9 Green Sectors for the Future

Online student resources

■ Additional materials

■ Green finance

In its most narrow sense, the concept of 'green finance' mean a class of finance that is specific to green business alone. As demonstrated below, such categories do exist, whether in relation to carbon price risk mitigation systems or else accounting principles that integrate previously externalised notions of environmental value into corporate evaluations. At the same time, there is a good deal of overlap between these topics and more traditional areas of financial focus, such as investor interest in a particular sector of activity. When exploring the necessarily non-exhaustive list below of green financial activities, readers are encouraged to reflect – as they will have done throughout this book - whether the topic in question in question is handled differently in traditional versus green business approaches.

Green investor services

As further discussed in Chapter 10, a core financial question for green business is the ease with which greening processes attract funding. Where the venture in question is driven by a division within a long established company, it can be difficult to ascertain investor interest given that the group may simply fund the new activity by re-directing surplus monies it has elsewhere - a channel that will always be hard to track due to corporate confidentiality. Hence the frequent use of statistics relating to the funding of standalone green start-ups to translate financial interest in green business at a given point in time. At the same time, it would be wrong to ignore the repercussions of older companies' sustainability initiatives since these have just as significant an impact on the outlook for green finance.

In terms of the economic actors pursuing green investment interest, banks may account for a higher percentage of the total funding made available in this area but their motives for participating in any given opportunity will be harder to analyse due to the variety of products that they bring to the table. Private investors, on the other hand, can be safely assumed to focus solely on the new industry's profitability outlook, an attitude redolent of the core finance theorem of investors' 'rational expectations'. This explains why this constituency has become the target of so many green seed capital requests in recent years.

The main distinction in this area is between services providing investors (mainly from the private equity industry but also pension funds and large foundations) with "environmental due diligence screens to discover new opportunities to improve operations and create value through environmental innovation prior to investment" (EDF 2010) versus services enabling so-called active investors to identify possible 'green returns' in the companies where they already have a stake. Pre-investment services often adjust corporate valuations to incorporate heretofore externalised environmental assets and liabilities, helping decision-makers to ascertain whether their target is under- or over-valued at its current market price. For instance, above and beyond a new requirement by the U.S. Securities and Exchange Commission that publicly listed companies' financial filings refer to their climate change risk and opportunities, many firms have also fielded shareholder enquiries relating to "pollution from concentrated animal feed operations, the impacts from toxic pollution on communities, hydraulic fracturing in natural gas drilling, pesticide use, recycling, and nuclear waste reduction" (Greenbiz Staff 2010b). Clearly it is in potential investors' interest to explore sources (c.f www.asyousow.org/) providing information on such queries.

Post-investment services seek to identify environmental savings in corporate operations along the lines detailed in Chapter 6. One example is the Environmental Defence Fund's 'Green Portfolio Program' (EDF 2010), where a set of analytic tools and metrics have been developed in conjunction with leading private equity firms such as KKR Kohlberg Kravis Roberts to raise performance in key environmental areas. Since 2008, eight firms managed by KKR that have implemented this programme have "saved over $160 million in operating costs" – directly improving their current financial valuations – "and eliminated 345,000 metric tons of greenhouse gases and 1.2 million tons of waste" – affecting their contingent liabilities.

Green accounting: 'Energy Budgets at Risk'

A number of items that have been heretofore ignored in most corporate evaluation systems are in the process of being added to create a new sub-discipline that might be called 'green accounting'. Carbon behaviour has

become a prime focus at this level, with a number of software applications having been developed in recent years to enhance corporate monitoring in this area (c.f. Groom Energy and GreenBiz.com's ECA 'Enterprise Carbon Accounting' package). Other initiatives have a broader scope, such as the Eco-Based Management Tools Network (http://www.ebmtools.org/) process that is titularly strategic in nature but which has direct accounting implications due to its more holistic integration of ecological considerations into corporate valuation exercises.

The significance of this latter approach is that it modifies calculations of an activity's total returns to represent the long-term benefits of energy efficiency more accurately than is currently the case. As demonstrated throughout the book, one of the chief obstacles to corporate greening is the generally high cost of upfront environmental investments compared to discounted future energy savings. Many useful green projects are mothballed because the pay-back period associated with them either seem too long to companies – raising questions regarding some shareholders' short-term financial focus and/or unrealistic expectations. They can also be represented inaccurately due to the under-evaluation of future benefits. Hence the search for new accounting principles capable of remedying these insufficiencies.

