"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. Such a move may result in greater certainty and transparency in the UK support system, theoretically at least attracting lower cost capital, although with less than 10 years remaining to meet 2020 targets, major overhaul needs careful consideration.

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.

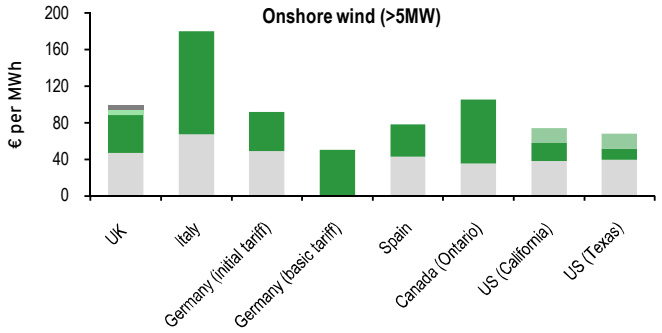
As the "shift to green" continues, the dilemma for policy-makers is how to maintain the rapid build-up of renewable capacity at a time of severe fiscal constraint and continued poor financial liquidity – and how this plays out in terms of technology mix, given that a portfolio of renewable technologies 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.

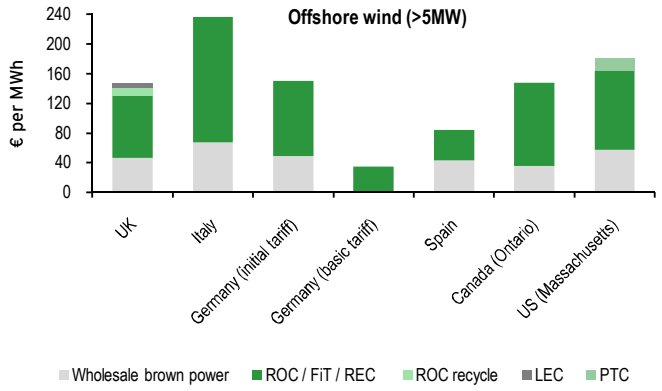
There are radically different costs of investment and per kilowatt hour by technology – not always commensurate with carbon impact. Other factors that are likely to come into play include the need to place renewables in the built environment where carbon emissions on the whole remain high, particularly 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

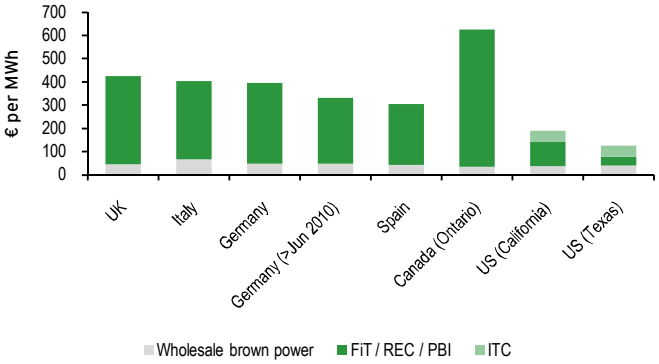
MW installed in 2009	UK	Italy	Germany	Spain	Canada	US
Onshore wind	793	1,114	1,887	2,459	950	9,996
Total / Brown Power (%)	213%	268%	187% (initial) 102% (basic)	181%	297%	196% (California) 173% (Texas)
Offshore wind	284	0	30	0	0	0
Total / Brown Power (%)	315%	352%	305% (initial) 71% (basic)	195%	418%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





Solar

	UK	Italy	Germany	Spain	Canada	US
Solar MW installed in 2009	10	730	3,800	69	41	477
Solar resource (kWh/m²/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)



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

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

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Germany incentives – *EEG 2009*

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

US brown power – *Energy Administration Information*

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