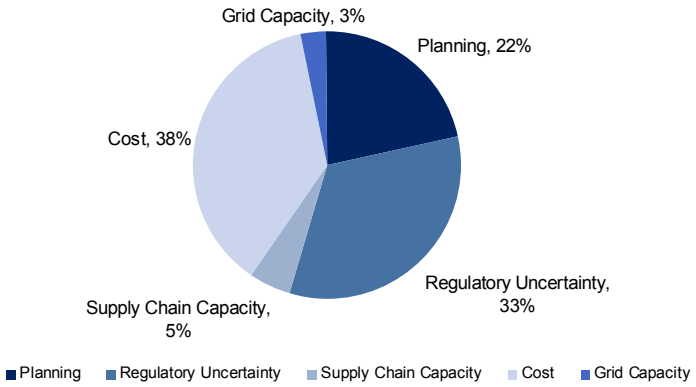
2. There is an opportunity to use a support mechanism to reinforce or create a strong domestic manufacturing industry with global prospects. There are also many opportunities in the supply chain. Policymakers may wish to consider whether the PTC, investment tax credit and other renewable mechanisms in the US have been effective in this respect. If a renewable policy is not based on creating a strong manufacturing and supply chain capability then existing incentives should presumably be stronger to ensure the flow of resource to that country. Capital grants and R&D incentives are likely to be required in any event for new technologies, although the US does benefit from a relatively strong venture capital community in the clean tech space. Several countries have chosen to focus these on economic development areas with varying degrees of success.

3 Some tax based incentives or feed in tariffs[1], if Government backed, can place strains on government treasuries with the impact that they can be withdrawn on electoral change (as occurred in the Netherlands for example). Climate change arguably requires a more sustained policy than can last beyond the next election. Tax based incentives for individual investment in projects (such as the KG fund structures used in Germany) can create substantial community interest, but can disrupt markets if they are withdrawn or modified (as happened in Germany). Notwithstanding these comments, cost is an important issue and it is important that the public (and business) feel value for money in the incentive mechanisms proposed.

4 It is important to complement a regulatory incentive with appropriate infrastructure. Ease of planning, appropriate grid investment to deal with distributed as opposed to centralised energy production and supply chain can have a very significant effect on the rate of deployment and undermine otherwise effective mechanisms. Micro-generation brings new challenges, for example the need to deploy smart metering as does the need to provide incentives for re-powering where technologies already deployed are reaching the end of their useful life.

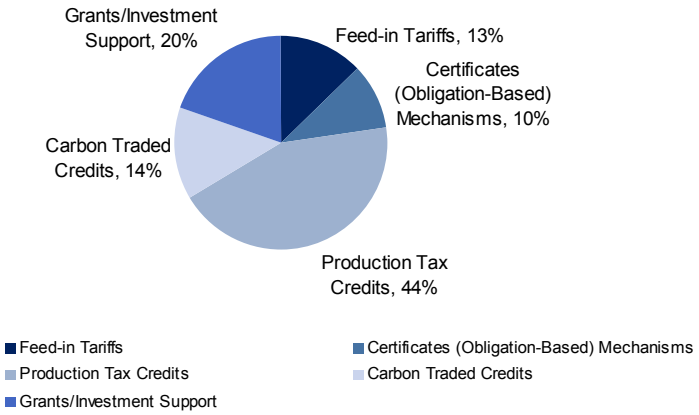
[1] The price per unit of electricity that a utility or supplier has to pay for renewable electricity from private generators. The tariff rate is set by the government.

What are the main causes of the renewables sector failing to achieve its potential?



5 There has been much debate over the effectiveness of feed in tariffs compared with other mechanisms. Feed in tariffs tend to leave more risk with the state and usually have a direct effect on the taxpayer or consumer. They have been effective in introducing large volumes of capacity but are arguably most effective in countries with less liberalised energy markets or a strong green lobby. In liberalised markets, a market based green certificate mechanism tends to be preferred. This can cause high energy tariffs to act as an incentive for developers and can lead to price distortion if supply is constrained by other factors such as grid capacity (as has arguably occurred in the UK). Many argue that carbon trading can provide adequate incentives, however, individual projects need visibility of forward prices for 10 or 15 years if investment is to flow in a cost effective manner. The federal tax incentives, when combined with individual state Renewable Portfolio Standards could be effective if applied more consistently.

Why do you consider to be the best mechanism to promote renewables?

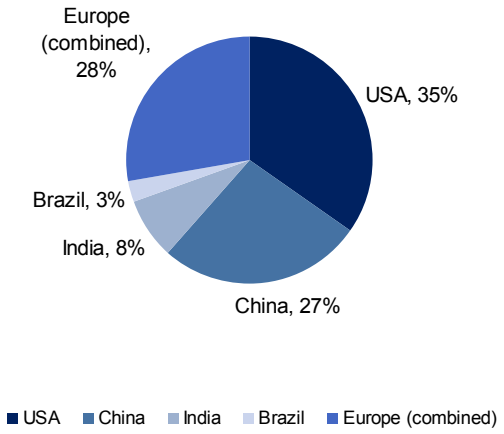


6 The character of public and corporate engagement is also a consideration. The issue posed by climate change requires active participation by government businesses and the public, balanced by due regard for cost. The democratisation of power whereby consumers, government, corporate and the public become suppliers of renewable energy in their own right as well as consumers is likely to be an increasingly potent force; particularly as many corporations see green energy as integral to their brand values and corporate social responsibility objectives. In many cases, regulatory changes supporting net metering (referred to above) and, the provision of financial incentives for on site capital investment are required. One other significant factor can be to ensure that government itself purchases appropriate volumes of green energy.

7. It is important to have due regard for the quality and availability of the indigenous resource. It is interesting to note that some countries with the greatest natural resource have not always been the most successful at harvesting it, e.g. UK and France with wind, and the US with biomass where the greatest focus to date has largely been on biofuels. In the UK, a technology indifferent structure was set partly to reduce consumer costs, although there are now proposals to introduce banding to facilitate less mature technologies (such as offshore wind and biomass). If other factors such as the creation of a strong domestic industry are important then it may be necessary to set tariffs relatively high – to compensate for poor indigenous resource levels. This has arguably occurred in Germany to great effect in the solar industry. Although the US is criticised by some for having different policies state by state, the inherently different geographic characteristics of individual regions provide strong arguments for a differentiated policy. The lack of renewable portfolio standards (RPS) in some states is more difficult to argue as part of a coherent strategy and there is a strong case to be made for harmonization of key parameters.

