Business Action to Influence Consumer Demand for Low-carbon Goods and Services

Department for Business, Innovation and Skills
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Contents

Executive Summary

1.1 Context and objectives to this study

The Climate Change Act has committed the UK to a legally binding target of reducing greenhouse gases emissions by 34% by 2020 and 80% by 2050. To support this ambition, the Government launched the Low-carbon Industrial Strategy in July 2009, with the core objective of ensuring that British businesses and workers are equipped to maximise the economic opportunities and minimise the costs of the transition to a low-carbon economy. The Strategy focuses on a number of key areas, including energy efficiency improvements, the scaling up of renewable energy and encouraging consumer and business demand for low-carbon goods and services.

The Department for Business, Innovation and Skills (BIS) has a key role to play in helping the private sector and businesses in the UK maximise the opportunities presented by a low-carbon economy. BIS has commissioned this research, to better understand how business can encourage greater consumer demand for low-carbon goods and services.

The objectives of the study are threefold:

1 To understand drivers and enablers behind business actions to encourage the take up of low-carbon products in the market, and also the potential barriers or market failures that may inhibit these actions;

2 To identify and assess the impact that a range of business models, strategies and actions have on consumer demand for low-carbon goods and services and the wider implications for markets;

3 To establish a set of case studies, which illustrate and increase the evidence base for objectives 1 and 2.

This research is structured to help understand the importance of the above drivers and how they interact, as well as how businesses and government can help steer behaviour changes amongst consumers that will help create and sustain demand for low-carbon goods.

1.2 Approach

This research involved three principle workstreams to identify the drivers, barriers and market actions relating to business influencing the take up of low-carbon products:

- Literature review: synthesis of key academic, market research, policy focused and advocacy papers;
- Case studies: interviews and research with twelve products or markets; and
- Synthesis and reporting: analysis of key findings and developing key conclusions.

The study aims to synthesise the experience across a wide range of case studies, and understand the common themes in drivers, enablers and business strategy or actions.

1.3 Summary of key findings

Reducing carbon emissions as a business strategy is still an emerging issue. It is even less well established as a consumer issue. There remains a significant educational and perception barrier that will take time to overcome.

In business-to-consumer markets, messaging for consumers is therefore key to driving demand for low-carbon products. In most cases, carbon is not the main focus in engaging with consumers. Other attributes, such as costs savings through reduced energy use are more important.

	Key message
1	Depending on the sector, product or service, innovations may be **demand led (customer pull driver)** or **supply led (production push)**
2	**External trends are critical** in driving business action. Some drivers are common to all sectors; however the most significant drivers are **sector specific**
3	External enablers can make the difference in moving a low-carbon product from niche to mass market. In many sectors, **regulation and standards** are important enablers
4	The extent to which carbon and climate change is **strategic to competitive strategy or corporate purpose** affects the nature and focus of business action
5	A critical success factor is creating the right conditions within a company's sphere of influence, **utilising the existing culture** and **engaging stakeholders and partners**
6	There are **significant external barriers** impeding the development and commercial success of low-carbon goods and services
7	The long-term nature of climate change and the largely intangible nature of carbon emissions means that the **consumer engagement with the issue is low**
8	**Trust, perception and behavioural barriers** are exacerbated where low-carbon products and services are not well established and are maturing, evolving offers. As a result, there is **little 'consumer pull'** for products and services marketed as low-carbon
9	Retail consumers and corporate buyers are **unwilling to compromise on price, quality, performance or convenience** for carbon or environmental benefits
10	The **information barrier** significantly inhibits effective innovation in low-carbon products and services and business models
11	**Innovation is a critical element in influencing demand** for low-carbon goods and services – it is a key route to removing barriers for consumers
12	**Choice influencing** is the most common approach taken by retailers and mass-market FMCG operators. The commercial risk of removing consumer choice (choice editing) is too high in many cases
13	**'Carbon' should not be main focus in marketing** and communicating with consumers to deliver mass-market success
14	Independent, third party partnerships are important. Partnering with NGOs or independent 'verifiers' can help overcome the trust barrier

1.4 Structure of this report

The first main section (section two) of the report presents the key findings of the research, with a summary of the key messages in terms of drivers, enablers and barriers of the introduction and uptake of low-carbon products and services. It also sets out the main business models, strategies and action as well as consumer response to low-carbon offerings. We illustrate these key findings by reference to the case studies, which add colour and resonance to the messages.

Section three sets out the methodology used for the research, including literature review and case studies, as well as the framework within which the study has been carried out.

In section four, the results of the literature review are presented. This section includes the framework used for the analysis and analysis of the findings on business strategies, marketing theories as well as drivers, enablers and barriers to low-carbon behaviour. It also suggests possible gaps in literature on the topic. Section five summarises the outcome of the case studies. Detailed case studies are included in the appendix of this report.

Key findings

1.5 Overview

Business action to influence consumer demand for low-carbon goods and services takes multiple forms and occurs right across the value chain, from raw materials production phases to consumption and disposal phases.

There are multiple drivers and enablers at work encouraging action to influence consumer demand for low-carbon goods and services. These are inhibited by key barriers.

1.6 Drivers

Both the literature research and practical evidence from the case studies demonstrate that there is a complex and interrelated set of drivers influencing action to create low-carbon goods and services.

These drivers can be identified as 'internal' or 'external', but based on our research both should ideally be present to bring low-carbon goods or services to market successfully.

External drivers

Our research has identified the following external drivers, presented in order of importance:

Market and competition

Both business-to-business and business-to-consumer operators are developing lower carbon goods and services in response to current or potential market opportunities.

The case studies of business-to-business products and services consistently cited the desire for stronger CSR credentials as a major attraction for their corporate customers. Seeking to compete on corporate social responsibility as a differentiating factor is an important motivation for procuring lower carbon goods and services. In this case, there is a 'consumer/customer pull' for such low-carbon products.

Business-to-consumer product innovations in the market are also motivated by commercial potential and competitive advantage. Products designed to meet the needs of mass-market consumers typically do not respond to a direct need for low-carbon goods - there is little evidence of 'consumer pull' for these beyond a small niche of consumers. Instead, the mainstream products are principally promoted on the basis of other attributes, such as lower in-use costs (lower temperature washing detergent) or address concerns over waste (Kenco Eco-refill packaging). The environmentally friendly attributes are offered as additional consumer benefits from purchasing or using these products. As a result, they can serve to change the nature of competition in the sector or category by raising consumer expectations of the products, thus encouraging further innovation and competitive rivalry.

Policy, regulation and standards

Policy and regulation – actual, proposed or anticipated – are all powerful drivers for the development of low-carbon products. In the case of the Solar PV, fiscal and regulatory incentives (feed-in tariffs, new building renewable obligations) have been central to the development of the market. Launch aid was important for the development of Modec and policy support at the local level has facilitated Zipcar's market development. Voluntary initiatives, such as standards and labelling are also acting as drivers of innovation.

Macroeconomic conditions

The recent difficult economic conditions have forced a greater focus on energy and production costs and resource efficiency. Thus, macro-economic factors have facilitated the development and marketing of lower carbon goods, supporting the business-to-business proposition of cost-saving through teleconferencing, for example. This value proposition/cost message also supports

the marketing of low temperature washing detergent and domestic solar PV. In a number of the interviews conducted as part of the case study research, there was also recognition that longer-term external macro trends such as peak oil and adaptation costs from climate change were important external drivers of the need to develop lower carbon business models (see further analysis in internal drivers) or use lower energy consumption products.

Social and behaviour

Consumer research from the literature review and anecdotal evidence from the interviews conducted as part of this research suggests that awareness and concern over climate change among UK consumers has been increasing, albeit that these may have had a lower priority during the recent recession. It is anticipated this increased awareness has raised expectations that businesses will do more to reduce carbon emissions in their products and business models. This is supporting the 'market and competition' driver outlined above.

Technology

The maturity of technologies is an important driver and enabler of many lower carbon goods, e.g.: solar PV and teleconferencing. The growth of the green technology sector and the increasing R&D spend in these areas internationally is likely to result in enhanced product innovation.

Some external drivers are common to all sectors and markets, while others may be sector-specific. For example, while the market and competition driver is common to all sectors, strategies to target the opportunities or mitigate competitor action will vary by sector and sub-sector, depending upon the characteristics of the sector. This distinction is evident in the differences between business-to-business and business-to-consumer approaches, outlined below. The motivations for the buyers to select lower carbon goods and services are very different and therefore the marketing and communication strategies to target the market opportunities are also different. Macroeconomic conditions (e.g. economic downturn) and social and behavioural awareness (e.g. perception on climate change) would also be common to most sectors. However, the pace of technology change (e.g. technology-based sectors vs. service-based) and influence of regulation and policies (e.g. feed-in tariffs for microgeneration renewable technologies vs. energy efficiency labelling for televisions) would tend to be more sector-specific.

	Key message
1	Depending on the sector, product or service, innovations may be **demand led (customer pull driver)** or **supply led (production push)**
2	**External trends are critical** in driving business action. Some drivers are common to all sectors; however the most significant drivers are **sector specific**
3	External enablers can make the difference in moving a low-carbon product from niche to mass market. In many sectors, **regulation and standards** are important enablers

In a number of case studies the development of low-carbon products or services has not been as a result of a specific focus or desire to address carbon emissions. Instead, it is a spill over from the motivation to achieve a different goal, for example the drive to reduce cost.

Similarly, carbon reduction is not the only, or even most important, driver in the purchase decision for most corporates and retail consumers. The desire to reduce cost, improve convenience, branding etc. are all more important drivers of purchase decision.

These external drivers interact with internal drivers within business.

Internal Drivers

Small and Large firms

The drivers identified below were common across different sized firms, although some generalities can be made in comparing small firm and large firm drivers. Small and medium sized firms supplied low carbon goods and services to a real or perceived demand but rarely aimed to influence behaviour or drive consumer demand. They are also likely to be influenced by larger firms through minimum standards or in supply-chain collaboration.

Larger firms who were taking a lead on carbon mitigation in the study were significantly influenced by carbon audits, which affected their consumer engagement strategy. It involved a whole lifecycle analysis and frequently involved resource efficiency measures and strategies to influence consumer behaviour following the purchase of the products.

Maturity of response to sustainability

Our research identified that companies which have developed market leading or advanced responses to sustainability issues are likely to have stronger internal drivers to take action on carbon emissions. Often these leaders have clearly defined corporate targets relating to the reduction of carbon emissions in both direct operations and indirect impacts. As a result businesses that align sustainability and social values with their corporate strategy tend to find greater internal support for their actions. Other enabling conditions include:

- Risk appetite: Companies that have a greater risk appetite tend to be more open to innovation and experimentation, for example launching new low-carbon products or services. Larger and medium companies tend to be more risk averse, there is more brand value at stake, but also tend to be more thorough in their market testing, so new low-carbon products and services are more likely to be successful.
- Materiality and product alignment: The size of the prize clearly matters. For companies that cover a number of product ranges (e.g. supermarkets, many fast moving consumer goods (FMCG) companies), materiality (e.g. of carbon savings, size of market) helps initiate and focus action. This is often enabled by insight derived from carbon lifecycle analysis. However, conflicts of interest and competition for resources between product types may restrict the amount of effort into the development of low-carbon products and services. For example, lifecycle analysis is a complex and costly process for a brand. This investment in research has to compete with others which may have more tangible, direct impact on cost reduction or sales in the short-term.
- The analysis shows that it is easier to create new markets for low-carbon products or services which will offer tangible energy savings than for products where the carbon emissions are embedded in the supply chain and therefore far removed from the consumer. For example, lower temperature washing detergent is a successful low-carbon product because cost saving in the consumption phase can be marketed as an attractive attribute. For food products, the benefits of lower carbon production methods are less clear to consumers because the cost reduction and resource efficiency benefits rest with the producer or retailer rather than the consumer. The complexity of food supply chains also creates difficulty in carbon measurement and communication. In this case, the lower carbon attributes of the product may never be marketed.
- Corporate culture: Corporate attributes such as innovation-led cultures, as observed in Procter & Gamble, Kenco and the televisions sector, are important internal enablers in the successful development of these products and services.

Those that are less advanced in their approach to sustainability are also influenced by this driver, but more by a ‘responsive’ CSR strategy to promote corporate identity, brand and good citizenship. This does not mean that this group does not take business action on carbon and climate change seriously – in some cases, significant effort have gone into addressing the issue. Rather it means that actions taken on carbon and climate change tend to be driven by a desire to strengthen their brand or profile, rather than creating competitive advantage or taking leadership on the issues.

