LESSONS FROM RECENT AND CURRENT INVESTMENT PRACTICE

Draft Prepared by Murray Ward, GtripleC

The purpose of this draft report, in the first instance, is to help facilitate and stimulate discussions at the CMCI WG1 workshop discussions in London in the week of 12 September 2011. It will be further developed following these discussions.

1. The Good News: In aggregate globally, investments in 'clean energy' are up significantly and closing in on fossil energy.

In 2010 Bloomberg New Energy Finance (BNEF) estimates that a record US$243 billion was invested in the 'clean energy sector', an increase of 30% over 2009 levels (see Appendix 1, Figure 1a). Growth occurred in all regions, although the 2010 over 2008 (GFC) percentage growth in the Americas was less than other regions (Figure 1b).

Another feature was that the 2010 over 2008 percentage growth was much stronger for clean energy investment than for fossil energy and the total investment for clean energy was the nearest it has ever been to fossil energy (Figure 1c). The most obvious explanation for this is the targeted support schemes for clean energy in government economic stimulus packages.

Some country data for 2010 stands out[1]:

- China solidified its global number one position (achieved in 2009 over the United States) with another 39% increase and world-record investment of $54.4 billion.
- Germany made it to number two, with $41.2 bn, a 100% increase over 2009
- The United States dropped to third place, with $34 bn (although this was a 51% increase over the recessionary 2009 level)
- Brazil, at $7.6 billion invested, is sixth in the G20 and second to China in developing countries.
- The United Kingdom dropped out of the top ten G20 countries, with a 70% decline in investment
- Spain, after showing historical leadership, also declined significantly (54%) in 2010, though its $4.9 bn still ranked eighth.

The stories behind these countries' performance provide many of the key lessons set out in this report.

2. Investment responds well to targeted support, if incentives are attractive enough.

Taking China and Germany as success case studies, it is instructive to look at the trend of investment over time and map this against changes in incentive structures. This information is provided in Figures 2a and 2b in Appendix 1.[2] The China example shows the effect of different types of incentives, in particular the very strong effect of the feed-in tariff (FiT) programme introduced in 2009.

[1] Who's Winning the Clean Energy Race - 2010 Edition; A publication by Pew Charitable Trusts and The Clean Energy Economy, developed from data by Bloomberg New Energy Finance

[2] Renewable Energy Policy Case Studies, August 2011; A paper developed for CMCI WG1 by DB Climate Change Advisors, Deutsche Bank Group

The Germany example shows a more steady and constant rise across a range of increasing policy incentives, which in the terminology of DB Climate Change Advisors (DB) reflects the core policy attributes of "transparency, consistency and longevity" (TLC). A FiT scheme has been central to the success in Germany.

According to BNEF, FiT schemes have proven to be the most effective policy mechanism in driving wind and solar deployment – 59% of global wind capacity and 87% of global solar PV capacity have been deployed in FiT markets.[3]

In the US, the dominant form of federal government support for traditional and renewable energy has historically been provided through the tax code in varying forms of tax incentives – e.g. in the case of renewables, Production Tax Credits (PTCs) for wind, biomass and small hydro, and Investment Tax Credits (ITCs) for solar and geothermal.[2] These have produced some good results, e.g. in the case of solar. But these measures can produce inconsistent results and US government stimulus measures in 2009 also provided for Treasury cash grants in lieu of PTCs and ITCs. The effects of these measures on annual solar installations can be seen in Figure 2c.

3. Investors can cope with policy certainty that incentives will decline.

Germany is also a good example of how investment can be sustained even as incentives taper off. The key issue is certainty. DB considers the German FiT as a model for good policy design, particularly the wind FiT as "it sets an initial tariff, follows a digression schedule[4], allows for extensions of the initial tariff for sites with lower capacity factors (i.e. less wind resource) and directly passes on the costs to end-consumers."

