Renewables to 2020 and beyond: it's not just the shale gas challenge

Guest columnist: Jonathan Johns

In mature economies, full-blooded growth has yet to replace recession, with China at the top of investment tables

When we suggested in our May 2009 CAI article, "Conceptual framework for navigating a renewables business through the financial crisis" (see an updated version of this framework in Figure 1 below), that the credit crunch and recession would have an adverse effect on renewables until 2013, some commentators suggested that we were too pessimistic and that the climate change imperative and the desire to promote growth through cleantech jobs would protect the sector. Sadly, this has not been the case, with a low margin decade becoming the norm for mature markets.

Nevertheless, the industry overall continues to add capacity and attract investment that is the envy of many other sectors, albeit below the heady growth levels (e.g., 2005–07) anticipated when climate change, rather than the economy, was at the forefront of legislators' minds. Bloomberg New Energy Finance (BNEF) has reported that investment in utility-scale renewable energy investment plants in 2012 was around US$149b (€113b) – down from US$180b (€137b) in 2011 but still a very respectable total – and the comments that follow should be interpreted in that context.

As foreseen in our 2009 analysis, the credit crisis and recession have driven public finances to the edge, with the cost of renewable support mechanisms firmly in the spotlight: for the taxpayer or consumer in general, and for the fuel-poor and energy-intensive industries in particular. It is likely to remain so.

In mature economies, full-blooded growth has not replaced recession. The overhang of the banking crisis in Europe continues to restrict the availability of capital for infrastructure, with loan tenors and terms remaining challenging (and only marginally improved on their low point). Unsurprisingly, China now sits at the top of the clean energy investment tables.

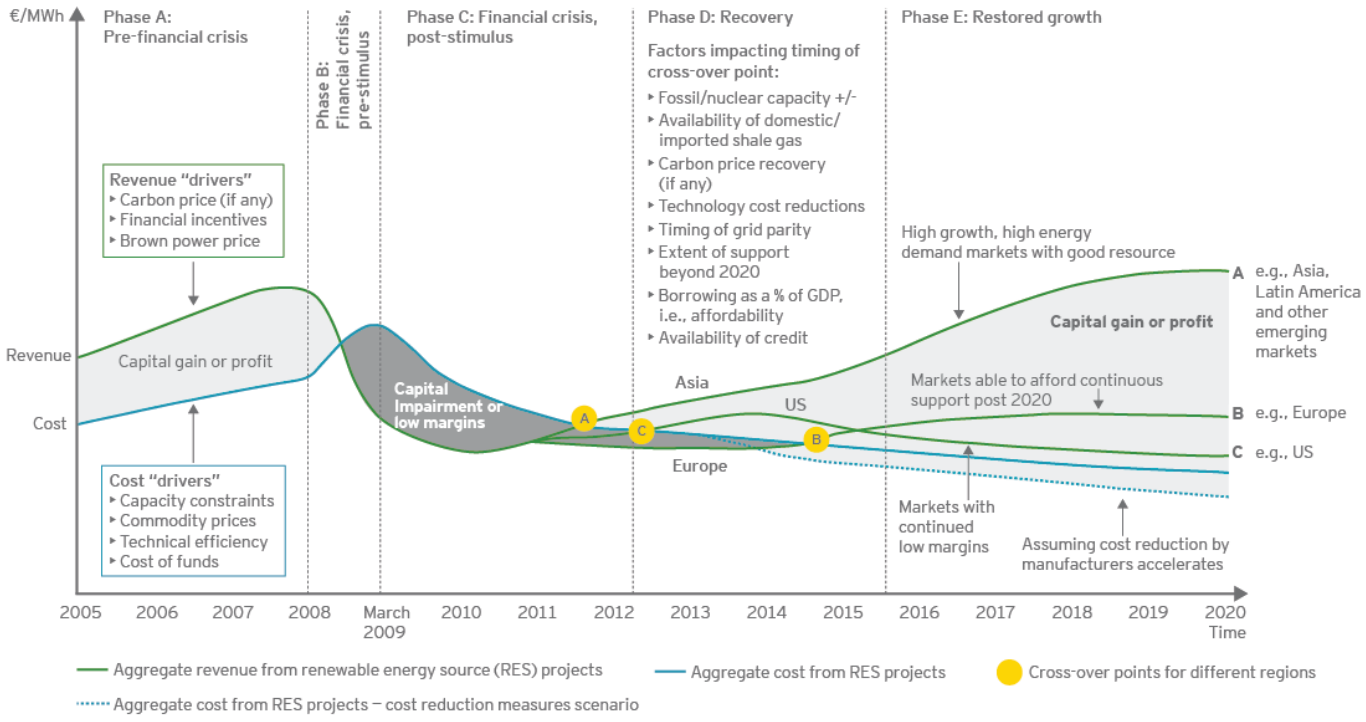
In the West, normal debt service has yet to be resumed