"EBaR Energy Budgets at Risk (energybudgetsatrisk.com) is a new quantitative process that provides financial analysis of energy efficiency projects by explicitly representing all the sources of risk that include energy prices, operating characteristics, weather" (Herrera 2008) and other heretofore neglected ecological phenomena. An extension of a widely accepted accounting technique called Value at Risk, the idea here is that instead of merely extrapolating future savings from current energy prices – a method that does not speak to the fear that the saving may not actually occur, for instance if energy prices were to fall over the period – analysis needs to provide a range of probabilistic scenarios that explicitly integrate all risk parameters to allay parties' sense that they need to add them on subsequently. Once decision-makers' faith in the valuation process is restored, they will no longer eschew the two or three year payback horizons associated with many energy-efficiency project insofar as they will have greater confidence that they can achieve the 33 or 50 percent rates of return implied by such timescales. In this way, EBaR "bridges that gap between the engineering characteristics of an efficiency project and what financial administrators do". By so doing – and in line with the principles detailed in Chapter 1 of the book – it reduces the divide between scientific realities and business thinking.

Carbon finance

A peculiar sub-section of green finance is the rise of carbon 'cap-and-trade' markets (see Chapter 4), mainly in the wake of widespread international con-

cerns about the climate change effects of further industrial greenhouse gas emissions. It is true that following the 2009 Copenhagen Conference's failure to determine a single standard for lowering global carbon emissions, the bubble that had started to develop throughout the financial sector in the years previous began to burst, with banks reducing the number of carbon traders they employed. Clearly, with some of the world's leading countries hesitating before introducing the kinds of formalised emissions standards that could underpin a private market in tradable carbon permits, there is less call for professionals specialising in the new carbon markets (CCX Chicago Climate Exchange, ECX European Climate Exchange, etc.) and trading volumes have fallen. In Q3 2010, for instance, 14 percent less carbon was traded worldwide than had been the case 12 months previous (Commodities Now 2010). Note that most of this fall could be attributed to the stagnation of President Obama's RGGI 'Regional Greenhouse Gas Initiative' in the United States following Republican Party resistance. At the same time, the European Union's ETS 'Emissions Trading Scheme' experienced an 8 percent year-on-year rise in trading for a similar volume of carbon allowances – an increase that would likely have been even greater had some of the uncertainties surrounding the linkage between the ETS and the UN's Kyoto Protocol or CDM Clean Development Mechanism been clarified. To some extent, this differential evolution confirms Europe's status as the "epicentre" of a global carbon market that amounted to $122 billion in 2010 (vs. $127 billion the year before).

There is no doubt that the new activity's genesis has been associated with a number of anomalies requiring rectification. A frequent criticism on the political right is that effective policing will be impossible – one example being New Jersey landfill operators who have qualified for carbon credits based on the methane gas that they derived from rubbish collected long ago (Ball 2008), meaning that they are being rewarded for old behaviour but not incentivised to do anything new. More generally, there is concern that inconsistent initial permit allocations will give an unfair advantage to certain industries or even companies as opposed to others. On the political left, the worry is that using market mechanisms to alter behavour will ultimately displace the burden of the ensuing adaptations from the rich, who can afford to buy carbon permits (especially if prices remain as low as they are currently), to the poor, who cannot. An example of this is that way that schemes such as the United Nations CDM international offset mechanism is "is being used by some companies to get enormous returns for very small outlays by making low cost changes that yielded large volumes of credits which they then sell" (Harvey and Crooks 2009). The calculation here is that at current low carbon prices (around $18 tonne in 2020, vs. the $50 that the IEA calculates is needed to change behaviour), companies have insufficient incentive to invest to any great extent in costly green technologies – meaning that in their current state, the carbon markets are not achieving their prime purpose.