Italy is another example where demand for renewable energy technologies, in this case solar PV, is still seen as robust even though FiT rates are being progressively cut.[5]

4. But policy uncertainty (risk) turns investors off, especially retroactive changes and on-again, off-again policy.

Spain, on the other hand, provides an example of an uncertain policy environment. In December 2010, Spain implemented retroactive FiT cuts for solar PV schemes "to grant the Government leeway in keeping consumer energy prices at a moderate level".[5] A 30% reduction in the revenue that solar projects can earn will be in effect for the next three years. Retroactive changes in policy are seen as particularly harmful for investment. The cut in the FiT has resulted in extreme policy risk in Spain and has been challenged in court by project developers and investors.

In the UK, FiTs for solar (and other renewables) introduced in April 2011 have produced immediate results. PV installations from April 2010 to June 2011 soared (Figure 4a in Appendix 1). This led some analysts to predict a growth rate of up to 1500% for this industry sector by 2015.[6] However, in March 2011 the UK government announced a plan for very significant cuts to solar PV tariffs. The effects of these cuts on the, thus far, rapid growth in the industry remain to be seen.

The US provides a telling example of the effects of 'on-again off-again' policy, in this case in the availability (and expiration) of production tax credits in the wind sector (Figure 4b). This has increased financing costs due to an uncertainty of cash flows and has hindered the emergence and ongoing growth of robust domestic wind development and supply chain industries.[2]

[3] Assessing the Effectiveness of Clean Energy Policy, May 2011, Bloomberg New Energy Finance

[4] Whereby tariffs are periodically reviewed to allow further cost reduction

[5] Global Climate Change Policy Tracker – Winners and Losers, July 2011, DB Climate Change Advisors

[6] PricewaterhouseCoopers analysis, June 2010

5. Efficiency and effectiveness are policy buzzwords; but the meaning can be unclear and, in practice, these can pull in different directions.

Calls for policy to be efficient and effective are common and make sense. But what does this mean exactly? And can these happen together, or are there reasons why these may be conflicting goals?

It is clear that providing generous incentives can be an effective way to stimulate investments in clean energy, if the metric of effectiveness is the level or growth of installations in a given time period. So it might be seen that Spain's initial FiT programmes were very effective. But, if by efficiency it is meant low or least cost, then a consideration of efficiency in the Spain case can lead to a quite different perspective. The design of Spain's FiT policy did not follow some of the better practice examples of Germany's FiT policy, in particular those that contained the cost, especially the cost to the government. As a result, as Spain's government came under fiscal pressure following the GFC, the FiT scheme became seen as overly generous, so not sustainable. This resulted in the retroactively applied cuts to the tariffs. Looking at this fuller story, the scheme might be seen as ultimately not effective because it was not efficient.

This said, investments in clean energy in Spain in the decade 2000-2010 were nearly $75 billion, placing it 3rd globally behind the US ($164 bn) and China ($148 bn) and well ahead of Germany ($39 bn) who came in 5th behind Brazil ($42 bn).[5] Arguably, had it not been for the GFC, Spain's situation and any judgements about the effectiveness of its FiT policies might be quite different.

The measure of efficiency should not just be seen in terms of fiscal cost to governments. If the costs of what ultimately are seen to be overly generous tariffs are just passed on to consumers, there is a 'political economy' risk which ultimately can be expected to bring the pressure back on to governments.

Definitions of efficiency and effectiveness could usefully be further clarified and elaborated beyond the more quantitative and narrow forms often favoured by analytical groups. Some attributes of 'good policy' reflecting these terms might be:

<u>Efficiency</u>

- Price discovery or contestability elements in the process that sets the levels of support – whether in the initial setting of fixed support tariffs or where the support is more dynamic and variable in nature.
- Clearly programmed review processes or schedules whereby the levels of support can be changed (down and up) depending on the changed economic circumstances
    - Related to this can be the extent to which incentives can be backed out, e.g. as technologies achieve 'grid parity' (so become commercially viable without incentives) in given country circumstances
- Means to minimise 'friction losses' (e.g. transaction costs and 'clip the ticket' costs) which add to overall project costs and mean less of investors' money gets to 'the ground' of the actual project or programme developer
- Means to encourage the early and vigorous uptake of lower cost renewables and energy efficiency measures before more costly ones – albeit noting that support is needed across the full R&D to commercialisation cycle, with the type of support depending on the stage