The availability of quasi-government funding has been vital to the closing of many important flagship transactions: whether US Treasury grants during the stimulus period, European Investment Bank (EIB) funding (recently replenished), UK Green Investment Bank monies (likely to be deployed by 2015–16), Australia's AU$10b (€8.0b) clean energy finance corporation (due to commence operations in July) and, hopefully, US initiatives to set up similar vehicles (e.g., the US$1b (€0.8b) Green Bank proposed by Governor Cuomo for New York state).

However, in more normal circumstances, there would have been strong banking competition for flagship projects, with quasi-government funds only required for more innovative transactions in less mature sectors.

Even allowing for pre-credit crisis largesse, in the West, "normal service" has not yet been resumed. For example, although the PTC investment market has shown early signs of revival, volumes are highly unlikely to get back to previous levels, with new see through structures, such as real estate investment trusts (REITs), being trialled for regulatory approval.

Figure 1: Renewables to 2020 – a financial framework recast



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Large utilities, once unbridled investors in the sector, have undertaken asset divestment programs, as they focus their portfolios on core sectors and redefine their roles as renewables portfolio developers and operators — rather than owners — often divesting substantial equity stakes to specialist renewable energy funds, pension funds, sovereign wealth funds and strategic investors (witness a number of recent transactions by E.ON, Iberdrola, EDF, Dong and Eneco).

Although transactions recycling utility capital are pleasingly increasing in frequency, size and geographic coverage, the new investor influx has yet to become the tidal wave needed to satisfy the huge infrastructure capital demands faced by the sector as whole in the run up to 2020.

There is clearly going to be a slower pathway to growth than that originally envisaged in 2009

Not all projects can have the "blue chip" sponsors favored by many of the new financing entrants who have, on the whole, limited their attentions to large-scale onshore or offshore wind and solar transactions — leaving medium-sized players and arguably the relatively undervalued biomass sector as a whole, out in the cold. BNEF estimates that, in 2012, investment in the biomass and waste to energy sector fell by 27% to US$9.7b (€7.4b), while solar and wind investment fell less (US$142.5b (€108.2b) down 9% and US$78.3b (€59.4b) down 13% respectively). For emerging technologies, such as wave and tidal, prospects are even starker unless a big ticket corporate player can be attracted.

Cleantech venture capital has also been in retreat, particularly in North America where funds have been burned by investments in the solar sector and biofuels, so that next stage technologies have become even more difficult to fund. Even more cautious infrastructure funds have had their setbacks in once core markets, such as Spain — although others have profited by secondary sales of aggregated portfolios to insurance funds or other consolidators.

There is clearly going to be a slower pathway to growth than that originally envisaged in 2009, with some markets yet to come out of recession. Only a few economies such as China (the leading destination for clean energy investment at US$67.7b (€51.4b), up 20%) have sufficient firepower to use economic stimulus in the renewable sector to raise domestic installation targets radically to compensate for the impact of declining global demand on its solar and wind manufacturing industries.

In the last quarter of 2012, China consumed over a third of the global market for PV modules, thereby supporting indigenous manufacturers in a way that other countries have found difficult to compete with — leading to continued plant closures in the West. In 2013, China plans to more than double its solar capacity by adding 10GW, and increase its wind capacity by 30% adding 18GW. Leaving aside grid connection issues, this is a scale of investment unmatched in other markets: but perhaps insufficient to prevent the need for further structural change in the manufacturing industries.