8 Focus on renewable or alternative energy can lead to insufficient attention being paid to combined heat and power (CHP). That said, there is some interesting work being done in the area of using renewable resources to generate combined heat and power. A number of countries have effective mechanisms to incentivise the use of district heating and on site CHP for domestic and commercial users. We are currently undertaking a review for the UK government on policies for renewable CHP. A further issue is the use of building construction regulation, and equipment standards to promote changes in energy efficiency behaviours. We have for instance recently completed a report for the Greater London Authority on financing mechanisms to create low carbon infrastructure in a metropolitan environment. This is an issue which is clearly gaining momentum in the US as well.

Finally, it is interesting to note the feedback from our webcast survey as to the regions most likely to produce growth in production of energy from renewable resources over the next 10 years.



This bodes well for the US, but also signifies the strong influence that China (and India) is likely to have on the market.

I would encourage the Committee to continue the excellent work it has begun to encourage the production of renewable energy in the US. As you go forward in your deliberations I would ask that you consider the fact that these are capital-intensive businesses competing in the global marketplace for capital. Our experience demonstrates that this market responds best to incentive mechanisms that are long term in nature, are designed to work in harmony with other incentive programs and that reward long term behaviors.

Exhibits

I set out below a summary commentary on the high scoring countries in our Country Attractiveness Indices.

Commentary — High-scoring Countries

USA – Production Tax Credit and State-specific RPS

Success due to increasing number of States adopting RPS mechanism together with good site availability. Biofuels also a strong growth sector.

1st CAI Score	All RE 72	Wind 73	Solar 75	Biomass / Other 64	Infrastructure 76
MW Total	26,803	11,603	200	15,000	-
MW 2006	-	2,454	-	-	-

Source: REN21, GWEC

Spain – Option of fixed price or market based tariff under Regimen Especial

Attractive renewables market resulting from broad-based tariff encouraging different sources of renewable energy. Recent revisions to the regime have made the tariff less attractive to onshore wind.

2nd CAI Score	All RE 63	Wind 63	Solar 71	Biomass / Other 57	Infrastructure 74
MW Total	13,915	11,615	100	2,200	-
MW 2006	-	1,587	-	-	-

Source: REN21, GWEC

India – Regional feed-in tariffs and tax incentives

Strong uptake of wind power by large power users has driven demand, together with generous State-led tariffs and tax incentives.

2nd CAI Score	All RE 63	Wind 64	Solar 61	Biomass / Other 50	Infrastructure 65
MW Total	8,870	6,270	0	2,600	-

MW 2006	-	1,840	-	-	-

Source: REN21, GWEC

Germany – 20 year guaranteed feed-in tariff under the EEG

Currently the biggest market for renewables, particularly wind power, driven by broad-based technology-specific feed-in tariffs.

4th CAI Score	All RE 62	Wind 62	Solar 72	Biomass / Other 60	Infrastructure 58
MW Total	25,621	20,621	1,700	3,300	N/a
MW 2006	-	2,233	-	-	-

Source: REN21, GWEC

UK – Green Certificate mechanism under the Renewables Obligation

High score due to very significant wind resource potential (and to a lesser biomass) and favourably received ROC mechanism with long tenor. However, planning and grid remain key issues in the medium term. Without offshore wind the UK would come behind Italy and China: with France, Canada and Portugal as strong challengers. The forthcoming renewable obligation banding review will be critical to the UK score.

4th CAI Score	All RE 62	Wind 62	Solar 48	Biomass / Other 57	Infrastructure 66
MW Total	3,586	1,963	11	1,612	-
MW 2006	-	635	-	-	-

Source: DUKES, GWEC

Drivers for Alternative Energy Policy

Until the 1990's Renewable Energy ("RE"), the generation of electricity from natural resources such as wind, solar, biomass, hydro, ocean and geothermal, was seen largely as the province of whole earth environmentalists rather than business. Power generation was considered best undertaken by large centralised coal, oil, nuclear and latterly gas installations. With the exception of hydro, RE was regarded as largely uneconomic with technology insufficiently advanced to provide the required economies of scale. Due to the concentrated efforts of pioneering manufacturers and developers and also rising oil and gas prices, the economic performance of many technologies has been transformed, particularly wind, solar and early stage biofuels. In this period, RE was encouraged by the support initiatives of particular governments seeking to encourage new environmentally friendly industries.

Individual states and regions have had a number of criteria in setting RE Policy:

1. Due regard for Kyoto and related agreements driven by a concern over climate change and specifically CO_2 emissions. The EU Renewable Energy Directive is clearly driven by Kyoto and has been very effective in

encouraging individual countries to adopt their own legislation (albeit on a non harmonised basis). The EC Directive 2001/77/EC (Sept.01) which sets targets for increasing the contribution of renewable energy sources ("RES") to gross domestic energy consumption from 6% in 2000 to 12% in 2010, and green electricity contribution to total electricity generation from 14% in 2000 to 22% in 2010 at a European level. The Directive also sets indicative, and non-binding, targets at national level as indicated below.

Targets for electricity from RES (EC Directive 2001/77/EC)

	Renewable Electricity Generated in 1997 (TWh)	Percentage contribution of renewable electricity to total electricity generation in 1997 (%)	Percentage contribution of renewable electricity to total electricity generation Objective in 2010 (%)
Austria	39.05	70.0	78.1
Belgium	0.86	1.1	6.0
Denmark	3.21	8.7	29.0
Finland	19.03	24.7	31.5
France	66.00	15.0	21.0
Germany	24.91	4.5	12.5
Greece	3.94	8.6	20.1
Ireland	0.84	3.6	13.2
Italy	46.46	16.0	25.1
Luxemburg	0.14	2.1	5.7
Netherlands	3.45	3.5	9.0
Portugal	14.30	38.5	39.0
Spain	37.15	19.9	29.4
Sweden	72.03	49.1	60.0
United Kingdom	7.04	1.7	10.0
Community	**338.41**	**13.9%**	**22%**

In March 2007, EU leaders agreed to a 20% mandatory target for renewable energy generation by 2020. Individual country targets are yet to be assigned, but are likely to cover all EU-25 countries. Markets with the most ambitious RES targets by 2010 under the EC Directive include Germany, the UK, France, Italy, Spain and Sweden. The short-term gap in RE capacity is essentially expected to come from wind power (both onshore and offshore), which is currently the most economically viable of all RE technologies (excluding large-scale hydro and geothermal). Other RE technologies, including biomass, solar power, and wave and tidal, are expected to make a significant contribution to the energy mix in the medium to longer term.