At the same time, there are still many strong signs of local communities' ongoing willingness to do what it takes to build a functioning carbon market. In April 2011, for instance, a Carbon Reduction Commitment scheme will start in Great Britain, replete with a bonus/malus system providing all 6,000 participants (government bodies but also companies, universities, etc.) with a clear financial incentive to reduce emissions. In the November 2010 US midterm elections, the voters of California rejected a proposition (financed by two Texas oil companies) that the state's incipient emission reduction targets only be enacted if economic activity surpassed certain thresholds. Even more poignant is the move by a growing number of companies such as PepsiCo, Yahoo or Nike to no longer obviate their emission responsibilities by purchasing offsets (i.e. REC renewable energy certificates) but instead to invest the funds directly in real onsite renewable energy projects that will allow them to reduce their carbon footprint (Greenbiz Staff 2010a). To some extent, decisions of this kind weaken the carbon markets since parties that would otherwise be injecting capital into the scheme are now investing in tangible improvements. From an ethical perspective, however, this is clearly a desirable outcome.

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Lighting

Traditional incandescent lightbulbs are in the process of being phased out worldwide, largely because they are inefficient: up to to 95 percent of the electricity that each incandescent draws is wasted as heat; and the next technological avatar – CFL (compact fluorescent lighting) – lasts around 10 times longer and uses up to 80 percent less electricity (Jha 2009). CFL bulbs cost more than incandescents but should become price-competitive in consumers' eyes once life cycle costing is brought into the equation. This is increasingly expected to become the crux of consumers' purchasing decision as different countries roll out the regulatory stipulation that light bulb packaging contains information on products' brightness, estimated yearly energy cost, bulb life expectancy, light appearance (from warm to cool) and mercury levels (GreenerDesign Staff

2010). Note that the comparative influence of each of these factors can vary at different moments in history: whereas consumer interest in CFL focused on their durability when they first came out in the mid-2000s, as energy prices rose in 2007 it was the savings aspect that began to dominate (Makower 2009). The result of this variability is that the big names in the sector (Philips, GE) tend nowadays to bundle all of the new generation bulbs' advantages together to attract different categories of consumers with varying motivations. This broad approach is appropriate given the size of the market: lighting alone accounts for something like 20 percent of all electricity consumption globally, with lighting in the U.S. consuming around one-fifth of this country's total at an annual cost of more than $40 billion. Moreover, with 95 percent of all US households lacking any CFL bulbs whatsoever in 2008, the room for growth is enormous.

Yet the expected trajectory for the lighting market remains unclear due to the arrival already of what is widely viewed as the next generation of bulb technology - light emitting diode (LED), which perform five to ten times better than CFL and dispenses altogether with mercury, a toxic component used in fluorescent bulbs. LEDs are made from semiconductors that produce lighting when electrons interact with ("excite") the phosphorus coating the LED's inner surface. This is superior to CFLs – not to mention incandescents - due to a lesser wear and tear on parts and also because of LEDs' ability to direct flows in a variety of ways and achieve flexibility in terms of colour spectrums and intensities. The applications are also much more variegated, since CFLs can be attached, for instance, to different kinds of receivers like solar batteries.

The problem is that LEDs remain prohibitively expensive, with 2009 prices commonly around $60 for LED retrofits for incandescent 60-watt bulbs and $40 to $50 for LEDs replacing 40-watt bulbs. In addition, the light quality that they currently tend to offer can be duller and less attractive than their predecessors. Given these obstacles, the big question in the lighting market today is mainly how long producers and users will stay with CFL – generally acknowledged to be no more than an intermediary solution – before moving on to LED. The answer depends on a host of factors. Firstly, there is the competition between different LED formats, as exemplified by the battle between Philips EnduraLED line and Siemens dimmable and mercury-free Sylvania ULTRA LED A-line 12-watt bulb (with other leading names including Panasonic, General Electric or Taiwan-based GlacialTech Inc., c.f. GreenerBuildings Staff 2010). In light of the market's youth, consumers cannot always be certain of any one product's viability, meaning that a benchmarking process that includes external certification expertise is as desirable here as it is elsewhere. Given constant product improvements, however, it is likely that one or the other of the sector's leading companies will achieve technological domination one day soon, imposing its own standards on most rivals. Then comes the not unrelated question of how soon the industry as a whole can achieve economies of scale to cut per-unit

production costs; and more strategically, whether buyers are happy to make incremental progress towards sustainability or will want to jump the interim steps (Werbach 2009). Lastly, a number of external factors will also influence the transition: how long it will take energy prices to get to a level where the savings gained justify LED's surcharge over CFL; and the pressures under which major lighting users such as local authorities are being placed as regulatory bodies impose higher lighting efficiency standards. Examples at this level include a whole array of EU or US directives targeting not only inefficient luminaries but building lighting, outdoor ballasts and workplaces. (http://www.lighting.philips.co.uk/lightcommunity/trends/green/legislation.wpd)