Many established technology manufacturers have been forced to undergo protracted and difficult negotiations to restructure debt, with the weaker party having to merge or suffer insolvency. The trend toward consolidation and difficult financing discussions is likely to continue; and probably needs to accelerate if industry is to achieve the cost reductions required. Aggressive cost reduction techniques (such as the cross-sharing of platforms common in the auto industry between otherwise competing manufacturers), do not occur readily in the wind industry, for example. It is widely recognized that further shake-up is required in the solar industry, not just in the West.

In the OECD, countries with rapidly growing markets are more of the exception than the rule. Japan, for example, has renewed interest in renewables as a consequence of its aversion to nuclear and exposure to high fossil fuel import costs (total clean energy investment in Japan in 2012 was US$16.3b (€12.4b), up 75% on 2011), with solar installation likely to be close to 5GW in the year to March 2013.

Nevertheless, the very attractive tariffs used to stimulate the market are likely to reduce by 10% from April onward, reflecting lower system costs. Moreover, while in the short term, prospects remain buoyant as Japan shifts away from nuclear, its high level of government borrowings relative to GDP (over 200%) could in the longer term act as a brake — witness the experience in Spain — particularly if a global market in transported shale gas emerges, although as discussed below this is not a given.

Many established markets are redefining support mechanisms with the flight path to grid parity uncertain

The redefinition of support mechanism is causing investment uncertainty in a number of markets, e.g., in the UK where, despite extensive consultation, concerns remain about the Electricity Market Reform due to its use of a "contract for difference" mechanism to calibrate a new feed-in tariff (FIT).

Even FIT stalwart Germany has been recommended by European Union (EU) energy commissioner, Günther Oettinger, to attenuate its pace of renewable development "either with a quota or a cap" to reduce the impact on energy prices, with the environment minister recommending a subsidy freeze until 2014 and a cap on levy increases to 2.5% thereafter.

In other markets, the previously sacrosanct concept of "grandfathering" (i.e., no retrospective adjustments) has been challenged — in Spain, Bulgaria and the Czech Republic. Spain has gone so far as to introduce an energy tax, partly as a consequence of the deficit built up from its previously strong renewables incentives, recently announcing its intention to freeze inflation uplifts.

Moral hazard risk, whereby support mechanisms are questioned if tariffs lead to windfall gains (or loss of state funds), is very much to the fore. The value for money of support mechanisms is subject to increasing regulator public auditor review, e.g., the debate over support to Solyndra in the US and the recent damning report of the European court of auditors on "the cost-effectiveness of cohesion policy investments in energy efficiency."

Indeed very favorable mechanisms can be an early indicator of emerging business risk — leading to an increasing need for industry to be responsible for the assistance it requests. Witness the American Wind Energy Association's (AWEA) sensible suggestion for a gradual step down of the PTC in return for longer-term renewal. While a one-year PTC extension for plants commencing construction before 1 January 2014 pleasingly occurred (with the ability to swap for investment tax credits (ITCs) retained), the long-term economics of the US renewable industry remains subject to perennial and therefore damaging regulatory uncertainty.

The challenge for legislatures in the established economies is that many appear to be contemplating post-2020 (if not earlier) withdrawal or reduction of existing support mechanisms, certainly for established technologies. Policy-makers are unsure of the "flight paths" required as theoretical grid parity is neared or achieved (if at all). Some are actively considering the origination of green power from nearby territories where costs may be lower (witness the recent memorandum of understanding between the UK and Ireland). It will be interesting to see whether policies focus on harvesting the best resource with the most cost-effective technologies — not always the case to date.

For some markets, shale gas rather than carbon prices is the game changer

The question is whether light touch support will be sufficient to support long-term energy infrastructure investments, hence the call by many for carbon targets for 2030 and beyond to underpin the industry.

The reality is that the renewables industry needs to further radically reduce costs to ensure its own long-term security. It also needs to be clear in the messages it communicates in a particular jurisdiction to support investment. For example, a focus on the impact on domestic GDP (not just jobs) is likely to be a solid counterweight to concerns about cost. However, such arguments need careful formulation if they are to succeed. (See Ernst & Young's report, *Analysis of the value creation potential of wind energy policies,* September 2012.)

Figure 2: European Emission Trading Scheme (ETS) — carbon pricing

Source: Bloomberg

Certainly, current carbon prices provide little incentive, with EU-ETS values falling below €5 per tonne (at the time of writing) compared with historic levels of €13 to €15. Given the ineffectiveness of the EU's strategy to deal with the allocation overhang (with the European Parliament querying the strategy of pushing it to later years) and the "wait and see" outcome of Doha, a high carbon price scenario is firmly off the global agenda — for several years to come at least.