The Directive 2001/77/EC gives each member state the freedom to implement the support mechanisms most suitable to national objectives (often set to be in line with the indicative objectives proposed by the EC). This has lead to a wide range of support mechanisms including a range of feed-in tariffs, grants, tax and

soft loan incentives, and sometimes technology-specific targets at national level.

The lack of homogenous support mechanisms does create a significant cost for investors. Although some commentators advocate carbon trading as a solution, others are concerned that there is insufficient certainty as to future carbon prices for this to act as a mechanism for long term investment other than in developing territories.

2. Security of energy supply and the need to maximise indigenous energy production vs dependence on remote sources possibly subject to interruption of supply. This was quoted as the reason for recent incentives for biofuels in the US.

3. Rising oil and gas prices, increasing the cost effectiveness of fuel free resources in particular (this also led to an initial rush towards renewables, pre Kyoto eg California and Denmark in the 1970's).

4. Support for domestic industry:

   (a) to encourage the research, development and manufacture of alternative energy technologies. Strong incentives for renewables have created significant industries in Denmark, Germany, Spain and more recently India and most likely to follow China.

   (b) to create a climate which fosters new entrepreneurial businesses or refocuses large corporate activity in renewable energy, development and generation. The Spanish system has created national renewable energy focused champions with Iberdrola and Acciona for example; and

   (c) to encourage the use of natural resources to provide alternative economic activities for the farming community via Biofuels and Biomass eg Brazil's ethanol market and more recently that of the US.

5. Support for broader environmental objectives: Incentives have been used to support technologies which deal with landfill gas, sewerage gas, coal mined methane, energy from waste and from refuse derived fuel. In some cases, broader environmental concerns particularly in relation to sustainability have raised questions over

   (a) coal mined and coal bed methane in some countries;

   (b) the diversion of food crops for the production of first generation biofuels; and

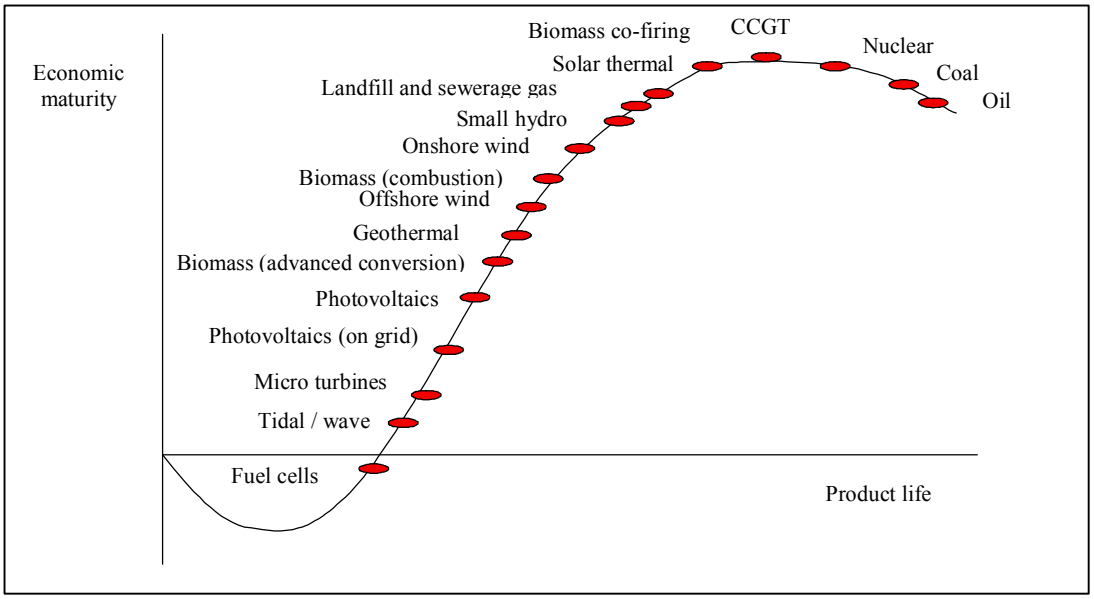
   (c) In the EU, the incineration of non separated municipal waste is not regarded as a renewable energy source, although other incentives are provided by way of the landfill directive.

6. The degree of maturity of the technology, with new technologies often best supported by way of R&D incentive and capital grants. As they approach commerciality the more revenue or production based incentives are more appropriate.

The position of RE individual technologies compared to conventional power can be shown in terms of the product life cycle below.

Renewable Energy Technologies Life Cycle in comparison to conventional energy

Source: Ernst & Young



NB In Appendix 1, we provide a costing by technology for projects based in the UK. Positioning is necessarily affected by particular support mechanisms.

The economics of RE broadly follow a similar cash flow pattern to other types of power generation; namely a large initial capital outlay, occurring after quite lengthy periods of planning and construction, followed by a relatively predictable operating income stream, usually derived from the sale of electricity to the grid through a power purchase agreement ("PPA"), over periods of 10 to 20 years. As with all power projects, the cost of capital and the efficiency of financial and tax structuring is an important component of project returns, especially when operating costs are low. In the case of biofuels these market dynamics are often complicated by exposure to raw material commodity risk as an input, combined with merchant risk on outputs with long-term contracts having more the characteristic of a tolling agreement than a PPA.

RE differs from conventional power generation in that the source of fuel is often free, and where it is not (eg biomass), there can be additional sources of income (eg gate fees). RE fuel sources are also not vulnerable to price shocks caused directly or indirectly by changes in oil (and gas) prices, although for biomass supply infrastructure can be problematic. The conversion of free natural resources into power requires technologies which often have a significantly lower conversion (or load) factor than the principal fossil fuel competitor, the combined cycle gas turbine. In addition, costs per MW of RE installed are often higher than for conventional technologies as RE technologies are at a still relatively early stage in the product life cycle, and, as yet, lacks the economies of scale of their fossil fuel counterparts. Government incentive schemes (discussed below) seek to compensate for these factors by providing

reliable above market income streams and capital grants for newer technologies, producing attractive returns for RE projects.

The more mature technologies pose fewer difficulties for developers and financiers and consequently schemes involving them require lower levels of credit enhancement through strong equity partners and long term government backed PPA's. Hence, in the right market conditions, merchant plant and lease financing can take place with CCGT, biofuels, landfill gas and in some cases wind, but is unlikely to be acceptable for advanced conversion biomass, wave or on grid photovoltaics projects. As commented above, biofuels projects are particularly dependent on the price of oil and feedstock inputs. These less mature RE technologies are much more likely to require high priced, strong incentive regimes or PPA's, experienced operators and strong counter-parties who may be required to provide financial guarantees or on balance sheet finance.