	Key message
4	The extent to which carbon and climate change is **strategic to competitive strategy or corporate purpose** affects the nature and focus of business action

Desire to develop corporate sustainability/resilience

Linked to the above 'maturity' driver is the recognition that carbon intensity is a risk to business and that taking action to reduce costs or improve resource efficiency includes reducing carbon emissions. For example, a number of the interviewees in the supermarkets case study stated this as a strong driver for taking action to reduce carbon in the supply chain and in direct operations.

Information on carbon

An important internal driver highlighted in a number of case studies was the increasing level of understanding and visibility of carbon in products and processes from the development of carbon lifecycle analysis. Enhanced measurement, better methodologies and greater use of lifecycle assessments are driving insight and directing strategy in the development of low-carbon goods and services.

Identifying the areas in the lifecycle of a product where there was the highest carbon intensity often defined corporate strategy. For example, for low temperature laundry detergent, consumer behaviour following the purchase of the product had the highest carbon impact. For Kenco, the glass packaging was a major source of emission and for Adnam's low carbon beer, most emissions were within the production process; therefore the strategy was to influence consumers to buy the product rather than influence their behaviour following purchase.

Understanding the consumer

Understanding consumer needs with regard carbon is an important enabler of the development of successful low-carbon products. In particular, developing the right marketing messages is critical for mass-market appeal.

Suppliers and supply chain

Businesses with close knit supply chains tend to be better able to influence suppliers towards lower carbon production methods. This is often evident in vertically integrated sectors and/or where there is a strong buyer.

The evidence from the supermarkets case study demonstrates that retailers are influencing demand for low-carbon goods and services through their interaction with suppliers. In particular, supermarkets are leveraging their scale by enabling, encouraging or mandating innovation by suppliers. Retailers are developing these collaborative solutions primarily to reduce cost and increase resource efficiency with the aim of contributing to supply chain resilience. Having more efficient suppliers, sharing knowledge and developing closer working relationships strengthens the supply chain against economic or competitive threats. As a result of such strategies, carbon emission reduction is clearly not the sole benefit or even the driving motivation. Nevertheless, reduced embedded carbon in the consumer product is often an outcome.

The level of collaboration with branded goods manufacturers relies less on the supermarket retailers providing the expertise and investment, as with the (SMEs) agricultural own-label suppliers outlined above. However, there is evidence of action to encourage supplier action to create low-carbon alternatives. The development by Adnams of low-carbon beer, in collaboration with Tesco and both the Kenco Eco-refill and the Ariel low temperature washing detergent case studies cite support from supermarket retailers as important in the development of consumer awareness, acceptance and sales. One interviewee identified that retailers are able to create 'a race' for lower carbon and more sustainable goods and services among suppliers.

Influence of/with partnerships

The importance of partners in creating successful low-carbon products features strongly in the case studies. Stakeholders such as NGOs, consumer organisations, the media and industry bodies are a key influencer of outcomes and the degree of business action. External independent recognition of a low-carbon goods or services can often help boost the take-up of the products.

Engagement with government

The voice of businesses in their respective sector in government is also important – this can help shape policies and incentives that are truly conducive and enabling the take-up of products. These usually mean large companies, but in some sectors with smaller players could also mean a strong sector association or representative (such as in solar PV).

	Key message
5	A critical success factor is creating the right conditions within a company's sphere of influence, **utilising the existing culture** and **engaging stakeholders and partners**

1.7 Barriers

The relative scarcity of mass market lower carbon goods and services suggests that commercial barriers are discouraging the development of new products and services, or that market failures are undermining their marketing and distribution.

Lack of effective communication of the issues

While consumer research identifies concern regarding climate change, consumers are not generally willing to make significant personal sacrifices to address the issues. The case studies confirmed this lack of consumer engagement is a key barrier to the development and success of low-carbon goods and services.

The credibility of 'eco-product' claims and trust in big business can also be significant barriers. In particular, poor performance of early innovations can create longer-term negative sentiment. The requirement for behaviour change by consumers can also be a critical barrier. This is difficult to engender, particularly when the issue and consequences are not particularly tangible; i.e. carbon emissions and climate change.

Consumers face a bewildering array of information sources on the issues of sustainability and climate change and often don't know who to believe. The complexity in understanding where in the value chain carbon is emitted and who is responsible for it adds to the difficulty in creating effective communication on the issues. Inconsistencies in the approach to communication on the issues represent a market failure of asymmetry of information and general information failure.

Low level of 'consumer pull'

Because of these and other barriers, there is very little consumer call for products or services that are branded as low-carbon. Even then, the literature review and case studies both confirm that consumers and corporate users are, on the whole, not willing to compromise on price, quality, performance or convenience for carbon or environmental benefits.

Economic barriers

While economic barriers were mentioned in a number of the interviews, it is evident from the literature review that cost presents a significant obstacle in the development of low-carbon solutions in many sectors. Technological solutions or infrastructure available to support innovation is holding back demand, as identified in the televisions and teleconferencing case studies. This under-investment represents a market failure in the absence of a carbon price

because the individual firm will not take into account the wider societal benefits when making the investment decision.

Lack of information on LCA and supply chains

As outlined above, insight derived from lifecycle assessments is driving and directing action to develop low-carbon goods and services. However, a number of case studies identified a lack of cost effective and standardised life cycle analysis information for carbon. For complex supply chains, composite products and those with seasonal variations (food in particular) gaining the carbon insight necessary to take focused action is costly and complex.

Uncertainty on policy, regulation and standards

The literature review highlighted policy or regulatory uncertainty on climate and carbon can be a major barrier to action to create lower carbon goods and services. However, our case studies demonstrate that the anticipation of further regulation is clearly an enabler in many markets. The lack of regulation or consistent standards on carbon labelling compounds consumer confusion. There is no strong consensus on the viability or effectiveness of carbon labelling for consumers.

Given the increasing focus on carbon reduction in the public sector, it was expected that public procurement would feature strongly as a driver for business action. However, public procurement was only mentioned in two case studies: by Zipcar, in the context of local government partnership, and by Modec. In the latter example public procurement in the US has bolstered the market for the products but in the UK policy commitments have yet to deliver a significant stimulus to demand.

Maturity of response to sustainability

The case studies all represent examples of companies who have an advanced understanding of sustainability and CSR issues. There are many other examples of businesses that have not moved their approach to the issues beyond basic compliance with regulation. In these circumstances, there is likely to be far less internal pressure to take action to influence consumer demand for low-carbon goods and services.

	Key message
6	There are **significant external barriers** impeding the development and commercial success of low-carbon goods and services
7	The long-term nature of climate change and the largely intangible nature of carbon emissions means that the **consumer engagement with the issue is low**
8	**Trust, perception and behavioural barriers** are exacerbated where low-carbon products and services are not well established and are maturing, evolving offers. As a result, there is **little 'consumer pull'** for products and services marketed as low-carbon
9	Retail consumers and corporate buyers are **unwilling to compromise on price, quality, performance or convenience** for carbon or environmental benefits
10	The **information barrier** significantly inhibits effective innovation in low-carbon products and services and business models

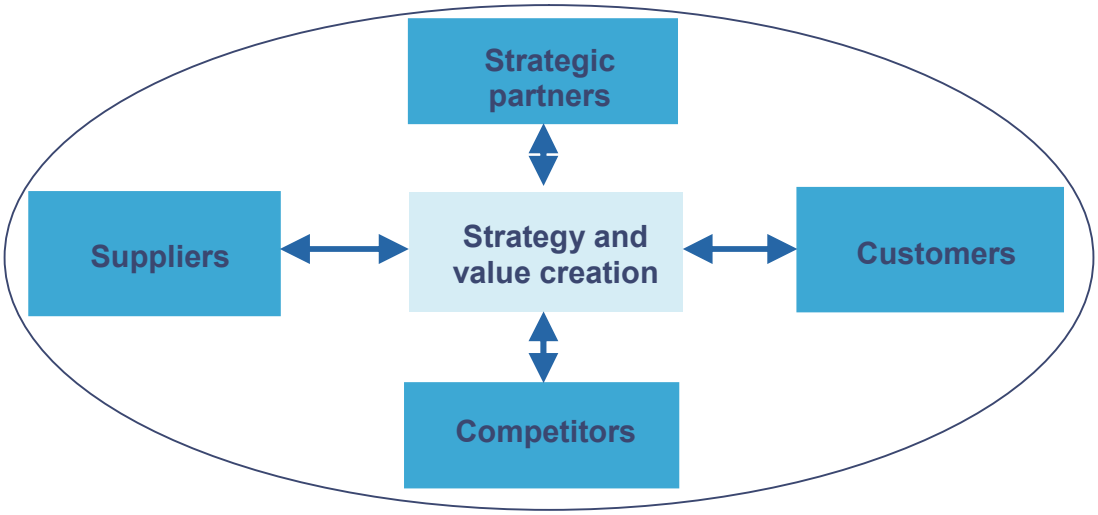
1.8 Business models, strategies and actions

The strategies and actions observed in the literature and the case studies have consistently demonstrated that business influences consumer demand by strengthening the drivers and removing the barriers to consumer take-up.

Using PwC's Climate Change Diagnostic Model, it is possible to identify the key drivers and success factors in business action to influence consumer demand for low-carbon goods and

services, as well as the market failures that may be inhibiting success or further action. These are applicable to most sectors.

Figure 1: PwC climate change diagnostic model



Source: PwC climate change diagnostic model

Figure 1: Business actions summary table

Factor	Actions & success factors	Case study evidence
Strategic Partners	▪ Enabler of consumer trust & external credibility ▪ Identification of appropriate partners is crucial ▪ Sources of information and guidance on actions and critical success factors ▪ External scrutiny on data and messages ▪ Collaboration between producers/suppliers and retailers at the point of sale important (particularly if consumer behaviour change is required to drive carbon reduction)	▪ Low temperature laundry detergent – partnership with Energy Saving Trust ▪ Tesco partnership on carbon labelling with the Carbon Trust
Customers	▪ Effective targeting of customers, with the right messages is a critical driver of commercial success ▪ Business-to-consumer operators engage the mass-market with lower carbon goods and services (shifting from the targeting of niche markets with products priced at premium to mainstream products) ▪ Mainstream brands are providing solutions with lower carbon attributes at no price premium ▪ Simple and easy to understand messaging referencing product efficacy and/or cost saving attributes (rather than	▪ Low temperature laundry detergent – cost saving and brilliant clean messages ▪ Kenco Eco-refill customer engagement ▪ Modec innovation on battery technology – addressing range challenges ▪ Teleconferencing technology development and cost saving messages ▪ Supermarket marketing approaches – cost saving,

Factor	Actions & success factors	Case study evidence
	focus on reduced carbon as an attribute) ▪ Address potential/perceived barriers for consumers on costs and effectiveness of low-carbon/environmentally friendly alternatives. Consumers are, on the whole, not willing to compromise on cost and price, performance or convenience for lower carbon attributes ▪ Manufacturers can establish stronger commercial relationships with retailers through the development of exclusive distribution agreements ▪ Leaders are creating demand for lower carbon goods and services by removing consumer barriers. (i.e. they are bringing to market products and services that offer lower carbon attributes at no compromise for the consumer on price, efficacy or convenience but also with effective and attractive marketing messages.) ▪ Choice edit out high carbon alternatives – communicate reasoning effectively	waste reduction focused messages ▪ Energy company action to improve domestic energy efficiency ▪ Adnams low-carbon beer development with Tesco ▪ Patio heater withdrawal; provision of alternatives
Suppliers	▪ Collaboration and influence with suppliers essential - in the development of innovative product or business model solutions ▪ Identification of carbon in the supply chain requires data sharing and collaboration ▪ Carbon emission in the supply chain of many consumer goods is the major source of emissions ▪ New product solutions are required to address carbon emissions. Supplier-led technological developments applications ▪ Retailers with strong relationships with suppliers are able to co-create resource efficiencies and commercially successful low-carbon solutions ▪ Retailers are developing supplier efficiency and supply chain resilience through the pursuit of resource efficiency and the development lower carbon process ▪ Encourage suppliers to develop lower carbon products by mandating minimum standards or rewarding innovation	▪ Supermarkets – taking action to reduce carbon in the supply chain for multiple reasons; cost reduction, supplier relations and resilience, addressing the largest impacts in their value chain (i.e. direct impacts are minimal) ▪ Adnams early adoption of lightweight bottle technology ▪ Technological developments in Solar PV, electric vehicles (batteries), teleconferencing
Competitors	▪ Competitive rivalry is driving action and innovation ▪ Energy, carbon and resource use reduction	▪ Low temperature laundry detergent – rivalry with concentrated alternatives ▪ Kenco Eco-refill new

Factor	Actions & success factors	Case study evidence
	enhances profitability and /or cost advantage ▪ Corporate reputation based on environmental credentials is a competitive battleground in many sectors ▪ Collaboration across sectors addresses market or information failure (on carbon footprinting and LCA)	market entrant ▪ Energy companies and environmental positioning ▪ Supermarkets supporting market positioning and brand values

Business actions: innovation, choice influencing, choice editing

The summary actions table demonstrates that there is not one single action, innovation or technological advance that is enabling the development of low-carbon goods and services. Companies are taking multiple approaches to the issue. Some are seeking to decarbonise existing structures to deliver lower carbon products, as identified in the case of supermarket actions in the supply chain. Others are pursuing system change, as in the case of Zipcar. However, most actions currently focus on the creation of substitutes to higher carbon alternatives.

