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Business and Climate Change: Key Challenges in the Face of Policy Uncertainty and Economic Recession

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Abstract

Climate change is seen as the most pressing environmental problem of our time by many companies, policymakers and other stakeholders. It is currently also at the forefront of attention in view of attempts to conclude a successor to the Kyoto Protocol that expires in 2012. In bail-out plans and policies to address the economic recession and credit crisis, climate aspects have figured prominently as well. This article examines recent policy and economic developments and their relevance for business and climate change, considering the implications of the economic slowdown, declining oil prices and bail-outs. Dilemmas in the economy-climate-policy nexus in the current setting are also placed in the broader context related to innovating for climate change, to highlight some of the competitive, technological and market issues that need to be taken into account to break the present dead-lock that hinder radical moves to a low-carbon economy.

Keywords: Climate change; Bail-out; Economic recession; Credit crisis; Innovation

Introduction

Over the past decade climate change has evolved as the most pressing environmental problem of our time. Particularly due to temperature increases, it already affects physical and biological systems by changing ecosystems and causing extinction of species, and will increasingly have a social impact and adversely affect human health. What is more, as a result of the economic costs and risks of extreme weather, climate change could have a severe impact on economic growth and development as well, if no action is taken to reduce emissions. Consequently, climate change affects companies active in a wide variety of sectors and countries. It is also not a 'purely' environmental issue because it is closely linked to concerns about energy security due to dependence on fossil fuels and oil in particular, and to energy efficiency in relation to economic activity in general. In turn, economic and financial conditions, such as the recession and credit crisis, have implications for business and climate change as well.

Over some years, the strategic impact of climate change has been surrounded by great uncertainty. This has, for example, included uncertainty about the type, magnitude, and timing of the physical impact; about the best technological options to address the issue; and about the materialization of public policies. In this article we will focus on some key challenges from a corporate perspective, considering recent policy and economic developments, and broader issues related to innovating for climate change.

Policy Developments

It has been a long time since the first deliberations on regulation of greenhouse gas emissions started, almost two decades ago, until sufficient ratification and thus entry into force of the Kyoto Protocol, in early 2005. The adoption of the Kyoto Protocol in 1997, however, had already set some things in motion, such as an emissions trading scheme in the EU (the EU-ETS which started on 1 January 2005). For companies, however, the overall policy context has been ambiguous with a range of national and international initiatives, some binding, others voluntary, and with a multitude of actors involved (Kolk and Pinkse, 2008a). Moreover, as the Kyoto Protocol expires in 2012, there is a large uncertainty as to future emission reduction targets and policy arrangements at various levels. This also affects emissions trading and the Clean Development Mechanism which was designed as an integral part of it.

Negotiations are currently under way for a successor to the Kyoto Protocol, but progress is slow. Although the US under the Obama administration has shown commitment to reaching agreement at a forthcoming follow-up conference in Copenhagen (in December 2009), there are many unresolved issues on the table. These include the level of the emission reduction targets for the US and other industrialized countries; the introduction of emission reduction targets for emerging economies such as Brazil, China and India; the future shape of emission trading schemes and the relationship between them; and the transfer of money and technology to less-developed countries.

There is thus much more at stake than the environment only: there are many trade-offs related to climate change, involving social equity, development, innovation and competitiveness. The credit crisis and the economic recession have also affected the current setting for business and climate change in various ways, thus shifting the terms of the debate and highlighting contradictions of the climate-economy nexus.