Many advanced conversion biomass technologies, such as pyrolysis, anaerobic digestion and gasification, are immature and insufficiently proven to meet the naturally conservative requirements of investors and project financiers, with efficacy insurance for example difficult to obtain. A number of equipment manufacturers are at an early stage in their lifecycle and often unable to provide sufficient counter-party collateral for product warranties and EPC commitments. In some cases, where suppliers have suffered significant financial difficulties, developers have had to assume the role of turnkey contractor with attendant system integration risks and significant periods of down-time as teething troubles are ironed out.

Solar technologies can be expensive (depending on resource quality) without support. Nevertheless both on and off grid markets are generating rapid growth. Newer technologies such as wave and marine current turbines offer great prospects for growth, but are often disadvantaged by support mechanisms targeted at more mature technologies closer to cost convergence

Other factors that require consideration

(a) Planning and Permitting

There are significant risks of planning and permitting delaying projects with a costly attrition rate due to permitting failure: after expensive public enquiries and appeals then overall investment returns can suffer. As a consequence some territories with the highest wind resource (eg, the UK and France) do not have commensurate installed capacity: although steps have now been taken to accelerate development in both countries.

(b) Grid infrastructure

This can be an inhibitor to growth in the longer term, requiring further investment, if wind, which is intermittent by nature, is to achieve more than 20% of total generation. This issue could be particularly relevant as large 500 MW plus wind farms become more common place onshore and offshore or in remote locations (eg Scotland).

(c) Supply Chain

The global supply chain is constrained. Inconsistent policies tend to discourage manufacturing investment. Those countries without high levels of domestic manufacture need to be able to satisfy the investors that their mechanisms are sufficiently attractive to ensure appropriate inflow of capital goods. In the past year, the US PTC has been effective at redirecting wind turbine output to the US at the expense of some European countries.

Tools commonly used to stimulate the market

Four generic support mechanisms can be distinguished for renewables and they are:

- Tariff incentives, which provide RE generators with advantageous and sometimes guaranteed offtake arrangements;
- Tax incentives, which influence the financial structure and return that can be expected of such projects;
- Grants, available at either local, regional, national and international levels (eg, EU, federal subsidy at Federal level in the USA) subject to project specifics; and
- Soft loans, which provide investors with subsidised borrowing facilities.

Some support mechanisms deployed in Europe and the US are technology-specific, and may be used in conjunction with other incentives/areas of support to help facilitate the deployment of such technologies. The table below provides an overview of the generic tariff incentives available to wind energy across the European and US markets, and a brief comment on their implications for project financiers.

Tariff incentives overview

Tariff	Description	Examples
Fixed Feed-in Tariffs	Single guaranteed payment per kWh produced	Germany (fixed feed-in tariff)
Fixed Tariffs through Competitive Tendering	Competitive "price-capped" bidding process for predefined generation capacity	France (government set tariff, some awarded by competitive tender)
		Portugal (government-set tariff awarded by competitive tender)
	Price fixed by bidders, or by legislation	India (set by State)
		China (competitive tender, typically at lowest price)
Premium	Fixed price premium on top of the market price for power.	Spain (recently restricted premium available to wind operators)
Obligation-based with tradeable Green Certificate	Obligation on utilities to supply a minimum amount of green electricity, historically 'technology blind'	Italy (guaranteed price offered to generator by regulator)
		USA (RPS varies significantly by State)
	Green certificates traded separately from power.	UK (likely to be 'banded' in future by technology)
Production Tax Credit	Tax credit available to RES operators on income from generation	USA (federal policy to 2008)
Brown Energy Taxes	Levy on brown energy cost	Climate change levy (UK)
Accelerated Depreciation	Incentivised tax depreciations on capital investments	100 % first year allowance for onshore winds
Investment subsidies	Grant or tax-based (ie tax rebate on capex)	Portugal, Greece (on top of feed-in tariff)
		USA (tax credit for solar installation)
Soft loans	Non-commercial loan rates available to RES projects	Germany (offered by KfW bank to RE projects)

Government-backed vs. market-led tariff mechanisms

Feed-in tariffs – or similar – are generally highly attractive in terms of value (eg, Germany with €89/MWh for the first five years of operation for onshore wind) and period of guaranteed offtake (for example twenty years for onshore wind in Germany). Such tariffs therefore provide a very strong incentive for technology deployment as has been seen in countries where they have been implemented (eg. Denmark with just over 3GW installed capacity at end of 2003 and Germany with circa 14.5GW installed capacity at end of 2003). However high priced longer-term tariffs do encourage the development of low wind speed sites, which would otherwise be uneconomic.

GC mechanisms (or RPS) can also be highly attractive for RE generators in occasions where GC prices reflect high demand conditions in a seller's market: this is currently the case in the UK where highly valued short-term ROC prices make for very attractive project economics for generators prepared to take market risks. By contrast to feed-in tariffs, the availability of long-term power

offtake contracts in market-driven environments is crucial to developers wishing to secure project finance. Lenders may indeed require minimum debt service guarantees possibly involving a minimum power offtake price (floor price) and specific credit rating requirements from the offtaker. This creates its own set of difficulties in markets where the energy sector may not be financially very strong or where government targets are not aggressive enough in the medium to long run to create the level of demand that should guarantee pricing. Shifting market risks to a power offtaker may lead to low long-term power offtake prices, which will in turn decrease equity returns.

Ernst & Young Renewable Energy Country Attractiveness Indices

Methodology

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 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 below).

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 tailor-made studies to meet specific corporate objectives.

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 is explained by the large amount of unexploited wind resource, strong offshore regime and attractive tariffs available under the ROCs system. 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:

- Wind Index and Offshore Wind Index – 85%
- Solar Index — 5%
- Biomass and Other Resource Index — 10%

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%

Technology Factors

These provide resource specific assessments for each country and comprise four indices providing resource specific assessments for each country, namely:

- Onshore Wind
- Offshore Wind
- Solar
- Biomass and Other Resources

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

- Power offtake attractiveness — 19%: This includes the price received, the potential price variation and length of PPAs granted. Higher scores are also achievable if the Government guarantees the power offtake rather than merchant offtakers.
- Tax climate — 11%: Favourable, high-scoring tax climates that incentivise renewable energy generation can exist in a variety of forms and/or structures. The most successful incentives and structures have been direct RE tax breaks or brown energy penalties, accelerated tax depreciation on RE assets and tax-efficient equity investment vehicles for individuals.
- 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 RE technologies to kick-start the industry. High scoring is achieved through an array of grants and soft loans.
- Market growth potential — 18.5%: This considers current capacity compared to published targets. Higher scores are given if ambitious targets have been made and policy frameworks are in place to accelerate development. The realism of targets are also taken into account as well as the seriousness with which they are being pursued (eg, penalties in place for non-compliance).