<u>Effectiveness</u>

- The scale of outcomes (whether in energy or greenhouse gas mitigation terms) in a given period of time as compared with reasonable objectives for the levels of potential outcomes
- The speed with which finance gets deployed, e.g. how long it takes between when public finance is provided by donors and when investments on the ground are evident
- The scale of investments compared with the scale of public monies that have been instrumental in helping to make these happen ("leverage")

- The progressive engagement of, and building up of, domestic finance and capacity – so the lessening of the need for international support
- The avoidance of 'clogging up' support processes with projects and programmes that ultimately prove to have had little chance to be implemented (this can also be seen as relating to efficiency as such process mis-steps are likely to increase costs, especially if some level of support is provided to proposals that do not ultimately process and this support is not recoverable)

Moreover, efficiency and effectiveness are not just about the efficiency and effectiveness of providing incentives to stimulate investment. These important expectations of 'good policy' need to be more broadly applied – e.g. in the fuller context of "investment grade policy" (see section 8. below).

6. 'Innovative finance' is another key policy term; but again it would be helpful to know what this means.

To be 'innovative', seems also to be a growing test of smart policy on many fronts. But what are the metrics by which this can be assessed? One possibility is that innovative policy is something that scores highly on all, or some particularly key, elements of what is seen as being 'efficient and effective' – e.g. using the attributes above, plus those more broadly set out under 'investment grade policy'. This "what is innovative?" question might usefully be informed by further scholarly endeavour through ongoing CMCI WG1 work. Notably, the term innovative seems quite subjective in nature so "in the eye of the beholder". It is likely that a survey approach is needed to determine what is perceived as innovative.

7. Most of the studies in this subject area look primarily at lessons from developed countries; but to what extent are the lessons transferable to developing countries?

A key point about so-called 'good policy', whether this is because it is efficient, effective and/or innovative, is that this must be context-relevant. This can be seen in a temporal sense (e.g. given prevailing economic conditions) or a geographic/national circumstances sense, including with regard to international political and policy settings.

In particular what might be promoted as good, or 'the right', policy in modern developed country economies may not be suitable or feasible (yet anyway) in developing countries. Most analyses that have been drawn on in the development of this paper primarily cover large OECD countries. The developing countries included are the large, rapidly emerging ones, e.g. China, India, Brazil, Indonesia, South Africa, Argentina.

It can be expected that looming over any policy discussions on enhanced levels of investment in renewable energy will be the question of international support – including on technologies and finance. This brings a political dimension to the national circumstance issue that is mostly lacking for investments in developed countries – although exists to some extent for investments in economy-in-transitions countries. (This suggests that perhaps there are some valuable and transferable lessons to be learned from investments in these EIT countries..... e.g. by EBRD, EIB and other FIs.)

This said, it is also a matter of fact that the large developing countries are looking to many of the same policy instruments to stimulate investment in clean energy as those that have been used in leading developed countries. But are they learning the best (and right) lessons? And to what extent are their experiences readily transferable to the next level of mid-size and rapidly growing developing countries? What is their current clean energy investment story? The current body of analysis on these issues in these countries is seemingly still quite limited or too new to derive detailed assessments. Again, more work is needed in this area.

Another good question is "can developed countries learn from success stories in developing countries?" Here, Brazil might be seen as an interesting case. Brazil's total clean energy investment in 2010 was $7.6 bn with 40% invested in biofuels, 31% in wind and 28% in other renewable energy sources.[1] The very proactive

role of BNDES, Brazil's development bank, and the government's use of tenders in allocating power purchase agreements (PPAs), are some features of the Brazilian approach to supporting clean energy investment that set it apart for other developing countries, and developed countries.

8. Assessments of "investment grade" or "best in class" policy often focus on the nature and level of positive incentives for clean energy; but a broader set of criteria need to be tracked.