Galvanised by these fillips, Greenbiz.com expects the total market for lamps in the commercial, industrial and outdoor stationary sectors to reach $4.4 billion by 2020 – while predicting that LEDs will account for half of this total. The initial driver is suppose to be LEDs used as 'outdoor stationary' lighting fixtures such as traffic signals and exit signs before finally penetrating the commercial building sector. Note the close links between the transformation of lighting and the future of green construction. For the moment, despite technological improvement, lighting use in buildings to seems to be rising by something like 2 percent per annum. The probable explanation a la Jevon's Paradox is that people have become complacent and no longer make the effort to switch off lighting (Monbiot 2007). Similarly, in many service industries nowadays, there is a sense that "throwing energy at guests" (Werbach 2009) is a good way to achieve customer satisfaction. In the absence of behavioural change, one response to this problem would be a static solution such as installing sensors that switch off lights automatically when people leave rooms. It is questionable however whether this kind of cosmetic remedy really suffices.

A more fundamental change involves retrofitting buildings in a way that focuses on basic interactions between lighting and other aspects of tpremises' use (GreenerBuildings Staff 2010). By incorporating efficient lighting targets into a building's design from the very outset, a number of positive outcomes can be achieved. For instance, "more efficient lighting produces less heat, which in turn can significantly reduce air conditioning demand, which then results in a smaller retrofit and fewer fans and pumps -- all of which result in cost savings. [Other] considerations include glare, comfort, colour, illuminance ratios"; whether daylight seeps through outside windows; how much time workers spend in front of computer screens, etc. It has been estimated that the integration of lighting variables into a building's EMS environmental management system (see Chapter 5) can add 10 percent to the overall cost. This materialises through controls such as building automation systems, occupancy sensors, dimming and lumen maintenance. The savings, on the other hand, can reasonably be expected to be much greater, both in financial terms but also due to proven link between happier light-streamed buildings and worker productivity.

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Revision tips

- There is a broad consensus that resource productivity will soon become the leading driver of global economic growth UN expects 20 million green jobs by 2030 as the longstanding under-evaluation of the cost of using nature's services is revised. Rising relative prices in the sectors affected by these trends (especially commodities and habitat-related) bodes well for careers in these areas.
- Due to rising demand (economic emergence) and supply constraints (drought, soil deterioration, higher oil costs), there has been a reversal in the decades-long trend towards lower food prices. Note the move towardsa greater localisation of food sheds to avoid long-distance food miles. Farmlands are being protected from urban sprawl and there is greater regard for biodiversity. In many locales, there is a conscious attempt to integrate city and country.
- Water supplies have diminished as a result of climate change, with demand rising due to population growth, urbanisation and industrialisation. There are also concerns about long-distance distribution networks. In response, water thrift is developing into an urban lifestyle. The new vision of habitat organisation incorporates the physical aspects of human interactions.
- Construction is comprised of many different sub-sectors, each with its own environmental issues (heating, materials, lighting, etc.). A distinction exists between new build and retrofitting. Note the proliferation of attempts to imitate natural processes via 'biophilic' designs affecting air quality, water usage, energy consumption, etc. Note also the advent of leading green construction standards agencies such as LEED (US); BRE-EAM (UK). Green construction is the main focus of many of the stimulus packages organised in the wake of the 2008 credit crunch.
- Transportation needs to be analysed within wider demographic (migration), economic (flows) and geographic (hinterland) frameworks. Globalisation has masked the advantages of proximity. At a macro level, urban infill

policies could obviate the need for mass transit. At a micro level, interest in energy-efficient vehicles has increased. Different modes of transportation have varying prospects. A key factor is the future localisation of power sources(e.g. Better Place charging stations).

- The sheer number of technological innovations requires the development of new managers capable of driving this industrial revolution. Questions remain whether the changes wil be incremental or revolutionary, or whether they will be driven by new companies or existing ones. Current competitive conditions in certain sector dictates the prospects for launching new technology start-ups.