- Current installed base — 8%: High installed bases demonstrate that the country has an established infrastructure and supply chain in place, which will facilitate continued growth and in particular encourage the repowering of older projects.
- Resource quality — 19%: For example wind speeds and the sun index.
- Project size — 15.5%: Large projects provide economies of scale and a generally favourable planning environment, which facilitates project development financing.

Long-term Wind Index

These indices are derived from scoring:

- The Onshore Wind Index – 70%
- The Offshore Wind Index – 30%

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. Whilst this may not affect current projects, these effects are particularly important when considering long-term investment prospects.
- Planning and grid connection issues — 42%: Favourable 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, characterised 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.

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 gives scores for onshore and offshore separately.

The scoring follows the same methodology as for the Long-term Index but with a more focused set of parameters and a tailored weighting. Therefore the Indices consider on a weighted basis the following for both onshore and offshore wind separately:

- Power offtake attractiveness – 27%
- Tax Climate – 8%
- Resource Quality – 14%
- Market Growth Potential (to end 2009) – 40%
- Project Size – 11%

In the Offshore Wind Near-term Index, countries with no projects estimated to reach construction in the next two years (to end 2009) are excluded.

It should be noted that the Market Growth Potential score is based on a view taken on the basis of a range of business analysts' forecasts and Ernst and 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.

Whilst comparisons have been made between scores in the Long-term and Near-term Indices it should be emphasized that, due to the different weightings and parameters used, these cross-comparisons are of a narrative nature only and in no means indicate any quantitative valuation.

Global Highlights

All Renewables Index

The US retains the top spot in the All Renewables Index for Q4 2006 following its rise to the position in Q3 2006. Spain's score continues to fall, a result of changing policy taking the shine off investments in onshore wind.

Germany moves into equal 4th position with the UK, as news of streamlined planning rules improves Germany's score in the Renewables Infrastructure Index.

Canada sees a slight improvement in its position because of renewed government support for renewable energy, which had previously halted funding of the WPPI tax incentive programme.

The Netherlands has suffered a significant drop in score again this quarter following confirmation that the tariff regime would close to new applications.

Australia, on the other hand, has recovered given Provincial support for renewables. New South Wales, Victoria and South Australia now have either actual or proposed emissions targets.

The Long-term Wind Index sees India rise to 2nd place behind the US due to the decline of Spain.

Near-term Wind Index

Canada takes equal 4th alongside Germany and Italy and moves into equal 5th position in the Near-term Wind Index beside the UK. High prices awarded to renewable energy output in Italy support this move, and strong near-term targets within Provinces are driving strong demand in Canada.

All Renewables Index at Q4 2006

Ranking**		Country	All Renewables	Wind Index	Onshore Wind	Offshore Wind	Solar	Biomass / Other	Infrastructure ***
1	(1)	USA*	72	73	79	58	75	64	76
2	(2)	Spain	63	63	70	48	71	57	74
2	(3)	India	63	64	74	41	61	50	65
4	(4)	UK	62	63	62	67	48	57	66
4	(5)	Germany	62	62	62	63	72	60	58
6	(6)	China	57	60	63	54	44	36	60
6	(7)	Italy	57	57	63	43	67	53	64
8	(7)	France	56	56	58	52	58	53	55
8	(7)	Portugal	56	57	62	45	62	49	63
8	(7)	Greece	56	58	62	49	53	43	59
8	(11)	Canada	56	59	64	47	41	41	63
12	(11)	Ireland	55	57	58	54	35	45	60
13	(14)	Sweden	52	52	53	52	44	53	53
14	(13)	Netherlands	50	51	49	55	45	39	49
14	(14)	Norway	50	51	52	49	31	48	51
14	(16)	Australia	50	51	54	43	59	45	54
14	(16)	Denmark	50	51	47	59	44	46	61
18	(18)	Belgium	49	51	49	55	36	36	53
19	(19)	Finland	38	37	37	36	27	50	39
20	(20)	Austria	34	31	45	NA	48	48	49

Source: Ernst & Young LLP

** (RPS) This indicates US states with Renewable Portfolio Standards and favourable wind regimes*

*** Ranking in the Q3 2006 Index in brackets*

**** Combines with each set of Technology Factors to generate the Individual Technology Indices*

The US retains pole position in the All Renewables Index as investors take a long-term view that political support has now turned firmly in favour of renewable energy. Wind, biofuels and solar are now key growth areas as the Bush Administration seeks to lower the country's dependence on foreign oil. Evidence of this is shown in the 2006 renewal of the Production Tax Credit and Investment Tax Credit, as well as new grant programmes and interest-free loans at federal and state level. Spain's score in the All Renewables Index drops further, making it joint second with India as details of the new tariff regime emerge, with a notable drop in wind tariffs from €97/MWh currently to €67–€84/MWh under the new legislation. Although development is likely to continue, the change has damaged confidence in the sector.

Germany's score in the All Renewables Index is now level with the UK largely as a result of an increase in the infrastructure score with news that planning processes are to be streamlined. The Offshore Wind score has also improved with the German Government's decision to make transmission system operators pay for the cost of connecting offshore wind farms to the grid.

Project news in China dominates, but some interesting political statements have been made such as a goal for biodiesel to make up 10% of total diesel consumption by 2020 and produce 30 million tonnes per annum by this date. Ethanol is also likely to see similar growth from companies such as China National Cereals, Oils and Foodstuffs Corporation (COFCO), which plans on spending US$1.3bn on new production capacity over the next five years. In Beijing, the work being carried out to tackle emissions will continue up to and after the 2008 Olympics, as the state has capped emissions growth at 18% by 2010. The country's concession programme for wind development made a step forward with 1GW of turbine contracts – all supplied by domestic manufacturers – being awarded for three projects in Inner Mongolia and Hebei provinces. Its position in the Indices recognizes the potential in terms of market size and growth potential, but also recognizes that this is a complex market and that the requirement for local partnering and presence is a barrier to some investors.