The core analysis drawn upon for this paper has been from the BNEF and DB sources referenced in footnotes 1, 2 and 5. Both sources 1 and 5 provide some detail on the supporting policy environments. In particular, the DB 'Climate Policy Tracker' report has a major section on what it refers to as a "Best in Class" analysis. This report assesses each country (and region) covered according to 6 criteria:

Emission Controls

- A binding emissions target
- A renewable electricity standard
- A long-term energy efficiency plan

Financial Support

- Feed-in tariffs
- Long-term government-based 'Green Bank'
- Tax benefits

Long-term grid improvement plan

An illustrative example of the visual output of the DB assessment (showing some of the smaller countries/regions to better highlight the diversity of the visual representation) is provided in Figure 8a in Appendix 1.

The DB and BNEF analyses of policy frameworks mostly focus on what can be seen as the positive incentives for, and government policies explicitly supporting, clean energy. An example for the development of wind energy in New Zealand provides a somewhat different story. The positive incentives 'kick start' for this sector occurred in 2003 and 2004 under the NZ "Projects to Reduce Emissions" (PRE) scheme. This was a bid-in contestable domestic projects scheme where the incentive provided was the awarding of Kyoto compliance units (AAUs or ERUs) for emission reductions that would occur in the first Kyoto period. A number of wind farms were awarded credits under this projects scheme before the policy was shut down in favour of the development of a national domestic ETS. However, wind farms have continued to be built without any incentive, beyond the additional profitability achieved because the market price for all electricity has been lifted by the cost of carbon imposed on fossil generators operating at the margin. New Zealand now has 16 onshore windfarms in operation, totalling around 615 MW. Another measure of the success of this 'price on carbon' means to support clean energy can be seen in Figure 8b which shows the increased level of consents (permits) for 'new build' power stations in the period before and after the introduction of the NZ ETS.

This New Zealand example highlights that aspects of policy other than just positive supporting elements on the 'green side'(e.g. those that are happening on the fossil fuel 'brown' side) are also important to begin to get a full picture of the extent to which policy might be described as "investment grade". As Report 1 in this initial set of CMCI WG1 reports sets out in detail, there are a range of elements falling into a number of categories that might be used to make such assessments.

In Appendix 2 a depiction is provided of a first draft of a possible qualitative 'scorecard' tool that might be used in surveys of groups that could be asked to assess different countries on the extent to which they are achieving "investment grade".

Feedback is invited on the usefulness of such a tool, and how this first draft effort can be improved.

APPENDIX 1: Case study results and figures

Figure 1a Global and G-20 Clean Energy Investment, 2004-10 (billions of $)

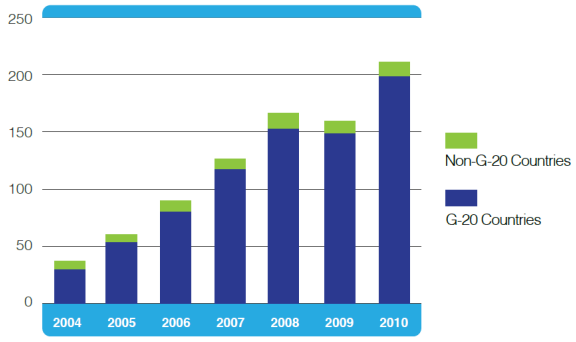


Figure 1b Total Investment in Clean Energy by Region 2007-10 (billions of $)

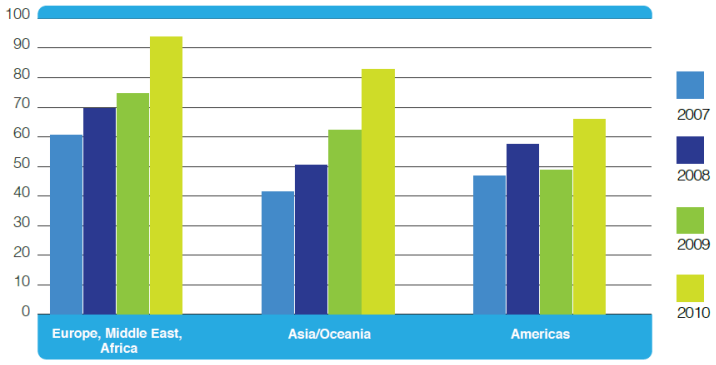
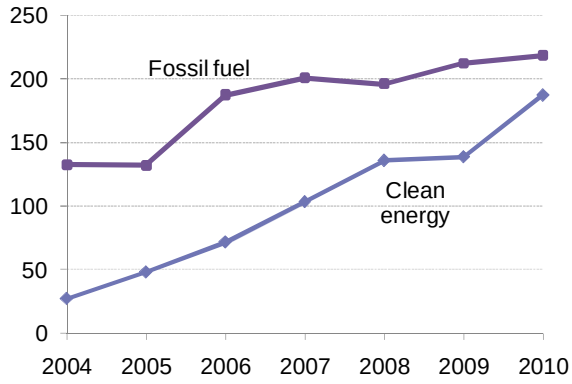