The strategies employed to bring lower carbon goods and services to market can be further categorised as falling into the three broad business approaches identified by the WBCSD (Sustainable Consumption Facts and Trends); Innovation, Choice Influencing or Choice Editing.

The **innovation** approach, described by the WBCSD as; 'business processes for the development of new and improved products, services and business models [that] incorporate provisions for delivering maximum societal value at minimum environmental cost… Business innovation responds to the challenge of sustainable consumption through: eco-efficiency measures, product innovation and design, production & supply chain management, and business model innovation.'

The innovation approach features strongly in most of the case studies. Product innovation is observed in the Modec, televisions, solar PV, low temperature detergent, teleconferencing and beer. However, innovation is not just a matter for producers. Supermarkets can be seen to be encouraging innovation in suppliers and are also taking innovative approaches to supply models, while Zipcar represents an innovative approach to selling to a market need.

Innovation can take place at all levels and is best illustrated in the case-studies in response to reducing CO2 emissions in transport. Modec offered a low emissions version of existing fleet vehicles and largely facilitated a reduction in emissions with little change in consumer behaviour. Zipcar represents a whole system change by offering vehicles to rent, thereby radically altering consumer behaviour and purchasing. Finally, teleconferencing represents a substitute to transport and an innovation in reducing emissions through reduced demand for transport.

	Key message
11	**Innovation is a critical element in influencing demand** for low-carbon goods and services – it is a key route to removing barriers for consumers

Choice influencing, defined by the WBCSD as; 'Creating a market for sustainable products and business models by working in partnership with consumers and other key stakeholders to demonstrate that sustainable products and lifestyles deliver superior performance at the best prices. Using marketing communications to influence consumer choice and behaviour.' is also well illustrated in the case studies. It is evident in the actions taken by supermarkets, by the marketing messages that support the low temperature washing detergent and Kenco Eco-Fill packaging, in green financial services and in energy products.

Choice influencing is critical to any product that requires consumer behaviour change. However, given the common barriers relating to lack of trust and the negative perception of 'eco-products', effective communication on product benefits is vital to the success of low-carbon goods and services.

	Key message
12	**Choice influencing** is the most common approach taken by retailers and mass-market FMCG operators. The commercial risk of removing consumer choice (choice editing) is too high in many cases

The case studies suggest that communication with customers should not focus on 'carbon', if the goal is success in the mass market. The barrier of lack of understanding and engagement with carbon among consumers means that marketing purely on a carbon platform reduces the market appeal to a niche of those that understand the issue. The experience of Ariel, supermarkets and teleconferencing suggests that the primary focus should be on the performance characteristics of the low-carbon product and/or the economic (cost saving) benefits of its use.

The case studies also illustrate examples where the opposite approach was less successful: Solar PV products were initially marketed largely on the basis of their eco-credentials (and thus the market was niche). However, with the advent of feed-in tariffs, the economics of installation begin to make greater sense, thus widening the appeal and potential market size.

	Key message
13	**'Carbon' should not be main focus in marketing** and communicating with consumers to deliver mass-market success

For low-carbon products and services for the business-to-business market, messages can be low-carbon focussed (although having an economic message also helps). This is because a strong motivator for taking low-carbon products for corporates is to enhance the CSR or sustainability positioning of the business.

To overcome the cost barriers associated with some low-carbon innovations, alternative budgets may need to be identified to encourage their purchase – the Modec case study highlighted that, procurement teams may not want to pay the premium associated with some low-carbon products, but the enhanced brand value (as sold to marketing teams) can help to justify the purchases.

In choice influencing, independent, third part partnerships are important. The trust barrier for consumers is high and therefore partnering with NGOs or independent 'verifiers' is a useful approach.

	Key message
14	Independent, third part partnerships are important. Partnering with NGOs or independent 'verifiers' can help overcome the trust barrier.

Choice editing is described by the WBCSD as: 'Editing out unsustainable products, product components, processes and business models in partnership with other actors in society such as policy-makers and retailers.' Choice editing is best evidenced in the case studies by the action taken by B&Q in removing patio heaters from the product offer. However, the distinction between some aspects of innovation and choice editing is not always obvious. For example, in supporting

agricultural suppliers through innovative business models/partnerships, supermarkets are effectively editing out higher carbon inputs to consumer products by changing behaviours up the supply chain.

All of these actions - innovation, choice influencing and choice editing - can be seen to address consumer barriers, i.e. the need for products and services that offer lower carbon attributes at no compromise for the consumer on price, performance or convenience. Innovation and/or resource efficiency contributes to the removal of the cost/price premium barrier and also the performance/ efficacy barrier. Choice influencing and effective marketing messages contribute to engagement and understanding on the issues, making it more convenient for consumers to act on the intangible concerns over climate change and sustainability. Choice editing makes it even more convenient by removing the decision altogether.

1.9 Consumer response

The observed consumer responses and behaviour to the low-carbon goods and services in our case studies suggest that, in general, although there is a rising awareness of environmental issues and an increasing desire to take action, low-carbon features are still not at the top of consumers purchasing criteria. In fact, the lack of understanding and engagement with carbon and carbon emissions is a significant barrier as identified above.

However consumers are increasingly responding positively to the availability of green products. Consumer survey research reveals several tendencies in consumer attitudes to low-carbon products and services. These include:

Rising awareness

Consumer awareness of low-carbon product has risen in the last few years. Recent studies suggest that 75% of consumers are concerned about climate change, and a proportion of these consumers are willing to act on it (Consumers International, 2009). However, press coverage of 'Climategate' (allegations of data manipulation by the University of East Anglia) may have caused a short term reduction.

Implementing easy and incremental actions

Consumers respond well to low-carbon goods and services that require minimal effort. They are also more willing to change if the changes are incremental (e.g. low temperature detergent 'turn to $30^{o'}$, 'then turn to $15^{o'}$ campaigns).

The general acceptance of the need to take action on climate change has not translated directly into engagement with carbon emissions as an issue or into mainstream consumer behavioural change. The overriding consumer response when making a purchase is that cost is a more important consideration than environmental impact, a tendency exacerbated by the recent recession and high fuel bills

Continuing exposure to the issues may help consumer engagement. However, there is a risk that it will engender consumer fatigue. Government has an important role to play in building and sustaining consumer engagement, for example through education and active policy initiatives.

1.10 Market impacts

The impact of low-carbon goods and services on their respective markets varies widely.

Many low-carbon products and services remain niche, either by design – because the target market is small, or by beacuse the product and technologies and other enablers are immature. This is the case for electric consumer and commercial vehicles, Zipcar and car clubs and solar PV and other microgeneration products, highlighted in the case studies. As a result, the impact on the wider markets for transportation and domestic energy is very small.

Others are targeting the mass-market. In case studies for low temperature laundry and Kenco Eco-fill packaging both manufacturers claim commercial success and market share gains. There is therefore evidence that low-carbon innovations can disrupt existing mass-market categories, creating new expectations and minimum benchmarks to which all others have to move to maintain market positioning.

More generally the public commitments made by the leading supermarket operators on sustainability and carbon have created a platform on which all are now required to compete, including suppliers. There is a strong reputational angle for supermarkets in this and potentially, implications for their licence to operate; they cannot be seen to be doing something that is detrimental to the environment.

Methodology and framework

1.11 Overview of approach

This research is underpinned by three principal workstreams to identify the drivers, barriers and market failures relating to business influencing the take up of low-carbon products:

- **Literature review: synthesis of key academic, market research, policy focused and advocacy papers;**
- **Case studies: research into twelve products or markets and interviews with management; and**
- **Synthesis and reporting: analysis of key findings and developing key conclusions.**

The study aims to synthesise the experience across a wide range of case studies, and understand the common themes in drivers, enablers and business strategy or actions.

We have outlined the approach to the literature review and case studies below; this forms the basis of the framework for analysis and reporting.

1.12 Literature review

Business has a central role in climate change mitigation through reductions in emissions from the use of its products and services, as well as through reductions in its own direct emissions and in its supply chains. There is extensive literature on how consumers and businesses interact in response to increasing environmental concerns. We have conducted a literature review to:

- understand drivers that are behind business actions to encourage the take up of low-carbon products in the market, including potential barriers or market failures that may inhibit these actions;
- identify and assess the impact that a range of business models, strategies and actions have on consumer demand for low-carbon goods and services and the wider implications for markets; and
- inform the proposed framework of analysis for the case studies, which seeks to align the drivers of business action in producing low-carbon goods and services with commercial strategy.

The review focused on academic, market research, policy focused and advocacy papers with an emphasis on the UK market. In selecting the literature for review, we aimed to cover the issues within the framework illustrated in **Error! Reference source not found.Error! Reference source not found.**.

Figure 2: Literature review scope and focus areas

Focus area	Description
Business drivers	Drivers of business action including general strategy drivers and drivers for action on climate change
Consumer demands	Drivers of consumer demands
Barriers to business and consumers	Market, policy and behavioural barriers that might inhibit business action
Business strategies	Strategies, business models and actions (along the value chain) including influences on corporate actions and consumer behaviour

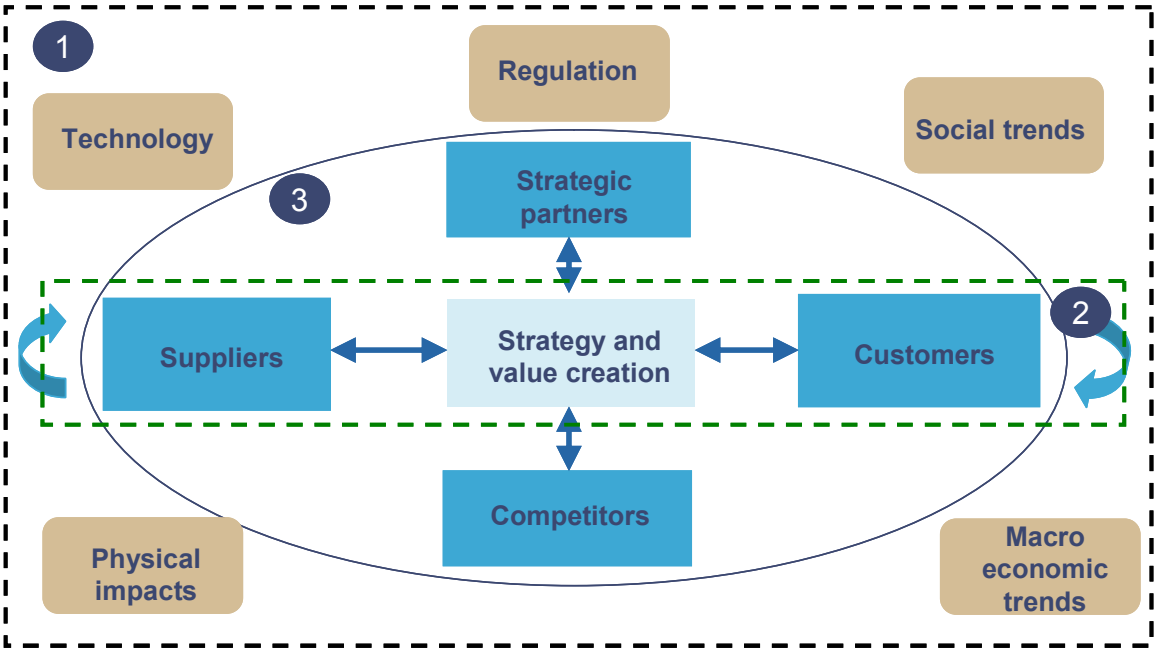
Additional considerations	Description
Sector	Sector coverage to include key sectors with high carbon abatement potential, and sectors with high consumer linkages
Materiality of carbon savings / reduction	The level of emissions reduction potential
Consideration of supply chain linkages	Connectivity/running themes across different stages of the value chain
Consideration of other resource efficiency	Wider resource efficiency implications
Suggested case studies	Identification of potential case studies
Discussion of the role of government	Recommendations to government

1.13 Case studies

Framework

The case studies were analysed using the following framework (Figure 3), which identifies 'megatrend' drivers and business drivers such as competition, cooperation and supply and demand, as well as interactions and linkages along the value chain.