Long-term Wind Index at Q4 2006

Ranking**		Country	Wind Index	Onshore Wind Index	Offshore Wind Index
1	(1)	USA*	73	79	58
2	(3)	India	64	74	41
3	(2)	Spain	63	70	48
3	(3)	UK	63	62	67
5	(5)	Germany	62	62	63
6	(6)	China	60	63	54
7	(7)	Canada	59	64	47
8	(7)	Greece	58	62	49
9	(9)	Portugal	57	62	45
9	(9)	Ireland	57	58	54
9	(9)	Italy	57	63	43
12	(12)	France	56	58	52
13	(15)	Sweden	52	53	52

Ranking**		Country	Wind Index	Onshore Wind Index	Offshore Wind Index
14	(13)	Netherlands	51	49	55
14	(14)	Norway	51	52	49
14	(16)	Denmark	51	47	59
14	(16)	Belgium	51	49	55
14	(16)	Australia	51	54	43
19	(19)	Finland	37	37	36
20	(20)	Austria	31	45	NA

Source: Ernst & Young LLP

** (RPS) This indicates US states with Renewable Portfolio Standards and favourable wind regimes*

*** Ranking in the Q3 2006 Wind Index in brackets*

Spain's proposed subsidy change will greatly affect the tariff received by wind operators, though it is not believed that this will slow development entirely. Spain therefore drops to 3rd place alongside the UK.

Denmark appears to be strengthening its own position as an established leader in renewable energy stating that it plans to double the contribution of renewable energy to 30% by 2025 and cut the use of fossil fuels by 15%. In Sweden, developers have been gearing up in anticipation of a new energy minister who is pledging €3.3m funding for municipal wind farms. Whilst Green Certificate (GC) prices are not the highest compared to other European markets, Sweden offers a stable regime with ambitious targets of 10TWh by 2015 and a GC market until 2030. Norway, on the other hand, has dropped further in the Indices largely due to a reluctance to commit to a joint green certificate market with Sweden, and a relatively low feed-in tariff rate offered instead.

Wind development activity has stalled in the Netherlands following the Government's decision to halt the MEP tariff regime to new applications, stating that the renewables target would be met without the incentive.

Canada looks to be doing a U-turn on its stalled wind programme as the Canadian Government pledged US$1.7bn to the ecoENERGY initiative, including around 4GW of renewable power production to be installed over the next four years. The programme will provide a production incentive to renewables generation as well as grants to support micro-renewables and R&D. Ireland has been named as the biggest landfiller in Europe and this opens the door to significant opportunities in the energy-from-waste market, which has increased the Biomass score in this quarter's All Renewables Index.

Near-term Wind Index at Q4 2006

Ranking**		Country	ST Combined Wind Index	ST Onshore Index	ST Offshore Index+
1	(1)	USA*	89	89	NA
2	(2)	Spain	75	75	NA
3	(3)	India	74	74	NA
4	(4)	Germany	55	55	54

Ranking**		Country	ST Combined Wind Index	ST Onshore Index	ST Offshore Index+
4	(6)	Canada	55	55	NA
6	(5)	UK	53	51	82
6	(6)	Italy	53	53	NA
8	(8)	France	52	52	41
8	(8)	China	52	52	NA
10	(10)	Portugal	49	49	NA
11	(11)	Greece	43	43	NA
11	(11)	Ireland	43	43	NA
13	(13)	Australia	42	42	NA
14	(14)	Netherlands	36	33	57
14	(15)	Norway	36	36	NA
14	(17)	Belgium	36	35	40
17	(16)	Sweden	35	35	56
18	(18)	Denmark	31	28	45
19	(19)	Austria	30	30	NA
20	(20)	Finland	27	27	NA

Source: Ernst & Young LLP

** (RPS) This indicates US states with Renewable Portfolio Standards and favourable wind regimes*

+ Countries with no offshore development expected to reach construction in the next two years have been excluded from the Near-term Offshore Wind Index

*** Ranking in the Q3 2006 Near-term Wind Index in brackets*

The Near-term Wind Index takes the perspective of an investor looking to make a commitment within the next two years. The methodology and weightings used to produce the Near-term scores are slightly different to that of the Long-term scores so the two are not directly comparable. The Near-term Index places a greater emphasis on market growth and takes into account a narrower range of parameters than the Long-term Index.

Italian electricity regulator, Gestore dei Servizi Elettrici, has confirmed that renewable operators will receive €125.8/MWh for 2006 Green Certificates. The market is potentially the most lucrative for wind operators in the near term, hence its rise in the Near-term Index. Its position would be higher in the Long term Indices were it to renew its targets beyond 2010.

In Canada, the new eco Energy programme targets significant installation of wind in the next three years, which is good news to investors who had taken a bet on such an incentive being implemented. Significant Provincial efforts will also boost wind investment in the near term. Requests for Proposals in 2007 are expected to come from Quebec (2,000MW), Manitoba (300MW) and Nova Scotia (130MW), and British Columbia is requiring 50% of new power projects to come from ‘clean’ energy.

Canada joins Germany in 4th place, displacing the UK for the first time since the Indices began four years ago. The UK, with its high ROC prices still makes this an attractive market to invest in, in the near term. UK projects still attract premium pricing and highly competitive bidding, in the hope that the current review of the RO will offer existing projects protection from any reduced incentive for onshore wind.

Commentary — High-scoring Countries

USA – Production Tax Credit and State-specific RPS

Success due to increasing number of States adopting RPS mechanism together with good site availability. Biofuels also a strong growth sector.

1st CAI Score	All RE 72	Wind 73	Solar 75	Biomass / Other 64	Infrastructure 76
MW Total	26,803	11,603	200	15,000	-
MW 2006	-	2,454	-	-	-

Source: REN21, GWEC

There is no sign of the anticipated slowdown in the US biofuels market after the US Government issued its strategy for developing alternatives to petroleum. Targets have been set to consume 13 bn gallons of renewable fuels by 2015 (more than double that today), with a particular focus on biomass. The Bush Administration has stated its intent in reducing petrol consumption by 20% over 10 years and has asked Congress for US$2bn to fund cellulosic ethanol R&D.

The renewables sector breathed a sigh of relief for another year as the PTC and Investment Tax Credit were renewed at the end of 2006. This ends a record year for US wind, with nearly 2.5GW wind power projects installed during 2006 taking the country's total capacity to 11.6GW. The growth is likely to continue unabated, with a further 3GW expected to come online in 2007.