Figure 1c

Clean energy versus fossil-based generating capacity, Investment 2004-10, $billion



Notes

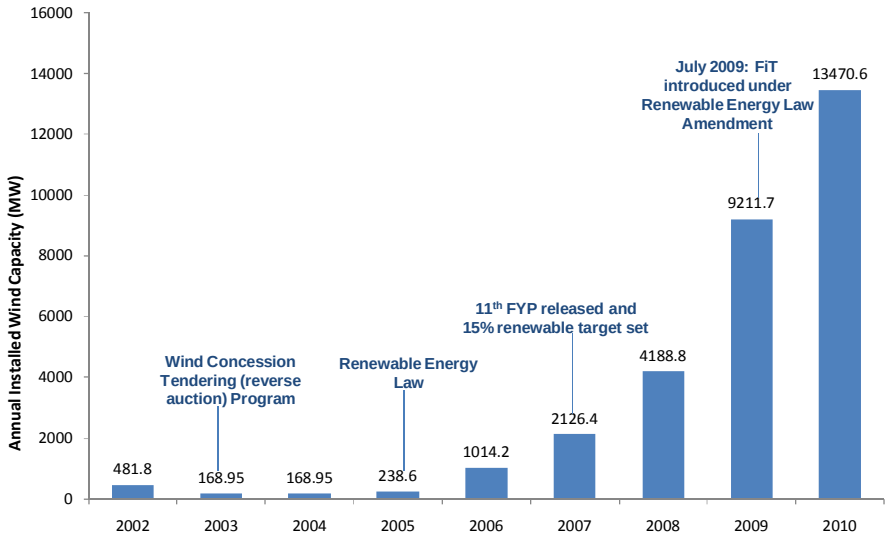
Source for 1a and 1b: Bloomberg New Energy Finance

Source for 1c: : IEA, EIA, Bloomberg New Energy Finance

Figures 1a and 1b: Dollar amounts do not include research and development investments

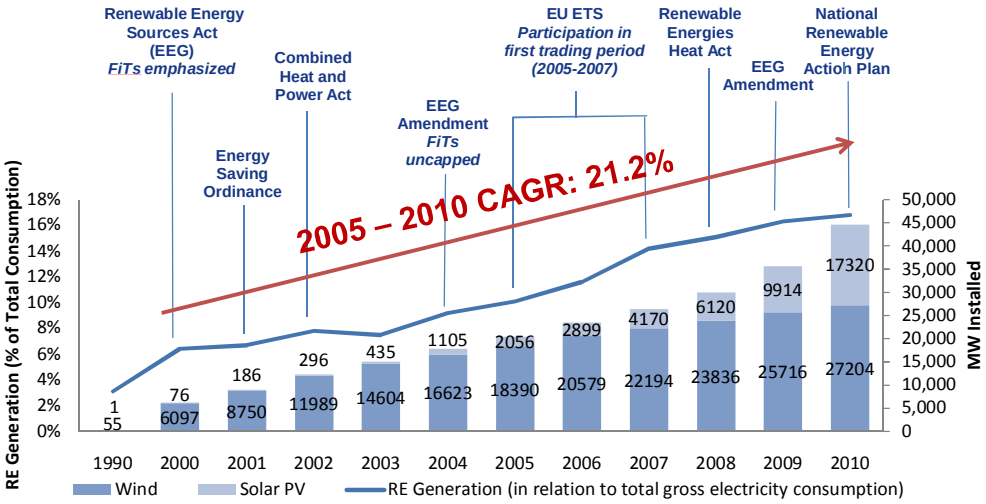
Figure 1c: Investment for new build - fossil fuel calculated from EIA & IEA numbers; clean energy taken from Bloomberg New Energy Finance totals. Clean energy capacity includes small distributed capacity.