Figure 3: PwC climate change diagnostic model



Source: PwC

The focus of our review was as follows:

1. **Macro drivers and trends:** identifying key external trends and linkages to business drivers
2. **Value chain:** identifying key opportunities to drive promotion of low-carbon goods or emissions reduction
3. **Stakeholders:** identifying "enablers", "blockers" and partners and their drivers of action

Macro drivers and trends

Identifying key external trends and linkages to business drivers to produce low-carbon goods and services helps to understand the key motivations for business. The case studies sought to identify, inter alia, the following key issues:

- What are the main motivations for taking action to develop the product?
- What was the source of the innovation or change?
- How has this evolved/changed over time? What caused this change?
- What were/are the key enabling factors/drivers in taking this action? What created the right conditions?
- What are the drivers to consumers taking up more low-carbon goods and services?

Examples of key drivers or trends included

Regulation: increased carbon pricing and regulation to manage carbon, particularly relevant to business-to-business products and services.

- Social trends: consumer pressure to produce low-carbon option, triggered by negative press and/or by NGO activity.
- Technology: availability of technology, for example to improve energy efficiency of products; or, conversely, the increasing sophistication of products and services, leading to higher energy consumption in their use.
- Macro economic trends: changes in wealth, economic growth and demography and their impact on purchasing behaviour.
- Physical impacts: changes to products and services to help manage the physical risks of climate change, in relation to the products and services themselves or more generally (relevant for adaptation, less so for mitigation)

Value chain

The case studies identified opportunities to drive promotion of low-carbon goods or emissions reduction, and the associated impact on profitability, operations and supply chain. Key issues posed to the case studies included:

- How and to what extent did strategic decisions influence internal operations or the supply chain? (e.g. changes in operations or suppliers)
- Were there significant cost or profitability impacts with the introduction of the low-carbon products or services? How does cost or profitability compare with the company's other products and services?
- What proportion of the company's revenues do the low-carbon products or services account for? How was this expected to change?

Stakeholders and consumer influence strategy

The case studies also identified "enablers", "blockers" and partners and their drivers of action, specifically in influencing consumers. It identified the relationship with other relevant stakeholders, e.g. competitors and suppliers. Questions covered were:

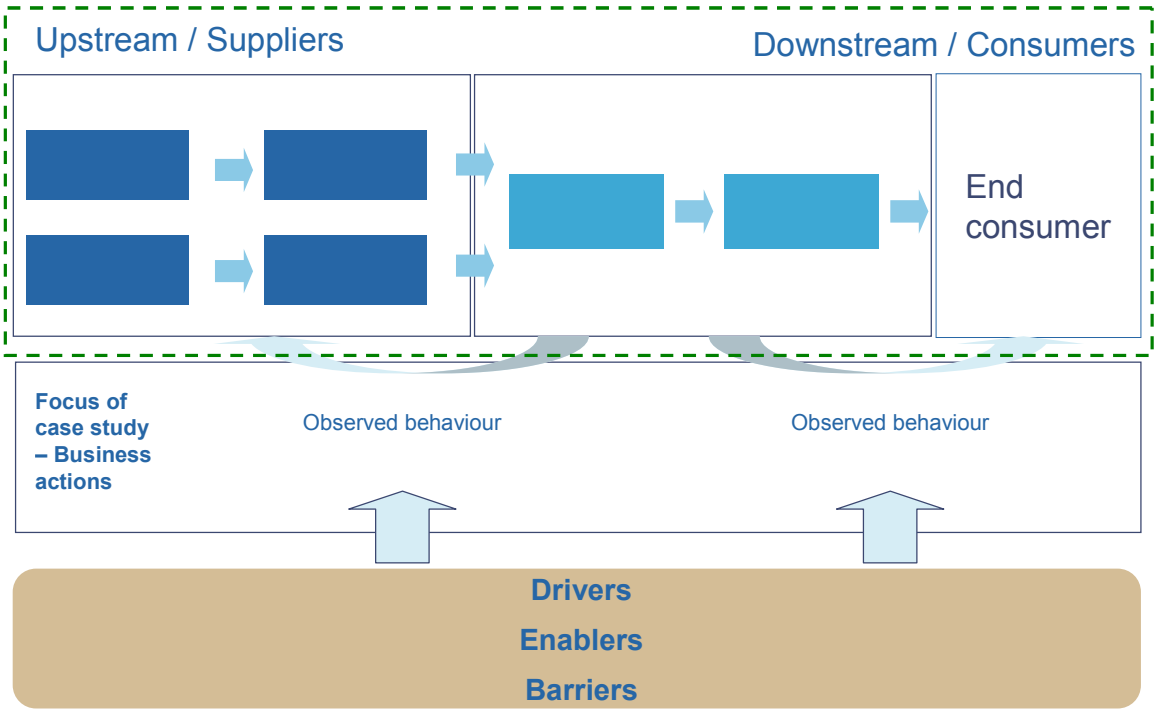
- What steps were being taken to influence consumer behaviour and drive take-up of the low-carbon products or services?
- How successful had this been? How were consumers responding to these actions?
- How has this impacted on the company's strategic positioning in the sector and its brand?

- How has the launch of low-carbon products or services changed the competition within the sector? Has this affected market share?
- How has the company's strategy changed following the launch of the low-carbon products or services?
- What are the key barriers in influencing low-carbon consumer behaviour?

Individual case study

Each case study was scoped around issues along a value chain, as outlined in Figure 4. Complex case studies involved more parties along the value chain, whereas simpler case studies focused on specific issues or parts of the value chain.

Figure 4: Case study framework



Case studies

We conducted a total of 12 case studies, with the focus areas described in **Error! Reference source not found.Error! Reference source not found.**

Figure 5: Case studies focus areas

#	Product / Market	Sector(s)	Key features	Focus of case study
1	Modec - Electric commercial vehicles	Automotive / Transport	Mainly Business to business (B2B)	Role of government and commercial procurement Influence on businesses Technology and supply chain challenges
2	Zipcar – London-based car club	Automotive / Transport, Services	Mainly retail market US company Technology savvy customer base	Influence on consumer behaviour and patterns of car ownership Importance of systems Role of government

#	Product / Market	Sector(s)	Key features	Focus of case study
3	Teleconferencing systems	ICT	B2B service	Use of teleconferencing to replace travel Impact of technology Marketing strategy
4	Solar PV systems	Renewable energy	Relatively low take-up Critical role played by government to overcome financial barriers Behavioural barriers/ perception by consumers (e.g. high costs, viability)	Role of regulation and incentives Impact of technology
5	Televisions: improvements in energy efficiency	Consumer electrics	Competing trends for more sophisticated products (higher carbon) vs. greater energy efficiency (lower carbon)	Role of energy efficiency as a differentiator Resource efficiency
6	Low Temperature Laundry Detergents	Consumer products	Sectors with strong business influence on consumer behaviour	Development and launch of the product Marketing and influence on consumers
7	Adnams carbon neutral beer	Brewery	Non carbon intensive sector Draught version as a low-carbon 'failure' Access to mass market as a key enabler	Consumer uptake Supply chain – Light weight technology bottles
8	Patio heaters	Consumer products	High carbon success	Phasing out of the product - choice editing Competitor and consumer response
9	Kenco reduced packaging coffee	Food and beverages	Heavy campaign on reduced packaging	Resource efficiency Marketing strategy
10	Supermarkets	Supermarket	High potential to influence mainstream consumer behaviour High level of maturity in terms of sustainability related actions	Choice editing and carbon labelling Influence on supply chain
11	Financial Services	Financial Services	Green credit cards Sustainable funds	Market segmentation Consumer engagement Green investment funds
12	Energy suppliers	Energy	Strong focus on energy efficiency and cost saving rather than carbon	Marketing Role of government incentives

Findings from the literature review

1.14 Key issues and potential remedies

Figure 6: Summary of findings from literature review

Area	Issue	Potential remedy
Drivers for consumer actions	▪ Cost (actual and perceived) is the key consideration for consumers	▪ Regulation and standards or fiscal intervention may be required to address cost disadvantages
Barriers to consumer actions	▪ Customers don't 'walk the talk'	▪ Choice editing by manufacturers or retailers is important - customers expect them to address the difficult issues ▪ Regulation and standards may be required to drive consumer behaviour
	▪ Lack of trust, particularly in big business, but also in politicians and now scientists	▪ Consumers trust NGOs and peers most, but also smaller, niche companies with strong reputations ▪ Standards help address information gaps and market failures ▪ The media and the internet play a big role in shaping perceptions (especially negative sentiments)
	▪ Information helps, but isn't enough in itself	▪ Regulation and standards have an important role to play ▪ Information helps both customers and retailers (to support choice editing)
Drivers for business action	▪ Profitability and business sustainability are key drivers, but climate change is now seen as a key strategic issue in many sectors/businesses	▪ Education, the media and peer pressure all help to shape management attitudes ▪ Government policy, regulation and standards are important drivers
Barriers to business action	▪ Size and profitability of the low-carbon market, particularly in consumer goods	▪ Regulation and standards and government procurement both have a role to play in accelerating market growth ▪ Government should focus attention on sectors where the UK has a competitive advantage
	▪ Launching new products, particularly in new markets, can be very difficult	▪ Government procurement can help to create new markets ▪ Fiscal incentives can help address cost/risk issues

The results of the literature review are summarised in Sections 4.3 onwards.

1.15 Gaps in the literature

There is extensive literature available on the consumer side of low-carbon products and services. This appears to result from the need of businesses to better understand consumer attitudes and demand, which encourages market research and surveys in this area. The topic of business

strategies around low-carbon goods and services is less well covered by the literature, and the research that there is tends to be more of an academic or theoretical nature than market research focused.

Drivers for business action are often missing from individual case studies. There is little information on the motivations for the development and introduction of specific products or services beyond common drivers such as CSR and regulation.

Similarly, although there is a large volume of publications both in academia and in the industry on conventional marketing, there seem to be very little material that identifies what distinguishes low-carbon products or services from conventional ones. Therefore, there seem to be a gap in the literature in terms of marketing strategies targeted especially at low-carbon goods. Literature linking low-carbon and the supply chain is largely focused on product carbon footprinting, whereas the broader linkages which may be more relevant for low-carbon services seem to be missing from available sources.

In general, consumer facing sectors such as food and beverage, retail and to a certain extent manufacturing are areas most extensively covered by the literature. There seem to be a lack of sector or industry specific focus, especially in transport, ICT and services.

Case study analysis conducted as part of this research in part fills these gaps in literature as it provides an evidence base for green marketing of products and services. More specifically, case studies on the financial and teleconferencing sector provide industry-specific example of the interaction between the various drivers for both businesses and consumers. In addition,

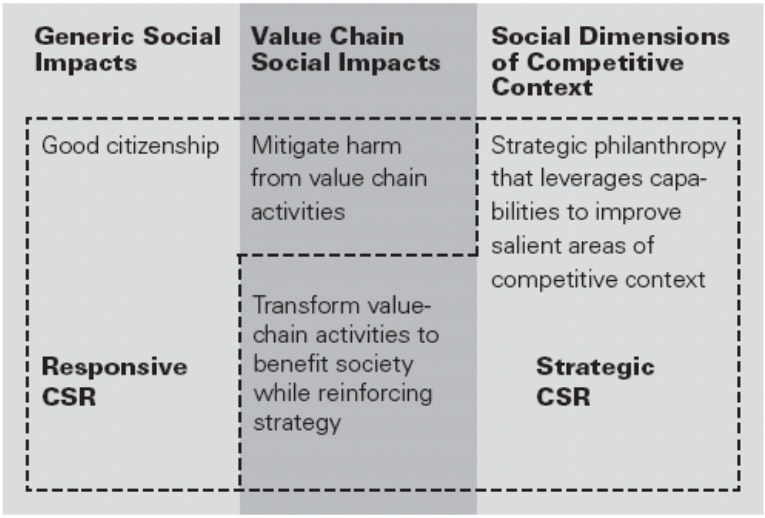
1.16 Evolution of business strategies

Over the last two decades, businesses have tended to move their environment and sustainability agenda along a maturity curve, from risk mitigation towards value creation, albeit at different pace. The main driver for this is the realisation that issues surrounding corporate social responsibilities are less about moral obligation and more about risk management, strategy and strategic positioning.