A new tax incentive for renewable energy projects has also been announced, to reach those who could not access the PTC – namely rural electric co-operatives and municipal utilities – called Clean Renewable Energy Bonds (CREBs). The CREBs work by raising money from outside investors in the form of a loan (a bond). Instead of receiving interest on their investment, outside investors are able to claim a tax credit against their own tax liability whilst the project raises interest-free capital to finance development. The new scheme is already proving popular, with around US$2.6bn in CREBs financing nearly 800 projects, with around one-fifth represented by rural co-operatives and the remainder for municipal-owned projects.

Leading American corporations are now turning to renewable energy for reasons of energy security and shareholder demands for more responsible companies. GE has announced that it is undergoing a solar PV makeover at its corporate headquarters and 30 facilities worldwide. Wal-mart has been notably vocal in its green future, looking to increase the use of biofuels for transport, solar and wind for its stores and improving energy efficiency in stores. Other

companies are following suit as they become aware of the potential value in the new 'clean tech' arena.

Spain – Option of fixed price or market based tariff under Regimen Especial

Attractive renewables market resulting from broad-based tariff encouraging different sources of renewable energy. Recent revisions to the regime have made the tariff less attractive to onshore wind.

2nd CAI Score	All RE 63	Wind 63	Solar 71	Biomass / Other 57	Infrastructure 74
MW Total	13,915	11,615	100	2,200	-
MW 2006	-	1,587	-	-	-

Source: REN21, GWEC

The Spanish Government has cut wind subsidies from €97/MWh to €67–€84MWh to boost other renewable power sources that co-generate power and heat, as well as solar power and biomass.

New proposals currently being considered by the Government, which would come into force from 2011, could offer a guaranteed 7% profit return for wind and hydro generators on the regulated tariff, and 5-9% from the liberalized market. Biomass, biogas and solar would benefit from higher, guaranteed profit margins.

The Spanish wind giant, Iberdrola, has set a precedent by investing over €3bn in the renewable energy industry. The portfolio includes solar PV installations, but will predominantly consist of wind farm projects, with €891m invested in Andalucia and €781m in Castilla-Leon. The long-term plan is to allocate 38% of funds to renewable projects abroad until 2009, which will increase to 56% by 2011.

In other wind news, Gamesa has signed three new wind deals worth €613m with total generating capacity of 710MW. The deals include 264MW supplied to EDP affiliate Neo Energia in Spain, 166MW to Enel for use in Italy and 280MW to Ibereolica for use in its wind farms in Northern Spain.

Endesa has signed an agreement with Isofoton for 100MW of solar PV equipment. The €250m deal includes the construction of the world's seventh largest polysilicon processing plant, enough for 250MW PV modules per year. Another PV project under way is La Magascona in Trujillo, which will have the capacity to generate up to 20MW. The €176m project is a joint venture between Qualitas Equity partners and Fotowatio Energia Solar.

India – Regional feed-in tariffs and tax incentives

Strong uptake of wind power by large power users has driven demand, together with generous State-led tariffs and tax incentives.

2nd CAI Score	All RE 63	Wind 64	Solar 61	Biomass / Other 50	Infrastructure 65
MW Total	8,870	6,270	0	2,600	-

MW 2006	-	1,840	-	-	-

Source: REN21, GWEC

Renewables in India are becoming a major part of the country's energy mix, and its position in the All Renewables Index is largely a result of a political environment that is friendly to foreigners and even friendlier to an Indian-based renewables industry. Renewables contributed some 7% of India's electricity in 2006, generated from around 9.1GW of renewable capacity – two-thirds of which come from wind power and around 1GW from bioenergy power generation.

India's home-grown renewables industry remains buoyant; MSPL is planning for an IPO and restructuring to focus on renewables, Suzlon is to start on a 1,500MW wind farm in Karnataka, Velkan Energy has obtained permits to build a 10MW waste-to-energy plant in the energy-starved state, and on-site generation continues to be a leading source of projects as Hindustan Zinc – a leading Indian zinc producer – announced plans for a 75MW wind farm in Gujarat or Karnataka.

The Indian president has stated that 16% of India's electricity, amounting to 64GW, could be supplied by wind power within 25 years. A special emphasis on manufacturing is also on the Government agenda, as India sets up another 'Special Economic Zone' (SEZ) targeted at renewable energy plants, offering manufacturers exemptions from excise duties and export licenses. The project, based near Chennai, in Tamil Nadu, expects to attract over US$600m in new investment over the next four years.

Germany – 20 year guaranteed feed-in tariff under the EEG

Currently the biggest market for renewables, particularly wind power, driven by broad-based technology-specific feed-in tariffs.

4th CAI Score	All RE 62	Wind 62	Solar 72	Biomass / Other 60	Infrastructure 58
MW Total	25,621	20,621	1,700	3,300	N/a
MW 2006	-	2,233	-	-	-

Source: REN21, GWEC

Germany has seen another record year of growth, with renewable energy generation of over 70TWh of power and nearly 100TWh heat in 2006. Wind and hydro continue to dominate electricity production, and bioenergy for heat, but the picture is likely to change as incentives become more significant for bioenergy and solar technologies. Future projects will also benefit from a Bill approved by the Bundesrat to speed up and simplify planning proceedings for all infrastructure projects.

Germany's diverse renewables industry continues to demonstrate that it can be a leading market for both renewable energy generation and technology manufacturing, evidenced by the level of German stock market fundraising activity and project announcements during 2006.

Germany's leading biogas developer, Schmack Biogas, has formed a joint venture with Erdgas Suedbayern to construct a biogas CHP plant in Germany. This follows an announcement that rival biogas developer Nawaro Bioenergie has secured a supply of GE Jenbacher engines for its 20MWe and 22MWt plant in Klarsee.

Leading German PV supplier, Conergy, plans to invest €250m in fully integrated solar wafer & cell production works which are tipped to be 'first of its kind in the world'. Rival Solarworld is planning on doubling capacity at its Freiberg wafer production plant to 500MW per annum to address an order book stretching out to 2018. Further PV production is planned in Germany through a joint venture between Q-Cells and Solibro AB to build a facility capable of producing 25MW–30MW thin-film PV per annum.

UK – Green Certificate mechanism under the Renewables Obligation

High score due to very significant wind resource potential (and to a lesser biomass) and favourably received ROC mechanism with long tenor. However, planning and grid remain key issues in the medium term.