Figure 2a China wind energy deployment and policy timeline



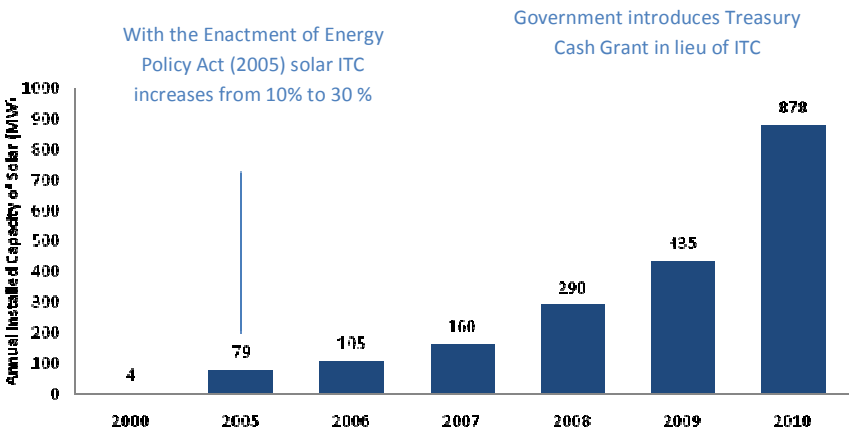
Source: CEIC, 2011; DBCCA Analysis, 2011

Figure 2b German renewable energy deployment and policy timeline



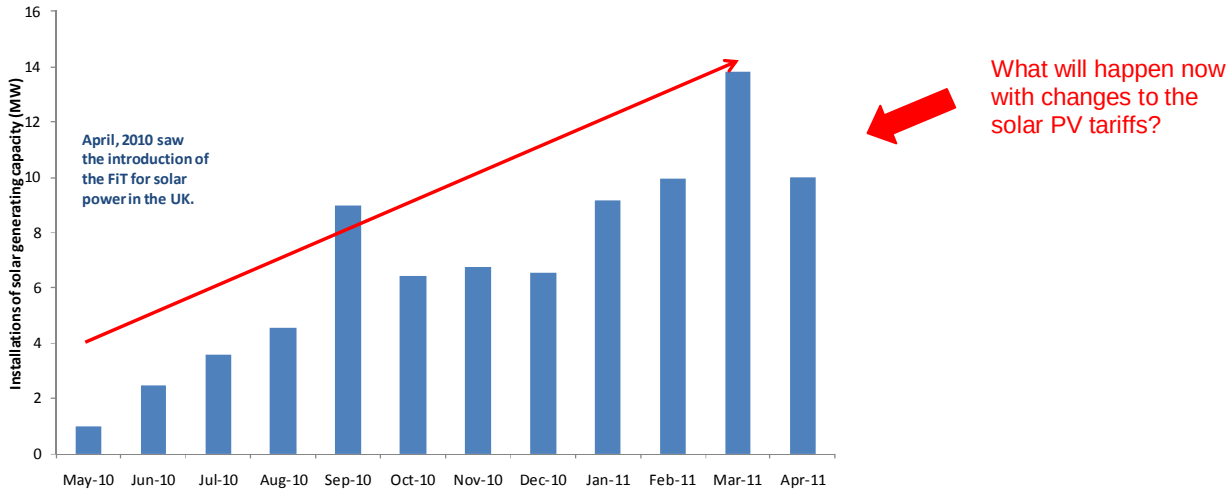
Note: Renewable energy generation includes small and large-scale hydro
Sources: German Government 2011 (BMU), DBCCA Analysis 2011