Implications of the Economic Recession

One of the obvious effects of the economic recession is that it has reduced economic activity and thus also greenhouse gas emissions, which has a positive impact on companies' and governments' ability to reach their targets. The Netherlands, for example, recently reported that it expected to be able to meet its Kyoto target in 2011, in which a reduction of industry emissions played a role as well. At the same time, this development has also induced a decline in the price of carbon permits and other tradable emissions rights. Still, particularly due to EU-ETS that is ongoing, prices have been recovering somewhat recently and trading activity for carbon permits has increased by more than 50% in the first quarter of 2009 (compared to the last one of 2008) (Harvey, 2009). Overall, however, the emissions market is not yet mature, and the outcome of the negotiations of the post-2012 policy regime will be

crucial for its future shape and viability. Current carbon prices are rather volatile and too low to provide sufficient incentive to change behaviour in a more climate-friendly direction.

The economic slowdown has contributed to a downward pressure on the oil price that makes the search for alternatives to oil less attractive. It has, for example, negatively affected attempts to exploit tar sands, although this is in itself generally regarded as positive for the environment. More far-reaching in climate terms have been lower incentives to develop renewables, also due to the credit crisis which has made it more difficult to attract venture capital. Particularly investments in 'green' technology (renewable energy and other energy-saving and environmental activities), which was a booming area before, have dropped. In the US, for example, investment figures fell from $1 billion in the last three months of 2008 to $154 million in the first quarter of 2009 (Waters, 2009a). Companies in Europe report similar problems; the Dutch company Econcern, for example, is currently reorganising and the Danish wind company Vestas announced it has been forced to lay off 10% of its workforce.

There has also been a sharp decline in interest in biofuels, which emerged in the past few years in a context of surging oil prices and government stimuli in the US and Europe. Particularly in the US, corn-based ethanol was directly supported as a possible alternative to oil, and demand for sugar-based ethanol, traditionally produced in Brazil increased as well. Lower oil (petrol) prices reduced driving activity due to the economic recession and oversupply has, however, changed the picture. The US ethanol industry went from boom to bust and even the strong Brazilian producers have been severely hurt, leading to bankruptcies and a wave of consolidation. This development ended the previously heated debate about the (potential) upward effect of biofuels on prices of particularly corn and soybean. The discussion centred on the extent to which biofuels had contributed to soaring food prices given other factors (such as bad harvests, export restrictions, higher demand, speculation in agriculture derivatives markets), with estimates early 2008 ranging from 10% (Food and Agriculture Organisation) to 20-30% (the International Monetary Fund and the International Food Policy Research Institute) (Blas, 2008). Moreover, there were allegations about who profited most from an analysis of this role; some car company executives believed that the oil industry had an interest in raising doubts about ethanol in order to defend their existing business models (Reed, 2008a).

The high oil price was one of the drivers behind the steadily rising sales of hybrid vehicles and smaller, more fuel-efficient cars in the US, as petrol prices at some stage were above $4 per gallon. The picture has changed considerably now that they have halved and car sales collapsed due to the economic recession (although hybrids suffer slightly less than the overall market). There is uncertainty as to how best to stimulate the use of lower-emission vehicles, also as to when the economy will recover again. An unusual voice in this debate has been Ford's CEO, who recently pleaded for a petrol tax which could structurally change habits in the US (Waters, 2009b), and make it more comparable to Europe in that sense. The case of The Netherlands shows another element that may play a role, which is the introduction of a different fiscal regime for lower-emission cars. This not only involves lower taxes for everyone who buys a car and a specific bonus for hybrids on top of this, but also, and perhaps more significantly, a more favourable treatment of leased cars. The results of the latter measure, which took effect in 2008, can be clearly seen in the growing popularity of small and particularly hybrid cars in The Netherlands: in the first eight months of 2008, sales of Toyota Prius lease cars increased by 550% compared to the same period in 2007 (for another hybrid, the Honda Civic, this was slightly over 300%) (Van de Wiel, 2008, p. 36).

Bail-outs

The car industry and lower emissions more generally have also received attention in bail-out plans that governments around the world introduced to sustain their economies and which have partly included spending for purposes labelled as 'green' – sometimes even characterised as attempts to kill two birds (the credit crisis and the climate crisis) with one stone. In almost all plans, a considerable portion of the measures is said to address the environment, particularly in the form of investments to further higher energy/fuel efficiency, renewables/clean energy and in some cases also public transport. Table 1 gives an overview of the 'green' share in the bail-outs by ten countries and the European Union as estimated by HSBC in March 2009.