Barring catastrophic events (such as Hurricane Sandy), it is difficult to see climate change moving soon to the forefront of the geopolitical agenda. President Obama, in his inaugural address, did not lip sync his commitment to deal with the challenges posed by climate change, but he also said, "The path toward sustainable energy sources will be long and sometimes difficult."

Rather than carbon price, it is shale gas that is seen as the energy policy "game changer" and not just in the US where its development has led to significantly reduced gas prices and, in regions with access, wholesale electricity prices. This is posing long-term challenges for wind and other renewables in the US — particularly if a successor to the PTC is not found or a gradually reduced renewal granted, and state renewable portfolio standard (RPS) mandates not extended.

Renewables to 2020 and beyond: it's not just the shale gas challenge (cont'd)

Other countries are also eyeing the shale gas opportunity. The extent to which a jurisdiction is aggressively pursuing shale gas or not (or indeed nuclear) is now a significant factor in evaluating the prospects for renewables (see figure 3 below), together with the more traditional indicators of wholesale electricity price trends, prospects for economic growth, resource quality, ability to afford support mechanisms (by reference to government debt as a proportion of borrowing) and likely timing of grid parity.

But not all countries have the frontier culture that has led to rapid expansion of shale gas in the US

However, in examining the shale gas revolution, a degree of caution: not all markets will have the liberal planning policies or frontier culture that allowed the rapid expansion of shale gas that took place in the US, nor indeed a similar cost base. France currently has a strong aversion to shale on environmental grounds, although the legislature is reopening the question by examining alternative methods to fracking; whereas the UK has recently unlocked the gates, subject to controls, and in China, a significant part of the resource is located in regions with limited access to water or where there is competition with agricultural users.

From an investor's perspective, the relatively liberal regime in the US led to oversupply – not only producing low prices, but also leading to significant asset impairment write-offs for late arrivals to the party. This in itself may lead shale industry investors to be more restrained in their exploitation of new markets – particularly where there is likely to be a lot of regulatory or societal supervision.

Geology and the consequent impact on the cost of extraction, and the pressure at which gas is available, play a significant factor. For example, it is not certain that deposits could be extracted in the UK for significantly below US$10 (€7.6) per million metric British thermal unit (MMBtu), well above the prices in the US (<$5 (€3.8) per MMBtu) and not substantially different from the current UK market price for gas. BP, in its recent press release, expressed caution as to the extent to which shale gas would be a game changer in the UK.

But shale gas is likely to have a significant effect on the renewables industry as it combines the prospect of substantial financial reward for prospectors with carbon gains for regulators if coal is substituted out of the energy equation (witness the US reduction in emissions in 2012). Shale gas may also provide GDP gains and balance of payments savings.

In its "golden rules" scenarios, the International Energy Agency (IEA) believes that shale gas will reduce the penetration of renewables by some 10% in the US – even if current renewable policy measures are maintained.

Figure 3: Top eight CAI countries – appetite for shale gas and nuclear

	Shale gas		Nuclear			
	Technologically recoverable reserves (Trillion cubic feet)	Appetite indicator	2012 estimated capacity	2020 estimated capacity	Target (where specifically announced)	Appetite indicator
China	1,275	🟢	14.5GW	67.1GW	40GW by 2015 60-70GW by 2020	🟢
Germany	8	🟡	12.1GW	8.2GW	Phase out nuclear by 2022	🔴
US	482	🟢	101.2GW	108.3GW	n/a	🟢
India	63	🟢	6.7GW	19.8GW	20GW by 2020	🟢
France	180	🔴	63.1GW	66.6GW	50% of electricity by 2025 (down from current 75%)	🟡
UK	20	🟡	10.4GW	8.2GW	n/a	🟡
Canada	388	🟢	13.9GW	7.6GW	n/a	🟡
Japan	Negligible	🔴	15.5GW[1]	25.2GW	Phase-out announced but no specific policy target set	🔴

[1]Japan's nuclear capacity in 2010 was an estimated 48.4GW, dropping dramatically to around 6.6GW in 2011 following the Fukushima nuclear disaster, when most reactors were shut down. The increased forecast for 2012 reflects the fact that some reactors have been brought back online, and the 2020 forecast projects further plants will become operational, though still far below the capacity prior to the Fukushima disaster.