For each company, however, the strategic positioning depends on:

- The relevance of the issues to be addressed to the business: Companies that choose to endorse social and sustainability issues with the primary aim of demonstrating good citizenship typically focus on “a generic rationale that is not tied to the strategy and operations” (Porter and Kramer, 2006). Those that seek to identify the intersection and interdependence between company and society would tend to prioritise issues to address, recognising that “no business can solve all of society’s problems or bear the cost of doing so” (ibid). This means that only companies that see a competitive context associated with the low-carbon economy or climate change will act strategically. Others would consider the low-carbon economy to be part of its core strategy.

Figure 7: Strategic approach to corporate involvement in society

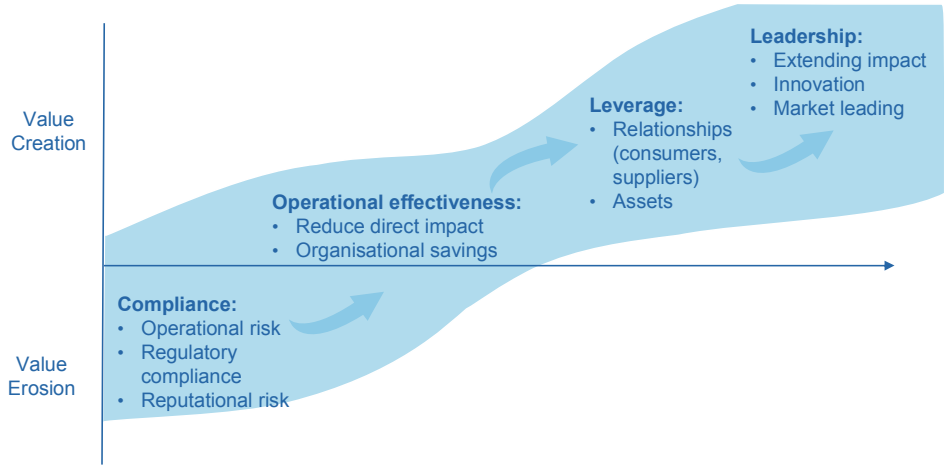


"Carbon emissions may be a generic social issue for a financial services firm like Bank of America, a negative value chain impact for a transportation-based company like UBS, or both a value chain impact and a competitive context issue for a car manufacturer like Toyota."

Source: Porter and Kramer (2006)

- The desired positioning and maturity of the strategy: As illustrated on Figure 4, companies evolve along a 'maturity curve' starting from basic compliance and risk mitigation measures, to supply chain and operations efficiency focus, and reach the leadership status of value creation through partnerships and innovation. The overall trend of business engagement on climate change followed a similar pattern, with companies moving generally from compliance or CSR-focused objectives, to energy management, and for some of the more advanced companies, into extending influence on supply chains and product innovation.

Figure 8: Strategic positioning on climate change



Source: PwC

- External megatrends and generic business drivers: Businesses are driven by the constant need to manage costs and risks, as well as improving market positioning and profitability. Businesses are also driven by specific trends over time. These so called 'mega-trend' are long term drivers of 10-15 years that have the potential to have significant impact on the market. For example the boom of the internet and ICT industries in the late 1990s or increasing globalization. Similarly climate change and sustainability have been rising on the global agenda, an emerging megatrend that business increasingly take note of. These are covered in the next section.

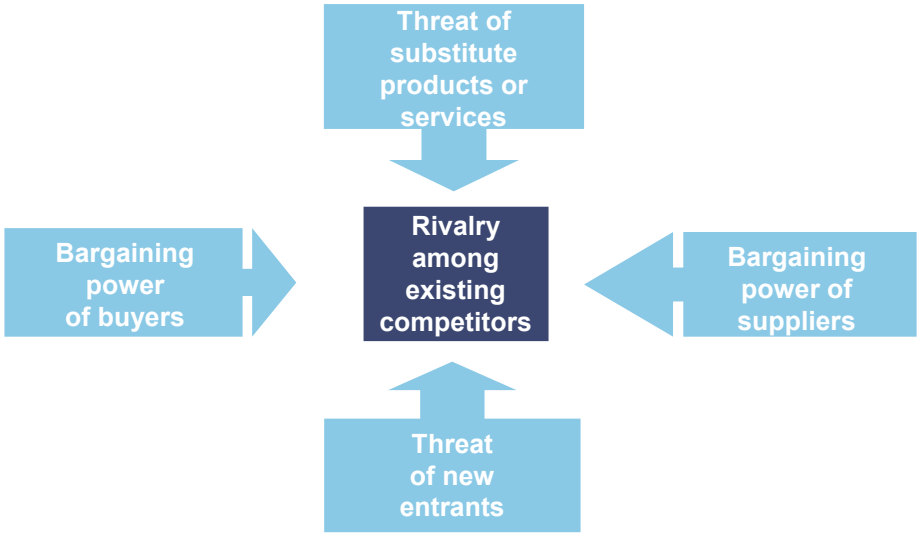
1.17 Different approaches to setting strategies for businesses

Porter's five "forces" (Porter, 1980)

Existing literature on management theory and strategy have focused primarily on helping business respond to competitive forces. Competitive strategy, reacting to rivalry in the market-place, the threat of entry, substitution, buyers' and suppliers' bargaining power, involves being proactive or defensive to gain temporary or permanent competitive advantage (Porter, 1980).

Porter's five "forces" (see Figure 9 below) are inherent and continuing challenges to business, underpinned by changing market trends and external conditions. Issues around environmental and social sustainability are increasingly perceived as an area of interdependence with business. More recent literature therefore began to look at how businesses are setting their environmental and sustainability strategies, as identified and described below. Although the majority of literature focuses on emissions management, increasingly strategists are recognising opportunities to produce low-carbon goods and services and addressing issues core to business.

Figure 9: Porter's five forces



Source: Porter 1979

Innovation versus compensation (Kolk and Pinkse, 2005)

Companies seek improvement in business activities through innovation, such as development of new technologies or practices, or through compensatory approaches, such as buying emissions credit. In either approaches, companies decides on the level of the improvement, whether it is at a company level or extends to the supply chain or other third parties.

Figure 10: Innovation versus compensation

Main Aim / Organisation	Innovation	Compensation
Internal (company)	Process improvement	Internal transfer of emissions reductions
Vertical (supply chain)	Product development	Supply-chain measures
Horizontal (beyond the supply chain)	New product / market combinations	Acquisition of emissions credits

This approach also identifies 6 clusters of business types, illustrating their different attitudes to sustainability strategies:

1. **Cautious planners** are not ready to act, more reactive and mention measures to reduce GHG only as a possibility in the future.
2. **Emergent planners** have set a process in motion to develop a more comprehensive climate strategy in coming years, but are at an early stage with regard to implementing organisational change to realise the objects.
3. **Internal explorers** have a strong internal focus, involving a combination of targets and improvements in the production process (energy efficiency).
4. **Vertical explorers** are characterised by a strong focus on measures within the supply chain and are developing more energy efficient products and engaging in a dialogue with suppliers to reduce emissions.
5. **Horizontal explorers** focus on the exploration of opportunities in markets outside of their current scope with potential cooperation with partners (e.g. paper and forest product using by product to enter green electricity company).

6. **Emissions traders** focus on opportunities of emissions trading and are companies with an internal reduction target.

Inside-out versus outside-in (Porter and Kramer, 2006)

This approach recognises the mutual dependence of corporations and society and the environment, which implies that both business decisions and social policies should follow the principle of shared value. Businesses are encouraged to identify points of intersection (inside-out and outside-in). Inside out linkages looks at impacts of operations on society; outside-in refers to how the external social conditions also influence corporations in a competitive context (e.g. quality and quantity of input, rules and incentives, demand, and supporting industries).

Understanding inside-out linkages in the context of climate change may include recognition that 'carbon is cost' and manage down carbon emissions in the same way as a business would take action on a department that has too many employees (Porter and Reinhardt, 2007). This also includes the direct and indirect carbon exposure along the value chain. Managing inside-out impact could also transition from cost management to strategy, for example as opportunities arise to enhance or extend their competitive positioning, or by inducing innovation in associated sectors that help produce competitive advantage.

Key outside-in linkages include regulation and physical impacts, which could have knock on impacts of input availability, size and growth of demand, access to partners and supporting industries.

"Nestlé eschews upstream vertical integration and instead outsources its raw material production. That makes its supply chain more flexible, which could provide valuable strategic advantage if the productivity of various regions shifts and Nestlé's competitors find themselves constrained by their more rigid supply structure." Source: Porter and Reinhardt, 2007

Supply Chain Linkages

In addition to 'overarching' strategic approaches, the literature stresses the strategic importance of collaboration on emissions reduction at all stages of the supply chain. This enables increased visibility of the embodied carbon of products and services and helps the identification of 'hot spots' of carbon emissions along the supply chain. Companies could forge better links with farmers, growers, NGOs and other external certification bodies. In addition, it allows producers and retailers that are investing directly in suppliers and farmers to create real strategic advantage and secure continuity of supply for the business.

Gaining better visibility over the supply chain may also help businesses gain increased resource efficiency through leaner business processes to reduce resource wastage. Literature is unanimous in stating that resource efficiency is the foundation of sustainable economic growth, whereas businesses are increasingly recognising that carbon saving is tightly linked to efficient resource use.

Literature on lifecycle assessment and hence the inclusion of carbon impact along the supply chain and throughout the lifecycle of the a product is increasingly available. An example is the development of the 'Publically Available Specifications 2050', which sets out guidance to account for the embodied carbon footprint of a product. Another example is the Carbon Disclosure Project's Supply Chain Initiative, which encourages companies to seek carbon information discloser among their suppliers. However literature covering broader aspects of carbon saving along value chain of a product or service remains limited.

1.18 Drivers of business strategies and actions

Underlying megatrends as catalyst for business action

Megatrends such as globalisation and the emergence of internet tend to help shape business and business strategy. Climate change and Corporate Social Responsibility (CSR) concerns are

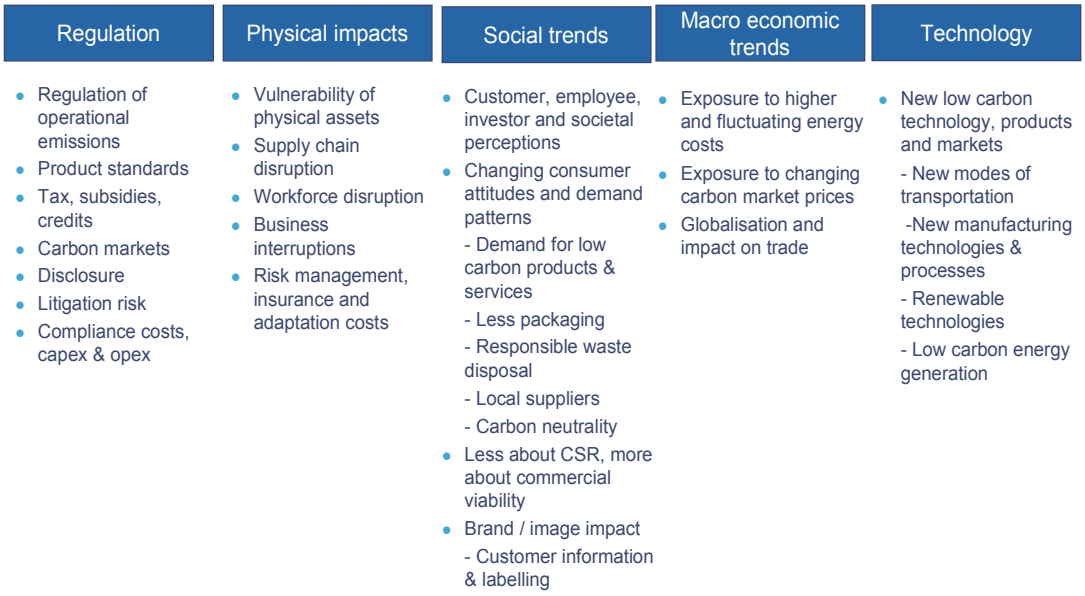
increasingly falling into this category, driving reputational and regulatory risks, as well as a driver of consumer demand (Porter and Kramer, 2006).

As consumers' awareness of environmental challenges has increased along with their greater sense of responsibility and empowerment, businesses have witnessed the emergence of ethical consumerism and demand for a better disclosure of environmental information (WBCSD, 2008).

Figure 11 shows a number ways in which climate change, as a megatrend, may contribute to business actions and to the way companies shape their business and environmental strategies. Understanding how business activities and investments are affected by climate change is increasingly part of the risk management culture, and long term strategies are being put in place that both ensures profitability and resilience to climate change impacts.

Regulation, in particular, has been an important driver for business action on climate change. This is enhanced by increased regulatory pressure for climate change mitigation on businesses and the supply chain, such as product standards, taxes and subsidies and mandatory disclosure of environmental information.