Table 1. Size and Share of Green Bail-out Plans

Country	*Size of bail-out plan (in $ bn)*	*Size of green bail-out (in $ bn)*	*Share of green bail-out (as % of total)*
Australia	26.7	2.5	9.4
Canada	31.8	2.6	8.2
China	586.1	221.3	37.8
EU	38.8	22.8	58.8
France	33.7	7.1	21.1
Germany	104.8	13.8	13.2
Italy	103.5	1.3	1.3
Japan	485.9	12.4	2.6
South Korea	38.1	30.7	80.6
UK	30.4	2.1	6.9
US	972.0	112.3	11.6

Source: Bernard *et al*. (2009)

The table shows that South Korea stands out for the highest percentage of green bail-out, followed by the EU and China, whereas Italy and Japan have by far the lowest share. In terms of volume, China scores highest, followed by the US and, at quite some distance, South Korea, the EU, Germany and Japan. Considering size of GDP to some extent as well, China's green investment is relatively high. Overall, caveats should be applied to the reliability of the figures, including the labelling of what is green, and the eventual implementation of the spending. For example, in the US, targeted recipients of the stimulus funds, such as the wind energy sector, have so far seen no money. It is also unclear what the environmental implications of infrastructure and construction activities will be, as well as other measures to stimulate domestic production and consumption.

Hence, although some are positive about these first attempts at a 'new green deal', there has also been a lot of criticism. Doubts have been raised about whether the measures go far enough; whether they are really beneficial for the climate; and whether they are not (implicitly) protectionist and tend to favour established companies which struggle rather than stimulating new (innovative) ventures. Much attention has focused on incentive schemes to scrap old, energy-inefficient cars earlier and boost demand for more efficient ones. Concerns have been raised about the (net) environmental benefits, given that the measures stimulate new car sales (sometimes even explicitly for types that are not widely available in all markets yet), as well as about other economic consequences. The latter have included the fact that

'cash-for-clunkers'/'dosh-for-bangers' will mean lower demand in the future, and that they distort competition. In Germany, the luxury carmakers have complained about disproportionate benefits for their high-volume competitors, which have seen growing sales since the scheme came into force. In the US, trade-in incentives initially aimed to apply only to cars produced domestically (thus not covering the Toyota Prius, for example, as it is built in Japan) (Reed *et al*., 2009), but this seems to be corrected in the scheme that is currently being finalised (Simon, 2009).

More generally, bail-out plans have aimed to sustain the national economy, thus almost naturally implying a focus on domestic spending and employment, even though protectionism has officially been denounced. There is also the broader critique that attempts to save the banks in a sense 'reward' irresponsible behaviour and greed, and a short-termism which contradicts moves towards a more sustainable approach that will be needed to deal with the climate crisis. It could even be argued that the root of both crises – the moral failure to take a long-term perspective considering social equity and nature – should be addressed simultaneously by a very different, more ecologically oriented strategy (cf. Kallis *et al*., 2009; Weitzner and Darroch, 2009). Regardless of these wider philosophical considerations, the same determination with which the financial crisis has been addressed has been echoed for climate change as well. It is in this vein that the recent move of a Dutch high-ranking official from the Ministry of Finance, where he dealt with the credit crisis, to the Ministry of the Environment, is a good example (Kalse, 2009).