Figure 2c Historic Impact of US Investment Tax Credit and Treasury Grant on Annual Wind Installations



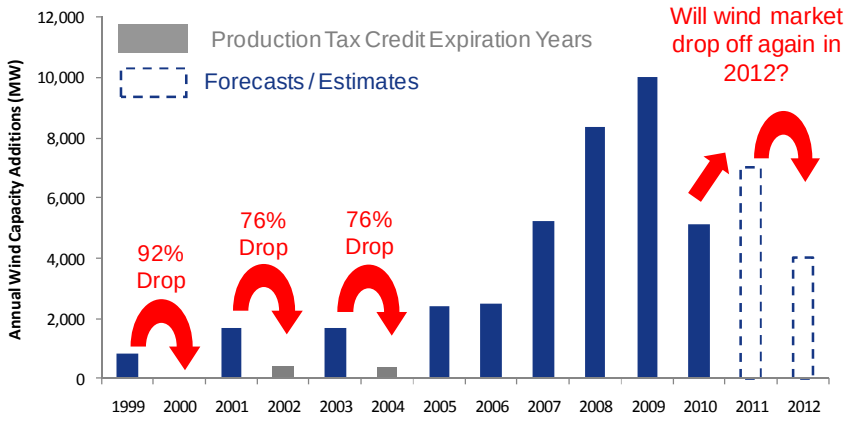
Sources: Solar Energies Industry Association 2011; Database of State Renewable Energy Incentives 2011
Figure 2c provided in "Renewable Energy Policy Case Studies, August 2011"; DB Climate Change Advisors

Figure 4a Growth in solar installations in the UK, May 2010 - April 2011



Source: Solar Power Portal, 2011

Figure 4b Historic Impact of US Production Tax Credit Expiration on Annual Wind Installations



Sources: American Wind Energy Association, Bloomberg New Energy Finance, DBCCA Analysis 2011
Figures 4a and 4b provided in "Renewable Energy Policy Case Studies, August 2011"; DB Climate Change Advisors

Figure 8a 'Illustrative' Best-In-Class assessment by DB Climate Change Advisors (showing smaller countries/regions to highlight diversity of visual format)

Country	Emissions Control			Financial Support				Long-term Grid Improvement Plan	Budget strength (deficit as % of GDP in 2010)	Capital Investment ($mn) 2000-2010	GDP 2010 (Real growth rate $ tn)
	Binding/ Accountable Emission Target	Renewable Electricity Standard	Long-term Energy Efficiency Plan	Feed-in Tariff	Long-term Govt-based 'Green Bank'	Tax Benefits	Long-term funding programs				
New Jersey	✓	✓	✓	X	X	✓	✓	✓	-2.1%	-	$0.50
Australia	✓	✓	✓	State-level	X	✓	✓	State-level	-4.2%	9780	$1.24
Canada	✓	State-level	✓	State-level	X	✓	✓	State-level	-2.5%	20482	$1.57
Indonesia	COP Acc	✓	✓	✓	X	✓	✓	X	-1.1%	1681	$0.71
Norway	✓	⏳	X	✓	X	✓	✓	✓	+9.9%	5767	$0.41
Mexico	COP Acc	✓	✓	X	X	✓	✓	State-level	-1.8%	4516	$1.04
United States	COP Acc	State-level	State-level	State-level	⏳	✓	State-level	State-level	-10.0%	164085	$14.66
Texas	X	✓	✓	X	X	✓	✓	✓	-2.2%	-	$1.14
South Africa	COP Acc	✓	✓	✓	X	X	✓	⏳	-5.3%	351	$0.36
UAE	X	State-level	✓	X	X	⏳	State-level	State-level	<- 1.5%	105	$0.32
Russia	✓	✓	⏳	X	X	X	X	✓	-3.9%	640	$1.47

Key to best-in-class ratings:

✓	The policy exists at a national level and generally displays TLC
✓	The policy exists at a national level, but has been negatively modified/proposals are in place to negatively modify - creating greater investor uncertainty
X	No policy exists
State-Level	The policy exists at a sub-national level only
State-Level	The policy exists at a sub-national level only, but is only present in a minority of states and/or has been negatively modified/proposals are in place to modify negatively - creating greater investor uncertainty
⏳	The policy is only in tentative or planning stages or is dependent on certain provisions such as a legally binding agreement or funding
COP Acc	The policy is a submission to the Copenhagen Accord and is not a national binding target

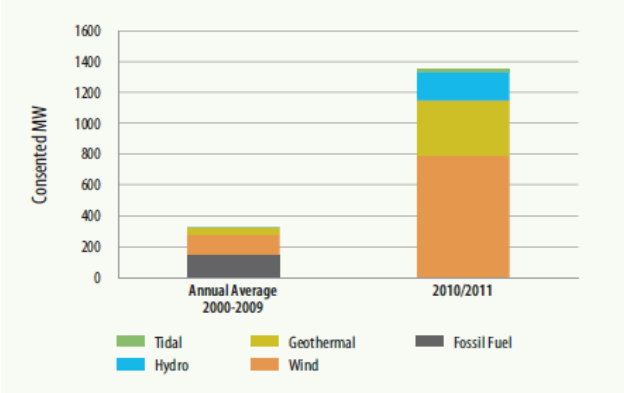
We also show the level of the budget deficit in each country as a potential barometer on government policy, especially where subsidies run directly through the budget. Red indicates a deficit over 5% of GDP.

Finally we show the actual amount of clean energy investment over the last decade and the latest level of GDP to see how significant this level of investment is relative to the national economy.

Source: Global Climate Change Policy Tracker – Winners and Losers, July 2011, DB Climate Change Advisors

Figure 8b

New Zealand electricity sector,
Consents (Permits) for new build, annual totals
period before and after NZ ETS



Source: Report on The New Zealand Emissions Trading Scheme, 30 June 2011

APPENDIX 2: A possible survey tool to assess "investment grade policy"

INVESTMENT GRADE POLICY SCORESHEET

Instructions:

- Against these indicators, you can score from zero (blank) to 4, by filling in the squares with the appropriate shade colour (copy from example cell). If a zero score in the example cell, unshade this cell.
- If don't know what score to give say: **dont know**
- Visually, the indicators are generally arranged from the bottom up, with the bottom category addressing measures for fossil fuels, the middle category for renewable energy and energy efficiency and the top category for other financial/risk mitigation instruments.
- The comment field can be used to provide the reasoning for the score. Even where the indicator seems 'binary', e.g. "Imposed cost on carbon", the score can address, for example the scale of the cost compared with in other countries, or the effectiveness of the measure by which it is imposed. The comment field can also be made to explain why, for example, you have given a low(er) score because there is a lack of certainty for how long an implemented policy might be sustained.
- If you want more than one "Other (specify)" indicator, insert a pair of rows and copy in the current "Other (specify)" pair of rows

COUNTRY:

INDICATOR CATEGORY AND DESCRIPTION	Score	Comment
General finance and risk		
Other (specify)		
Availability of sovereign guarantees		
Availability of export credit guarantees		
Availability of technology risk instruments		
Availability of foreign currency risk instruments		
Availability of political and regulatory (policy) risk insurance		
Requirements for declaration of risks to climate change, incl policy		
Support for Renewable Energy (RE) and Energy Efficiency (EE)		
Other (specify)		
Availability of favourable cost of capital - debt		
Availability of favourable cost of capital - equity		
Availability of credit or certificate incentives (carbon, RE, EE etc)		
Incentives to reduce capital and O&M cost ('tax equity', fast deprctn etc)		
Energy revenue incentives (FiT, PPA etc) - including for EE 'negawatts'		
Eliminate system access barriers, e.g. grid (and policy) improvements		
Implement ambitious targets for energy efficieny and renewable energy		
Reduced support for fossil energy and internalising costs		
Other (specify)		
Imposed cost on carbon (and other environmental factors)		
Signalled future cost on carbon (and other environmental factors)		
Elimination of fossil fuel subsidies		

Note: This tool is provided as an excel spreadsheet