Figure 11: The climate change "megatrend"



Source: PwC climate change diagnostic model

Business drivers

At a broad level, business pursues a number of 'generic' competitive strategies: overall cost leadership or management, differentiation and focus on a particular market (Porter, 1980).

Cost leadership and management

From an operational efficiency and supply chain management point of view, environmental strategies can help support long-term cost saving measures. Low environmental impact goods and services may not only save on raw materials, packaging and transportation, but also contribute in helping the business mitigate future risks to resource supply. Similarly, as costs for high carbon products continue to rise as a result of carbon pricing or regulation, the payback period for green capital investment is reduced (SDC, 2007).

For most companies, action on climate change has been driven by a desire to reduce energy and compliance costs. On top of carbon management within a company's own operations, its supply chain will increasingly be judged on the basis of its carbon content (Watt, 2009).

As part of cost and asset management, businesses are also increasingly aware of the potential physical risks of climate change impacts, such as impacts on trade, exposure to higher and fluctuating energy prices, security of supply for raw materials and other key resources and asset base.

"The concerns over cost have, it seems, been replaced by the sense that there are tangible benefits to be derived from focusing more intently on packaging sustainability, perhaps even improved profitability. The Walmart packaging scorecard, for instance, helps suppliers see first-hand how sustainable business practices can boost their profits."

Source: Packaging-Gateway, 2007

Differentiation

Retention of existing customers and market share are key to a business, but the drive for incremental revenues will require further improved understanding of customers, value propositions and new market opportunities.

Exploring ways to address climate change will also help companies to identify growth opportunities and create business advantage through an effort to save energy, bolster efficiency and reduce costs, while enhancing their competency in the market place (CCC, 2008). Energy efficiency and carbon content are increasingly a metric of comparison when consumers are choosing products. In particular, if customers value the information provided on product standards they make purchasing decisions on that basis. In these cases, product standards open up a new dimension along which competition takes place (Frontier Economics, 2008).

Sustainability strategies are used to enhance or safeguard reputation and achieve market differentiation. More precisely, business innovation in sustainable or climate change goods and services enables companies to:

- Attract investors with strategies that focus on long term profitability;
- Build satisfaction and pride into the workforce and make the business attractive for future employees
- Build brand value by exceeding customer expectations (SDC 2007); and
- Use sustainability to support their brand and develop range and price propositions that generate competitive advantage.

Businesses also need to differentiate themselves to other stakeholders, including at a minimum their ability to attract and retain staff, and moving on to inspire and empower staff, suppliers, stakeholders and other businesses in their sector and related sectors. They can leverage their position in the market to trigger change and positively influence the entire supply chain (CCC, 2008).

Focus

Focus refers to a particular customer group, segment of the product line, or geographic market that the business targets. By focusing on specific markets, business can serve a narrow strategic target more effectively or more efficiently than competing with others more broadly. Thus, climate change could serve as a catalyst or trigger that led to particular focus on specific areas of the business.

Jens Ultveit-Moe, CEO and founder of Umoe, an investment company that successfully shifted its focus on traditional energy sources to renewable energies, shared his experience:

"I recall the first time I became aware of global warming, as far back as the 1970s. I followed the debates but did not really believe in it. By the time the Stern Review was released, I found the evidence utterly convincing and the trajectory [of climate projections] very frightening. I also saw that this was very significant in terms of my own business, which was at that time very reliant on oil and gas." Source: CCC 2008

1.19 Barriers to business action

Business, particularly market leaders, have been active in trying to reduce their impact on the environment and climate change through greater resource and energy efficiency, but there is a perception that there is still a clear 'value-action gap' between the high level of awareness of and demand for low impact goods and the low levels of uptake (Consumers International, 2007). Although a large proportion (70%-80%) of consumers are worried or concerned about climate change (PwC, 2008), only a small subset of these consumers are prepared to 'do more' or pay a premium for addressing climate change. With the current pattern of consumer action, consumer facing initiatives may still fail to achieve mainstream uptake.

The literature identified several factors which may contribute to this gap and hinder businesses from successfully entering the market with products and services that contribute to low-carbon consumption:

Confusion over brand or message

Consumers sometimes fail to associate key brands behind the propositions and messages. This suggests that companies have yet to represent themselves as stewards of a low-carbon economy (The Climate Group, 2007). For example, most people – 66% in the UK and 65% in the U.S. – could not name a brand that they believe is taking the lead in tackling climate change (The Climate Group, 2008).

Lack of willingness to pay for low-carbon features

Literature argues that the consumer uptake of low-carbon goods must be characterised by improved environmental performance with no compromise on quality or price. As drivers for purchase remains price and especially cost saving, environmental features remain mainly a 'nice to have' rather than priorities in a purchasing decision.

Lack of credible products

The importance of rising personal commitment is argued to be undermined by a long standing lack of trust which consumers have shown towards businesses and their claims. This is partly because early products have not met basic expectations, leading to consumer scepticism (WBCSD et. al., 2008). In particular, consumers are increasingly wary of commercial claims and green-labelled products that could just be 'greenwash'. Certain sectors face a greater uphill struggle in building trust. For the oil, investment and transport sectors, environmental concerns are perceived to be inherently at odds with their business goals (Downing and Ballantyne, 2007). On the other hand, the lack of trust could be lower for niche operators such as Body Shop, innocent and Ecover (PwC, 2009).

Policy uncertainty over the long term

Many businesses have also highlighted the uncertainty around policies that make priority setting for companies difficult. This is particularly relevant for emissions reduction efforts, for example uncertainty around carbon pricing, not so much at the direction they are heading, but more so around the speed at which carbon prices will increase. Energy and transport companies, for example, face uncertainty in major capital investment decisions that could in turn drive the portfolio of products and services available to consumers. Related to this is the lack of government incentives for businesses in most sectors to invest in improving their green credentials.

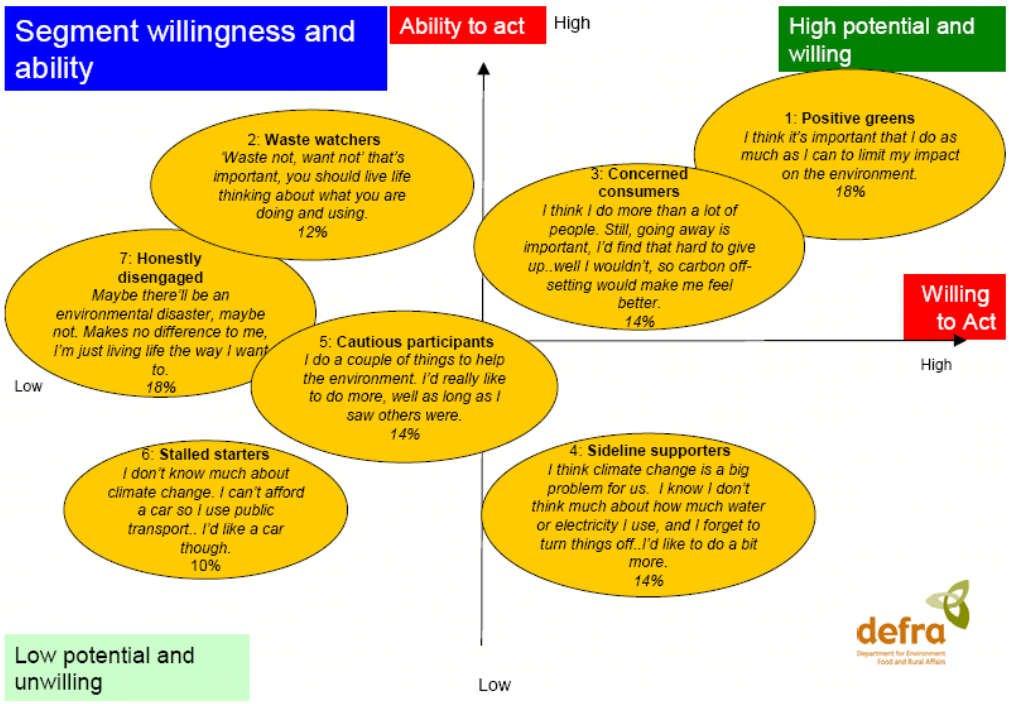
1.20 Drivers of consumer decisions

Underlying social changes and the emergence of ethical consumerism

Consumers are increasingly empowered to influence businesses on the environmental impact of their goods and services. Downing and Ballantyne highlighted the complexity of behaviour change. For example, there is a distinction between conscious behaviours (e.g. buying a car) and

subconscious behaviours (e.g. driving a car); between small behaviours that are likely to change rapidly and those requiring longer time horizons; and between isolated behaviours and interconnected 'sticky' behaviours that catalyse others. The heterogeneity of households and consumers means it is critical to target messages, products and services at particular audiences (Downing and Ballantyne, 2007). In particular the difference in behaviour across population groups and time emphasises the importance of consumer segmentation (WBCSD, 2008) such as the study carried out by Defra, summarised in Figure 12. **Error! Reference source not found.Error! Reference source not found.**2 (Defra, 2008).

Figure 12: Defra's seven consumer segments



Source: Defra, 2008

In the context of climate change and sustainability, rising personal commitment and the importance of societal norms are seen by many as the underlying drivers of sustainable consumption habits. In addition, the change in consumer demand as a result of increased awareness and belief that they can make a difference is identified as a major driver in consumer choice and habits (SDC, 2008). Together with this is the desire for consumers to have the assurance that they would be acting in collaboration rather than isolation.

Social status and brand consciousness are identified as major influences in consumers adoption of low-carbon goods (Defra, 2008). The symbolic value of 'material artefacts' is driven by what consumers perceive to be the appropriate attitude to adopt and good to purchase. In addition, negative press tends to generate a greater reaction than positive press (The Climate Group, 2007).

Cost saving and price remain the key determinants

Drivers for pro-environmental behaviours have been comprehensively studied by the Defra research (Defra, 2008), as well as many other literature with a consumer focus.

While drivers differ across population groups and may change over time, the literature has been unanimous in suggesting social norms are good motivators for consumer behaviour (Defra, 2008), but that a majority of consumers consider economics as a higher priority than environmental issues, consistent with the 'value-action-gap' identified by business.

Downing and Ballantyne (2007) and SDC (2007) all argue that consumers prefer to change habits rather than to pay extra to contribute to environmental causes. Thus consumers are attracted to goods and services that either save money or are not more costly than conventional alternatives while giving them the sense of doing something good for the environment.

On the other hand, in line with the belief that consumer awareness has initially triggered the emergence of low-carbon products, The Climate Group (2007) research suggest that an important barrier to consumer action is that demand is ahead of supply despite strong demand for business innovation.

Ease of action

The majority of the population find changes happening when it is easy to understand, convenient, or enabled by external action such as recycling and doorstep collection (SDC 2007). Choice-editing, where retailers screen products e.g. for environmental impact, has also been identified as a critical driver of change (SDC, 2007).

For many developed world consumers, climate change is still not a tangible threat and their motivation to change and concern about climate change vary on a daily basis. Similarly, consumers admit being overcome by a sense of hopelessness in the face of a huge problem and do not believe that individual actions have an impact considering the scale of the problem.

Exacerbating this trend is the ’consumerist’ culture which is fundamentally at odds with sustainable lifestyles. Consumers are 'locked-in' to unsustainable consumption patterns' by perverse incentive structures (economic constraints, institutional barriers, or inequalities in access) (SDC, 2007). As a result, research by Downing and Ballantyne (2007) revealed that consumers still seek to make changes at the margins of their lifestyles and do not perceive the need for a fundamental shift in behaviour. The resulting consumer actions thus do not appear consistent, well planned or systematic.

Information

The lack of credible and objective claims on the low-carbon performance of products and services is a barrier to consumer action. Consumers also typically trust each other more than other sources of information. Examples where consumer trust has led to better adoption of low-carbon goods tend to involve partnerships, external certification and standard, and peer-generated information (for example through the Internet).

Exacerbating this problem is the general lack of information available to consumers on sustainable goods and services and environmentally friendly lifestyle and behaviours. Downing and Ballantyne (2007) survey found that consumers are typically confused about what to do: the majority of people in the UK are unable to identify anything beyond recycling, while not being aware that some of their actions are associated with a large carbon footprint.

Firms also sometimes seek to blunt competition by making it difficult for customers to observe or compare the total costs associated with the products they are considering purchasing. This is especially the case with products that involve trade-offs, for example durables with both an up-front cost and an ongoing usage cost (Frontier Economics, 2008). However, setting product standards may or may not yield overall positive outcomes for consumers. In particular, co-ordinated behaviour between firms (particularly if based on voluntary agreements) could weaken the intensity of competition in the market, and there is also a risk where firms try to game the regulatory process in order to gain a competitive advantage vis-à-vis their rivals (ibid).