Broader Issues Related to Innovating for Climate Change

The developments outlined above point to quite a few dilemmas in the economy-climate-policy nexus in the current setting. In this final section, we will briefly put them in a broader context related to innovating for climate change, to highlight some of the issues for the way forward (Kolk and Pinkse, 2008b; Pinkse and Kolk, 2009). In view of the importance of transport, fuels and energy use for the economy, key sectors for reducing emissions are car and oil & gas companies as well as utilities. Not only have they been most frequently targeted when it comes to measures, they also provide good illustrations of the trade-offs faced in moving towards a low-carbon economy, and where quick and easy solutions are not at hand. While it is widely recognised that a much greater deployment of low-carbon or carbon-free alternatives is needed, it is not at all clear what should replace the prevailing fossil-fuel based technologies – there is no technological 'silver bullet' solution at the moment. While alternatives are being explored, problems usually come to the fore when they are added up.

This leads to the broader question of whether companies should focus on addressing limitations for further deployment, thus trying to fully exploit existing know how and technologies to scale them up, or on developing new possibilities that may imply a departure from the current energy infrastructure and technological trajectories. In most cases, there is not just one 'solution'. For example, if companies want to invest in renewables they still have various options, ranging from more mature to much less well-developed technologies (Neuhoff, 2005). Most mature are hydropower, biomass combustion, solar boilers and geothermal technologies, which in specific, beneficial circumstances, are already cost-competitive with conventional sources. Wind and solar are seen as emerging technologies that are not yet cost-competitive due to a lack of market experience. And there are renewable technologies that are still in the R&D phase – e.g. specific forms of solar power,

ocean energy and advanced bio-energy – which completely lack market penetration, and largely depend on public R&D programmes for further development.

The specific decision made in balancing risks and returns differs fo eachr company but also depends on the sector and its level of technological dynamism that shapes room for manoeuvre. The latter can be illustrated by pointing to the difference in R&D patterns between the power generation industry and the automotive industry (Margolis and Kammen, 1999). R&D intensity in power generation has been notoriously low, due the fact that innovation involves massive capital investment combined with limited opportunities for product differentiation. Car companies, on the other hand, operate in a much more dynamic technological environment and therefore face greater pressure to develop alternative drive-train technologies, such as hybrids, electric vehicles and fuel cell vehicles (Dyerson and Pilkington, 2005; Van den Hoed and Vergragt, 2004).

In addition to technology, the issue of how to develop new markets should be considered. There are various routes, with pros and cons, for a move to a non-fossil fuel based economy: via the development of niche markets that allow companies more opportunity to experiment, or via incremental changes and transition technologies. The car industry can serve to illustrate both. The fact that the fuel cell vehicle was long predestined as the ultimate solution was partly because it followed the route of niche development. Since the 1960s, fuel cells have been used in several market niches, such as space travel and the US army and navy. However, they have demonstrated the typical problems of niche development as well: it has been difficult to move beyond the niche into mainstream markets, also because such a sequence of market niches requires many resources (Raven, 2007). Transition technologies, on the other hand, may become dominant themselves and then stand in the way. A case in point is that the recent success of hybrid cars such as the Toyota Prius might have serious consequences for the further development of the fuel cell vehicle. The fuel cell's main advantage compared to the internal combustion engine – that it performs much better in terms of emissions – almost completely fades away compared to hybrids and may not weigh up to the much higher costs of bringing the fuel cell vehicle to the market (Hekkert and Van den Hoed, 2004). In other words, because resources for new technology development tend to be scarce, there is a trade-off between developing carbon-efficient transition technologies for mainstream markets and developing carbon-free end-points for niche markets.

Another example of a technology that allows companies to build on existing technologies and know how, by providing an add-on element to existing practices, is carbon capture and storage (CCS), popular amongst oil, coal and electricity companies. CCS gives carbon-intensive companies the opportunity to show proactivity on climate change, while concurrently continuing their core business activities – this has also been a source of criticism. Transition technologies also play a role in the oil & gas industry more specifically, where gas has been presented as a bridge to a lower carbon economy while alternative energy solutions are being developed. As to the latter, oil companies, and particularly BP and Shell, have invested in the development of niches in alternative energy, including solar, wind, hydrogen and biofuels. BP has focused on solar in particular, while Shell has tried the full range but by now has left all of them except for biofuels. This shows the complexities as it is not clear what the end-point of these niche-development efforts will be given uncertainty about which alternative energy technologies will prevail in the coming decades.