4th CAI Score	All RE 62	Wind 62	Solar 48	Biomass / Other 57	Infrastructure 66
MW Total	3,586	1,963	11	1,612	-
MW 2006	-	635	-	-	-

Source: DUKES, GWEC

The UK's attractiveness as a market is heavily influenced by its resource potential, in particular for offshore wind: it would come in equal 6th position behind Italy and China if measured against onshore wind only. In terms of MW installed, several markets installed more capacity than the UK in 2006, including China (1,347MW, open tender), France (810MW, fixed feed-in tariff), Canada (776MW, wind power production incentive) and Portugal (694MW, feed-in tariff). Despite this, the UK's high score in the Country Attractiveness Indices reflects the ability of the RO regime to support offshore wind.

In the North West of Scotland, the EU has intervened over the 652MW Lewis wind farm claiming that it is in breach of EU policies regarding protection of wildlife. UK property company and wind developer Peel Holdings reached financial close on the 65MW Scout Moor wind farm, with around GB£70m project financing. This was the UK's largest independent wind financing to date. Meanwhile npower has announced a GB£100m investment in two UK wind farms totaling 76MW capacity.

Bioenergy has been a feature of energy news in Scotland. Ineos plans to construct Europe's largest biodiesel facility in Grangemouth. The project will cost GB£70m, and is expected to fulfill 35% of the UK's biodiesel requirements once fully operational. Also in Scotland, Fife Council has approved the construction of a 100,000 tonne per annum oilseed biodiesel factory in Rosyth.

The Scottish Executive has backed plans by Northern Irish wood supplier, Balcas, to build a GB£24m biomass CHP facility on the site of a former aluminium smelting plant in Invergordon. This is Balcas' second biomass plant – the first being at its Northern Ireland headquarters – and will be one of largest biomass plants in the UK supplying around 5MW to the National Grid and around 3MW will be used to create wood pellets for domestic use.

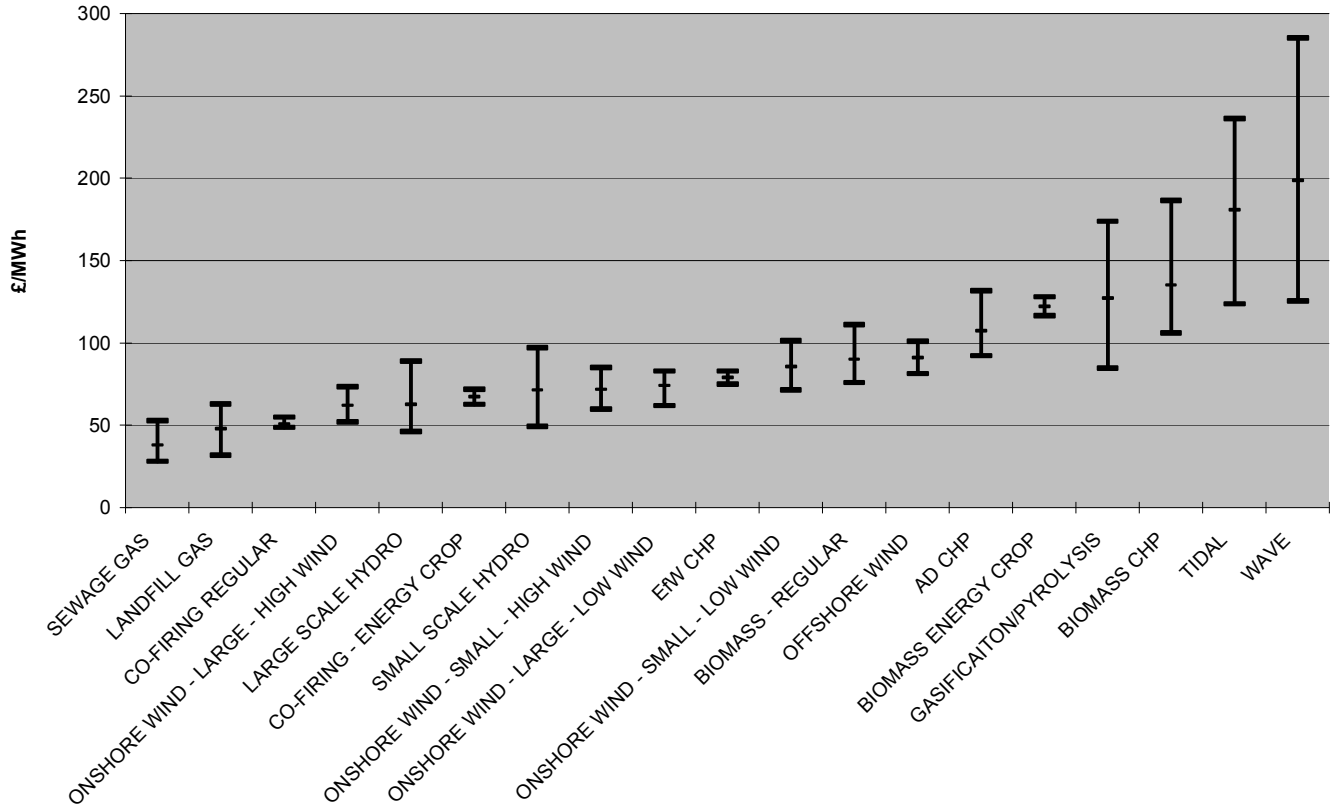
Welsh Prenergy Power has confirmed a proposed large-scale 350MW biomass-fuelled power station in South Wales, near Port Talbot, which will run on imported feedstock.

Infinis, which is owned by Private Equity firm Terra Firma, has announced a GB£80m acquisition of UK biogas company RE-Gen, which will include 42MW installed capacity and around 20MW in development.

On site generation took a step forward this quarter with Tesco's announcement that it is to install wind turbines, ranging from 225kV to 3MW, at 43 stores across the UK. AIM investors are also showing interest, such as the Low Carbon Accelerator, which has announced a GB£4.5m investment in small wind turbine manufacturer, Proven Energy.

Compliance with the Renewable Obligation (RO) has reached 76% as a result of the closing gap on the UK's renewables target. The gap could open up again, however, in the advent of the new 10% cap on co-fired ROCs, which will drive demand for other renewables and co-fired energy crops (which will still be eligible for full ROCs).

Indicative Levelised Cost 2006 (for UK projects)



Note: The levelised cost for Solar PV has not been included in the graph above due to the costs being much higher than the other technologies, with a typical cost of £635/MWh for UK projects this high cost reflects the poor solar resource in the UK