Similarly, consumers feel that there is not enough information about which companies and products are better. It has been argued that in general when people act as shoppers, they expect some issues to have been dealt with. They may not be aware that government and retailers are delegating to them much of the responsibility of choosing society’s way out of ’unsustainability’ (SDC, 2007).

Early adopters but not mainstream

Advocacy papers tend to emphasize an underexplored sustainable consumption market, where demand for innovation is ahead of the supply, but the assumption that consumers will be easily taken on board and bear a large share of the costs and responsibility of sustainable consumption has been challenged (SDC, 2007). There is not yet sufficient evidence that green consumers on their own are driving changes in mainstream product markets. These consumers may, in some cases, have played a role as early adopters. However, consumers can lead some degree of market change if the issue acquire emotional resonances (ibid).

Availability

The availability of sustainability related products and services has been identified as one of the main barriers for consumer action. Many people do not think they are available in their specific region, for example public transport or recycling services which may influence their habits and lifestyles. Consumers also feel that they have not been given enough information on what alternatives are available.

Studies revealed that one of the reasons for such delay is the failure by brands in building equity and ownership from the innovative climate responsible products and services that they are introducing to the market. As such, many consumer research studies have showed that consumers do not necessarily know what products is available or which brand is behind which propositions and messages (Downing and Ballantyne, 2007).

Sector focus – personal vehicles

Business drivers

- Regulation
- Image and leadership
- Consumer drivers
- Social factors playing key roles in the construction of car buyers' social and personal identify
- Fuel efficiency, cost saving

Barriers

- Market information (mpg) is not the most effective metric with which to influence the car purchasing process and promote the adoption of lower carbon cars
- Uncertainty over the strength of policies makes priority setting for companies difficult
- Lack of inherent consumer demand for low-carbon vehicles, whereas the notion of fuel-efficiency remains a relatively weak element in the important process of social or personal identity construction

1.21 Influencing consumer behaviour: 'conventional' marketing

Mainstream marketing is commonly described as '*Putting the right product in the right place, at the right price, at the right time'.* Ascertaining consumer demand is vital for a company's future viability and even its existence as an on-going concern. In order to understand how consumers behave when faced with the option of purchasing low-carbon products and services, it is important to understand the wider marketing concepts through which those products have come about. In other words, in order to mainstream low-carbon goods and services, it is important not to consider 'green' goods and services as a stand-alone category, but rather to assess them in a wider context in which climate change is one of the many driving forces.

Understanding consumer behaviour requires knowledge of psychology, sociology, social anthropology and economics, in relationship with all the mega trends as laid out in previous sections. This enables the marketer to understand the buyers' decision-making process, both individually and collectively.

This complex interaction affecting the decision making process can be explained by the 'black box' model. This model shows the interaction between marketing (marketing mix) and environmental drivers (megatrends), and the characteristics of the consumer in terms of attitude, personality, awareness etc along the consumer's decision making process (Sandhusen, 2000). The model considers consumers' purchasing decision as a result of a conscious, rational decision process in which it is assumed that the buyer has recognised the need or problem. It is at the same time influenced by a series of marketing and environmental drivers which the marketer must understand and influence as much as possible. Marketing stimuli involve the marketing mix or 'the 4Ps', which are the four main factors which the marketer has control over to lead to the optimal consumer response to a product or service. Environmental stimuli are external drivers or mega trends. These trends are long term external forces that have the potential to fundamentally change global social economic cultural systems and should be considered when developing a marketing strategy. All these forces come into interaction with the buyer's individual characteristics such as motivation, awareness and personality.

A purchase decision is made as a result of the interaction of all these aspects, which a successful marketing strategy should be able to exploit and influence to elicit consumer response.

Figure 13:The Black Box Model

Environmental Factors		Buyer's Black Box		Buyer's Response
Marketing Stimuli	Environmental Stimuli	Buyer Characteristics	Decision Process	
▪ Product ▪ Price ▪ Place ▪ Promotion	▪ Economic ▪ Technological ▪ Political ▪ Cultural ▪ Demographic ▪ Natural	▪ attitudes ▪ motivation ▪ perceptions ▪ personality ▪ lifestyle	▪ problem recognition ▪ information search ▪ alternative evaluation ▪ purchase decision ▪ post-purchase behaviour	▪ Product choice ▪ Brand choice ▪ Dealer choice ▪ Purchase timing ▪ Purchase amount

Source: Sandhusen, 2000

Marketing stimuli: 4 P's of marketing (Chekitan and Shultz, 2005)

Companies focus on consumer demand in the planning and design of activities and products. Based on this consumer focused approach, a relatively well- known framework is the is the '4Ps of marketing' or 'marketing mix', used to describe the different kinds of choices organisations have to make in the whole process of bringing a product or service to market. This concept lays out the four variables that marketing managers need to control in order to best satisfy customers and influence the uptake of products or services.

- Product (or services) - This includes making decisions around product on, for example, function, appearance, packaging, warranty etc.
- Price - This includes taking into account cost, profit margins and competitors' prices.
- Place / placement - This includes making decisions on channels of distribution and route to market. Distribution decisions include aspects such as market coverage, target selection, logistics and level of service.
- Promotion - Promotion involves communicating and selling the product to the customer and includes advertising, media coverage, public relations etc.

The marketer's role is to maximise the marketing mix by exploring its different spheres of influence set out in the black box model. In order to do so, research needs to be conducted in order to understand the interaction between the different stimuli and factors such as environmental trends and buyer characteristics.

Market segmentation

The maximisation of the marketing mix can be helped through consumer segmentation. This method recognises that factors influencing purchase decisions vary across individuals or groups of individuals and this difference is often related to buyer's characteristics. Segmentation provides the right goods and services to the appropriate people and tends to be applied to help allocate finite resources and serve the tastes of consumers, and in particular to lead to better target product marketing.

Environmental stimuli – mega trends

As identified earlier, both businesses and consumers are affected by a series of underlying trends. These include regulation, economic situation, technology, physical impacts and social and cultural norms and beliefs. Understanding these trends and how they are affecting consumer behaviour is fundamental for the marketer to successfully develop products that satisfy a particular need. A purchasing decision is very clearly driven by economic situation and technology. Other factors include how inter-personal drivers such as cultural and social values can influence consumer behaviours. Norms can be related to social groups and consumers may belong to groups with which they share characteristics such as beliefs and which may influence purchase decisions (Downing and Ballantyne, 2007).

Buyer's response- Customer decision-making process (KnowThis, 2010)

From a consumer's perspective, research suggests that for any purchase, customers go through a five stage decision-making process:

1 **Need recognition & problem awareness** - The consumer's purchasing activity is initiated upon recognition of a problem or need, such as hunger. In reality, this step is debatable, as some argue that many decisions are not made in awareness of a determined problem, e.g. the purchase of luxury goods or impulse buys.

2 **Information search** - Once the consumer has recognised a problem or need, he/she undertakes a search that can involve memory and perception in order to satisfy the need. Marketers typically explore this stage to develop an effective promotional strategy, and select which sources of information are more effective for the brand.

3 **Evaluation of alternatives** - Having gathered the information, the consumer compares the brands and products that are available. Marketing at this stage needs to be tailored to increase the likelihood that a product is part of the consumer's considered set of alternatives. The size of a purchase will have an impact on how the customer makes the purchase decision: e.g. low cost products tend to skip information search and evaluation stages, whereas large or durable products tend to involve greater search and evaluation costs.

4 **Purchase** - After the evaluation, the consumer makes a purchase decision. The role of marketing at this stage is to facilitate the consumer to act on their purchase intention, for example by introducing various modes of payment.

5 **Post-purchase evaluation** - The consumer is known to experience a 'cognitive dissonance' after the purchase. This is the feeling that the alternative may have been preferable. The role of the marketer at this stage is to convince the consumer that the purchase was the right decision, and the product will satisfy the desired needs.

Typically a purchasing decision would go through all five stages, but some purchase decisions could skip some steps, in particular information search and evaluation of alternatives. For example, in food purchasing, if driven by hunger, information search and evaluation may not be key steps in the purchasing decision. Marketers must understand the factors that come into play at each stage of this process and design marketing strategies that allow the proposed product or service to be taken up by the consumer.

Buyer characteristics

In addition to understanding the above influences of a purchase decision, there are other underlying behavioural tendencies that marketers typically seek to understand and exploit.

- 'Herd Behaviour' (Suroweiki, 2004)- Studies have shown people's attitude and social norms play an important role in purchasing habits. Herd behaviour is identified when consumers tend to buy a product that is seen to be popular. This behaviour is also linked to network effects. It has been argued that consumers perceive that certain products provide greater utility if others are also consuming the same product e.g. mobile tariffs, social networking websites.
- Internal influences / individual characteristics (KnowThis, 2010)- 'Psychographic' variables are difficult to identify but nevertheless important in successfully understanding consumer behaviour and segmenting markets and building persuasive marketing mix (Sandhusen, 2000). Among the most commonly considered ones are motivation, perception, attitude, and lifestyle.
- Motivation - Motivation is a stimulated need that a consumer seeks to satisfy and which marketing activities can encourage.
- Perception - Perception is of particular interest to marketers. It is defined as the 'process by which people derive meaning from the selection, organisation and interpretation of the stimuli from themselves or the environment' (Sandhusen, 2000). There are three types of perception-related concepts:
- Selective exposure is the concept that consumers only have the mental capacity to process a small amount of stimuli.
- Selective distortion implies that consumers distort the meaning of stimuli so that they become consistent with their beliefs and feelings.
- Selective retention means that consumers are more likely to remember and be impacted by stimuli that support preconceived feelings and believes.
- Marketing strategies must understand these perception concepts in order to promote a product or service effectively and send messages that take advantage of consumer's perception.
- Attitude - Attitude is tied to feelings and beliefs. These are known to be relatively stable tendencies and make the consumer act in a consistent way towards products.
- Lifestyle – Lifestyle is also a fairly stable tendency determined by a consumer's activity, interest and opinion, which lead to a certain response to stimuli. Although difficult to determine, it provides the marketer with opportunities for better positioning and communication.

Other characteristics related to these variables may include the level of knowledge and interest as well as personality.

Marketing plan

Marketing strategies typically design the marketing mix so as to reflect and satisfy these different tendencies. For example, the promotion of a product needs to consider the different concept of perception and be implemented in a way so as to fit into the target population's beliefs while being framed in a way that is understandable to this particular group.

There is a wide range of marketing tools, including awareness raising campaigns to influence consumers at early stages of purchase decision, free product sample offering focusing on the evaluation of alternatives stage, or price discount to influence at the purchasing stage. In terms of product promotion that explores the psychographic variables of target groups, a typical example is the awareness campaign of Ariel Cool Clean. The energy saving it achieved was compared to the energy used to brew tea in the UK, whereas it was related to the energy used to light plazas in Italy. The messages typically reflect the local population's lifestyle and perceptions.

1.22 Marketing of sustainability and low-carbon goods and services

Literature encourages the use of the above marketing techniques and concepts to achieve specific behavioural goals, both in sustainable businesses and government policies (Downing and Ballantyne, 2007).

The additional challenge in encouraging sustainable and low-carbon consumption is decoupling material consumption from consumer value (for example, encouraging non-consumption of certain products). Marketing needs to help achieve this through innovation and choice influencing (Downing and Ballantyne, 2007).

Pomering et al. argue that two extra P's – 'People' and 'Planet' - need to be included in marketing thinking.

Similarly, Sustainability Marketing (2010) points out that environmental products and services are also tied to sustainable innovation, as sustainable products and services have to be improved continuously on customer, social and environmental performances, making innovations inevitable. There are four types of innovation requiring different marketing strategies.