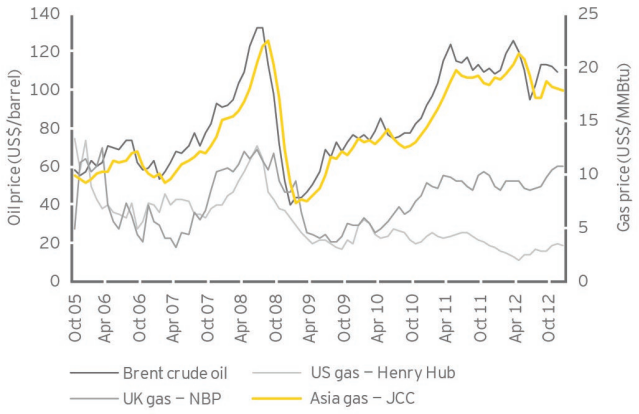
Source: *Ernst & Young analysis; Business Monitor Online (2012,2020 nuclear estimated capacity); US Energy Information Administration (EIA) "Annual Energy Outlook", 2012 and 2011*

This compares with a more modest reduction of 5% for the world as a whole; though the effects could be greater if support measures weaken. Shale gas is already showing signs in some jurisdictions of competing with renewables for regulatory and energy policy "air time." It will also provide significant competition for scarce infrastructure investment funds – to build new pipelines for example.

A three-tier world energy market is emerging, with the greatest opportunities for renewables in Asia

Shale gas is already leading to the emergence of a three-tier world gas market, breaking the historic linkage of electricity prices with conventional gas and oil. In the US, prices are very much at the lower end of the spectrum, with Europe at an intermediate point and Asia at the higher end – exacerbated not only by its lack of indigenous resource but also by its high economic growth rate.

Figure 4: Oil and gas commodity pricing



Source: EIA; Energy Intelligence group "Natural Gas Week;" Thomson; Reuters

Even if international trade in shale gas becomes common (by no means certain, as the US manufacturing industry is lobbying hard to retain resource for domestic consumption), many commentators believe that Asian prices would only settle closer to European levels rather than descend to those currently found in the US. There is already an indirect impact from US shale gas in Europe – which now receives liquefied natural gas (LNG) from the Middle East originally intended for the US. The development of substantial shale gas reserves in Poland and the Ukraine could certainly have an impact on European prices in the medium term.

Although there are significant reserves of shale gas and very high levels of coal bed methane in China, these are likely to be retained for domestic use in that rapidly growing energy market – merely reducing the huge growth required in coal fired power. In the absence of more globalized gas markets, Japan may well need to move to a strong dependency on renewables to avoid significant impairment of its balance of payments position, as it does not have the capacity to develop indigenous gas production. South Korea is in a similar position, and although less nuclear averse with a strong build program, has some reliability issues recently commented on by the IEA.

Consequently, a regional perspective is useful in considering a revised conceptual framework with the greatest opportunities to be had in Asia, Latin America and emerging markets such as South Africa (which had nearly double the investment of Spain last year). These markets benefit from a rapid growth in energy consumption and may well be unaffected by large volumes of domestic shale gas production. For example, Brazil has a well-established conventional gas industry thereby delaying the likely timing of shale gas exploitation.

In the US, prospects are likely to become difficult unless the PTC or equivalent is extended again, whereas in Europe, the overhang of high levels of state borrowing and the likely low levels of economic growth will restrain renewables – which still benefit from favorable support in some jurisdictions. The diagram at the start of this article provides an interpretation of how trends may evolve.

Globally, cost reduction is vital for the renewables industry, with carbon pricing unlikely to rescue the day

For renewables to 2020 and beyond, shale gas may grab the headlines, but not the whole market. A remorseless reduction of costs is vital for renewables – and if that is achieved, it may be a good thing that the industry and investors are no longer reliant on carbon pricing to provide the competitive edge over fossil fuels. In this scenario, carbon pricing becomes the upside for those who believe the climate change imperative will inevitably re-emerge and quality of resource will be the key.