Case study Getting nature to nurture

One of the most widely debated aspects of modern globalisation is that way that so many areas of human activity have become subject to bottom line constraints. Supporters of neo-liberal economics will rejoice in the spread of market systems deemed to enhance overall productivity but others oppose the hegemony of financial logic in areas crucial to the very survival of humankind - first and foremost being food. The argument here is that governments no longer control the way that their populations are being fed, having been pushed aside by huge multinational enterprises (MNEs) wielding the power to determine key market factors such as supply and price (Oosterveer 2007). The general fear is that this commoditisation of the food industry has the potential to produce certain very negative outcomes: in quantitative terms, with the Global North outbidding billions of hungry LDC citizens for increasingly limited global food stocks; but also qualitatively, with healthy eating being sacrificed on the altar of corporate efficiency.

From Upton Sinclair's The Jungle to Eric Schlosser's Fast Food Nation, authors have long criticised the use of industrial methods to grow and process food. There are many examples of the industrialisation of agriculture, ranging from the overuse of fertilisers or pesticides to the introduction of genetically modified (GM) organisms, over-exploitation of resources (fishing stocks but also agricultural land), rise of monoculture cash crops antinomic to biodiversity, primacy of long-distance supply chains or overuse of chemical additives. The curious reality is that a sector directly rooted in the natural world is often viewed as one of the least aligned with the principles of ecological thinking – an observation best incarnated by the industrialised foodstuff beings served in the chains or fast food outlets where more and more people eat nowadays.

This is not to say that modern food practices are universally criticised. The world's least affluent populations, for instance, sometimes referred to as highly indebted poor countries (HIPC), often have neither the means to overcome the vagaries of nature (droughts, plagues), the infrastructure to get their

perishables to market on time nor the knowledge needed to increase farming productivity beyond sustenance levels. The priority here is simply to stave off starvation. Whether or not this is achieved using natural or other methods is less crucial.

Conversely, other societies benefiting from both abundant food supplies and advanced technical knowledge tend to feature growing constituencies of producers and consumers for whom environmentally-friendly food practices are a real priority. The motives are diverse, ranging from a cultural disdain for fast food (c.f. www.slowfood.com/) to the growing number of health-conscious consumers who prefer biological authenticity to industrial treatment. Hence the growing market for organic foodstuffs in the years preceding the 2008 credit crunch, but also for 'biodynamic' skin care products from companies such as Germany's Dr. Hauschka WALA Heilmittel or the UK's Natural Elements. The key selling point for all these goods is that they contain minimal or no chemical additives. In and of itself, this makes them greener than other fast moving consumer goods.

Today there are numerous examples of large agricultural interests consciously adopting sustainability policies and making this orientation a key part of their branding. For instance, one of Spain's leading winemakers is a family business called Torres, renowned for its longstanding focus on environmental concerns. The current managing director, Miguel Torres, has on various occasions proclaimed that climate change is a serious and present danger to vineyards in Spain's hot northern plans and acted upon this by moving a large proportion of his assets to cooler climes in the Pyrenees mountains. Above all, Torres has gained renown for the broad range of sustainability initiatives that his company implements (www.torresgreen.com/). Some are internally-oriented: wind turbines or permanent and mobile photovoltaic panels for electricity and hot water; electric delivery vans; wastewater treatment; rainwater harvesting; and biomass applications. Others benefit external stakeholders, such as the help that Torres provides in protecting forests in Spain and Chile or his creative use of seaweed beds to absorb the CO2 created during the wine fermentation process. Lastly, in terms of the product itself, Torres grapes have not been sprayed with synthetic chemicals for more than 20 years now, with natural pheromenes being used instead to trap any potentially harmful insects.

It is true that Torres's organic wines are probably not competing for the same customers as the ones targeted by the industrial food conglomerates whose products are being consumed via mass retail outlets. Yet company's rising fortunes clearly have something to do with the positive publicity earned by its sustainability practices. Having said that, after years of high growth, general demand for organic foodstuffs stagnated in the difficult economic climate of 2009, partially because consumers seem to pay less attention to the

ecological imperative when times are tough. What will be interesting to see is if and when demand for environmentally-friendly foods returns to its earlier uptrend.

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Case study questions

A. Is farming a business like any other or does it need to be governed by different rules – and if so, which ones?

B. To what extent have agricultural developments over recent decades been detrimental to the environment?

C. Do organic and similar kinds of ecological farming have much of a future? Why?

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