A final aspect that deserves some attention is that, due to the comprehensiveness of the

climate change problem, cooperation is usually needed as one company (or other actor) cannot deliver solutions single-handedly. This raises the question of how far companies are willing to go in taking responsibility for climate change when they need responses from others to achieve a positive outcome, and also how they deal with the competitive dimensions involved. Various types of cooperation can be noted. One is by several competitors together with smaller niche players that own a specific technology, as has happened often in the car industry (e.g. Daimler and Volkswagen together with Choren; or Ford and Daimler with Ballard). A drawback of this construction is that companies share the technology with a close competitor. In that sense, cooperation with companies from other sectors offers more opportunities for creating a competitive advantage for all parties. An example is Dow Chemical and General Motor's joint work on the development of fuel cells, each for a different purpose.

In some cases more systemic, infrastructure-related forms are required. For example, to be able to commercialise the fuel cell vehicle, the car industry needs the chemical and oil industries to supply the hydrogen necessary to attract prospective customers. This necessitates a major breakthrough in the production and distribution of hydrogen, which has not occurred yet because it is threatening to fossil-fuel suppliers as well. As the car industry will not be able to supply the hydrogen itself, it thus faces a major barrier in bringing the fuel cell vehicle to the market. It is basically a chicken-and-egg problem: oil companies will not scale up their hydrogen activities until car companies come with more affordable fuel cell vehicles, while car companies will only launch such models if there is a hydrogen infrastructure (Romm, 2006). A somewhat comparable problem exists regarding plug-in hybrids or electric cars, which need electricity networks capable of meeting (peak) demands to charge the vehicles and thus depend on utilities. Two partnerships – between Toyota and EDF; and between Daimler and RWE – were announced last year, both with the aim to develop a recharging infrastructure in selected locations (Reed, 2008b). For a more widespread use, there must also be a sufficient number of charging points and/or places to exchange batteries, which often requires cooperation with local authorities and electricity grid operators, and substantial investments. In The Netherlands, such a partnership has been formed recently; it aims to realise ten thousand charging points in public spaces in the coming years.

Ultimately, a crucial issue regarding electric/plug-in solutions is whether the electricity originates from fossil fuels or from renewables, because if the former prevails, a 'solution' to the climate problem has not come nearer. However, the power generation industry has a vast grip on the infrastructure for the transmission and distribution of electricity. The system for supply of electricity clearly suffers from a 'carbon lock-in' as technological and market systems surrounding electricity favour generation from fossil fuels (Sandén and Azar, 2005; Unruh, 2000), which hinders scaling up the use of renewables for electricity generation. Technologically speaking, renewables involve intermittent generation instead of the constant generation that characterises coal- or gas-fired power plants. This creates a barrier because existing transmission networks cannot handle intermittent sources of electricity very well, due to the fact that power stations would need more back-up and storage capacity (Neuhoff, 2005). To reach a mainstream market of electricity-consumers, renewable energy suppliers thus rely on cooperation with incumbent utilities. However, the barrier lies therein that adjusting the transmission network to enhance access of renewables is not to the benefit of these utilities because the transmission network is specialised towards working with large conventional power plants, which they generally own themselves. Adapting the network

would thus open the door to new entrants at the cost of profitability of their own power plants (Neuhoff, 2005).

It is on these broader issues where determined policy efforts are needed to break the deadlock, while taking the competitive implications as well as the technological options and market development opportunities into account. The current search for innovation, and simultaneous attempts to address the economic slowdown and the climate crisis, requires a comprehensive approach that reckons with sometimes contradictory effects. This seems to be a key challenge for the coming years.

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