1 Improvement of existing products and services with regard to environmental and social performance (e.g. Increased fuel efficiency)

2 The development of alternative technologies to existing problems (Hybrid cars).

3 Application of existing knowledge to new market areas (e.g. Zipcar)

4 Creation of novel products and services

Figure 14: Business strategies to influence demand for low-carbon goods and services

Environmental specific marketing strategies to influence consumer behaviour	Examples provided in the literature
▪ Understanding of social norms and its influence on consumer behaviour (Downing and Ballantyne, 2007) ▪ Descriptive norms teach us how most people around us behave ▪ Injunctive norms alerts us to what is sanctioned or punished in society	▪ Toyota marketed its hybrid Prius as mass market vehicles, attracting buyers not only for the fuel efficiency but as an iconic and popular vehicle. (Consumer International, 2007). ▪ Zipcar market members as being part of the 'Zipster community', with programmes to encourage environmentally friendly behaviour such as using more public and alternative means of transportation. ▪ Satirise carbon-intensive behaviour
▪ Understanding of the influence of personal identity on consumer behaviour (Sustainability Marketing, 2010). ▪ Whether or not we can see ourselves adopting certain behaviour may influence whether we ultimately will ▪ Under-researched area	▪ Goldstein, Cialdini and Griskevicius (2008) study on the effectiveness of signs requesting hotel guests' participation in an environmental conservation program, revealed that signs with "the majority of guests in this room reuse their towels" was more effective than '"the majority of guests reuse their towels"

Environmental specific marketing strategies to influence consumer behaviour	Examples provided in the literature
▪ Building of trust ▪ Partnership with key opinion formers (WBCSD, 2008) ▪ Give out the same message in every thing they do, through products, labels and promotions, staff, and partnership with trusted experts (Consumer International, 2007)	▪ Ariel's Partnership with the Energy Saving Trust ▪ Assurance, standards and certification ▪ 3M use life cycle management (LCM) to address systematically the environmental, health and safety opportunities and issues of new products. ▪
▪ Demonstrating the 'real thing' rather than words (Consumer International, 2007) connect with consumers, recognise information is not enough, and making sure to find ways to make positive behaviours into unconscious habit	▪ Unilever launched the ' Family Kitchen' programme with Asda to communicate with shoppers about the difference that they can make to the environment with live demonstration of tips and suggestions for their everyday behaviour (Dasgupta,*et* al. 2009).
▪ Comprehensive communication strategy	▪ The repeated advertising campaigns by P&G for their low temperature laundry detergent have been successful in changing consumer habits. ▪ In 2007, an IPSOS survey reported that 17% of UK households now wash at 30%, up from only 2% of households in their 2002 survey. According to the 2007 IPC Green Research study, approximately 85% of UK consumers claimed that Ariel's Turn To 30 campaign was the main reason that convinced them to turn down their washing temperatures.
▪ Sustainable choices should be simple easy and straightforward (Downing and Ballantyne, 2007)	▪ Migros, a cooperative of manufacturers and retailers in Switzerland provides convenient in-store recycling facilities with links to Walt Disney's 'Wall-E' animated film. The project was carried out in partnership with various recycling organisations and resulted in almost 90% of the PET bottles bought in store being recycled (Dasgupta, et al, 2009).

Findings from the case studies

1.23 Analysis of Typology

The case studies selected as part of this research cover a wide range of sectors, markets and types of business.

	Market type	Size of producer/supplier	Materiality of carbon (H / M / L)
Consumer products			
TV	Mass market	Sector	M
Kenco	Mass market	Large	L
supermarkets	Mass market	Sector	H
Solar PV	Niche market	Sector	M
Adnams carbon neutral beer	Niche market	SMEs	L
Laundry detergent	Mass market	Large	M
Patio heaters	Mass market	Large	M
Consumer services			
FS	Niche market	Sector	L
Energy	Niche market	Sector	H
Zipcar	Niche market	SME's	L
B2B			
Modec	Niche market	SME's	H
Teleconferencing systems	Mass market	Sector	M

The following section summaries the output of the case studies into the key drivers and barriers for the development of low-carbon goods and services and the business actions taken to encourage demand.

1.24 Key drivers, barriers and action in producing low-carbon goods and services

Drivers

The origin of the drivers to create low-carbon goods and services can be identified as 'internal' or 'external' but it has been observed that both need to be present to successfully bring the low-carbon good or service to market.

Our analysis identifies that external drivers for developing low-carbon goods and services (or removing high carbon variants) can be characterised using PwC's climate change diagnostic model. In descending order of importance they are:

Market and competition

Both business-to-business and business-to-consumer operators are developing lower carbon goods and services in response to current or potential market opportunities.

The case studies of business-to-business products and services consistently cited the desire for stronger CSR credentials as a major attraction for their corporate customers. Seeking to compete

on corporate social responsibility as a differentiating factor is an important motivation for procuring lower carbon goods and services. In this case, there is a 'consumer/customer pull' for such low-carbon products.

Business-to-consumer product innovations in the market are also motivated by commercial potential and competitive advantage. Products designed to meet the needs of mass-market consumers typically do not respond to a direct need for low-carbon goods - there is little evidence of 'consumer pull' for these beyond a small niche of consumers. Instead, the mainstream products are principally promoted on the basis of other attributes, such as lower in-use costs (lower temperature washing detergent) or address concerns over waste (Kenco Eco-refill packaging). The environmentally friendly attributes are offered as additional consumer benefits from purchasing or using these products. As a result, they can serve to change the nature of competition in the sector or category by raising consumer expectations of the products, thus encouraging further innovation and competitive rivalry.

Policy, regulation and standards

Policy and regulation – actual, proposed or anticipated – are all powerful drivers for the development of low-carbon products. In the case of the Solar PV, fiscal and regulatory incentives (feed-in tariffs, new building renewable obligations) have been central to the development of the market. Launch aid was important for the development of Modec and policy support at the local level has facilitated Zipcar's market development. Voluntary initiatives, such as standards and labelling are also acting as drivers of innovation.

Macroeconomic conditions

The recent difficult economic conditions have forced a greater focus on energy and production costs and resource efficiency. Thus, macro-economic factors have facilitated the development and marketing of lower carbon goods, supporting the business-to-business proposition of cost-saving through teleconferencing, for example. This value proposition/cost message also supports the marketing of low temperature washing detergent and domestic solar PV. In a number of the interviews conducted as part of the case study research, there was also recognition that longer-term external macro trends such as peak oil and adaptation costs from climate change were important external drivers of the need to develop lower carbon business models (see further analysis in internal drivers) or use lower energy consumption products.

Social and behaviour

Consumer research from the literature review and anecdotal evidence from the interviews conducted as part of this research suggests that awareness and concern over climate change among UK consumers has been increasing, albeit that these may have had a lower priority during the recent recession. It is anticipated this increased awareness has raised expectations that businesses will do more to reduce carbon emissions in their products and business models. This is supporting the 'market and competition' driver outlined above.

Technology

The maturity of technologies is an important driver and enabler of many lower carbon goods, e.g.: solar PV and teleconferencing. The growth of the green technology sector and the increasing R&D spend in these areas internationally is likely to result in enhanced product innovation.

However, internal drivers of action are also powerful and include the desire for cost savings, the pursuit of other commercial success and corporate purpose or strategy.

Internal drivers identified include:

Maturity of response to sustainability

Our research identified that companies which have developed market leading or advanced responses to sustainability issues are likely to have stronger internal drivers to take action on carbon emissions. Often these leaders have clearly defined corporate targets relating to the

reduction of carbon emissions in both direct operations and indirect impacts. As a result businesses that align sustainability and social values with their corporate strategy tend to find greater internal support for their actions. Corporate attributes such as innovation-led cultures, as observed in Procter & Gamble, Kenco and the televisions sector, are important internal enablers in the successful development of these products and services.

Desire to develop corporate sustainability/resilience

Linked to the above 'maturity' driver is the recognition that carbon intensity is a risk to business and that taking action to reduce costs or improve resource efficiency includes reducing carbon emissions. For example, a number of the interviewees in the supermarkets case study stated this as a strong driver for taking action to reduce carbon in the supply chain and in direct operations.

Information on carbon

An important internal driver highlighted in a number of case studies was the increasing level of understanding and visibility of carbon in products and processes from the development of carbon lifecycle analysis. Enhanced measurement, better methodologies and greater use of lifecycle assessments are driving insight and directing strategy in the development of low-carbon goods and services. This was evident in the inception and execution of low temperature laundry detergent, Kenco Eco-refill packaging and across the supermarket agricultural supply chain strategies.

Understanding the consumer

Understanding consumer needs with regard carbon is an important enabler of the development of successful low-carbon products. In particular, developing the right marketing messages is critical for mass-market appeal.

Suppliers and supply chain

Businesses with close knit supply chains tend to be better able to influence suppliers towards lower carbon production methods. This is often evident in vertically integrated sectors and/or where there is a strong buyer.

The evidence from the supermarkets case study demonstrates that retailers are influencing demand for low-carbon goods and services through their interaction with suppliers. In particular, supermarkets are leveraging their scale by enabling, encouraging or mandating innovation by suppliers. Retailers are developing these collaborative solutions primarily to reduce cost and increase resource efficiency with the aim of contributing to supply chain resilience. Having more efficient suppliers, sharing knowledge and developing closer working relationships strengthens the supply chain against economic or competitive threats. As a result of such strategies, carbon emission reduction is clearly not the sole benefit or even the driving motivation. Nevertheless, reduced embedded carbon in the consumer product is often an outcome.

The level of collaboration with branded goods manufacturers relies less on the supermarket retailers providing the expertise and investment, as with the (SMEs) agricultural own-label suppliers outlined above. However, there is evidence of action to encourage supplier action to create low-carbon alternatives. The development by Adnams of low-carbon beer, in collaboration with Tesco and both the Kenco Eco-refill and the Ariel low temperature washing detergent case studies cite support from supermarket retailers as important in the development of consumer awareness, acceptance and sales. One interviewee identified that retailers are able to create 'a race' for lower carbon and more sustainable goods and services among suppliers.

Influence of/with partnerships

The importance of partners in creating successful low-carbon products features strongly in the case studies. Stakeholders such as NGOs, consumer organisations, the media and industry bodies are a key influencer of outcomes and the degree of business action. External independent recognition of a low-carbon goods or services can often help boost the take-up of the products.

Engagement with government

The voice of businesses in their respective sector in government is also important – this can help shape policies and incentives that are truly conducive and enabling the take-up of products. These usually mean large companies, but in some sectors with smaller players could also mean a strong sector association or representative (such as in solar PV).

Barriers

The case studies highlight a number of common barriers in the development of low-carbon goods and services. The most important of these 'common' barriers, observed in both consumer-facing and in B2B case studies is the issue of negative perception surrounding the products or services. This negative perception stems from a lack of trust as a result of inferior products in the market in the past and/or lack of understanding and misinformation.

This lack of trust or understanding is particularly acute for consumer facing products and services. For those that rely on behaviour change in consumer use phase, there is the additional challenge of having to encourage that change. This is a major barrier to the effectiveness of low-carbon products.

The perception (or reality) that using these products requires some kind of compromise be that on reduced performance, higher cost of lower quality, for lower carbon benefits remains a barrier for consumers. In a number of cases, it keeps the appeal of these products niche.

These trust, perception and behavioural barriers are often linked to the fact that these products are still not well established and are maturing, evolving products. Examples from the case studies of this include Zipcar (and car clubs in general), carbon neutral beer, teleconferencing variants and solar PV.

Other barriers are more specific to individual cases and are highlighted in the table above, they include economic barriers (cost of development or routes to market or visibility/viability of cost savings from lower carbon products), technology and infrastructure and data/information availability barriers.

Business actions

The strategies employed to bring lower carbon goods and services to market can be further categorised as falling into the three broad business approaches identified by the WBCSD (Sustainable Consumption Facts and Trends); Innovation, Choice Influencing or Choice Editing.

The **innovation** approach, described by the WBCSD as; 'business processes for the development of new and improved products, services and business models [that] incorporate provisions for delivering maximum societal value at minimum environmental cost… Business innovation responds to the challenge of sustainable consumption through: eco-efficiency measures, product innovation and design, production & supply chain management, and business model innovation.'

The innovation approach features strongly in most of the case studies. Product innovation is observed in the Modec, televisions, solar PV, low temperature detergent, teleconferencing and beer. However, innovation is not just a matter for producers. Supermarkets can be seen to be encouraging innovation in suppliers and are also taking innovative approaches to supply models, while Zipcar represents an innovative approach to selling to a market need.

Choice influencing, defined by the WBCSD as; 'Creating a market for sustainable products and business models by working in partnership with consumers and other key stakeholders to demonstrate that sustainable products and lifestyles deliver superior performance at the best prices. Using marketing communications to influence consumer choice and behaviour.' is also well illustrated in the case studies. It is evident in the actions taken by supermarkets, by the

marketing messages that support the low temperature washing detergent and Kenco Eco-Fill packaging, in green financial services and in energy products.

Choice influencing is critical to any product that requires consumer behaviour change. However, given the common barriers relating to lack of trust and the negative perception of 'eco-products', effective communication on product benefits is vital to the success of low-carbon goods and services.

The case studies suggest that communication with customers should not focus on 'carbon', if the goal is success in the mass market. The barrier of lack of understanding and engagement with carbon among consumers means that marketing purely on a carbon platform reduces the market appeal to a niche of those that understand the issue. The experience of Ariel, supermarkets and teleconferencing suggests that the primary focus should be on the performance characteristics of the low-carbon product and/or the economic (cost saving) benefits of its use.

The case studies also illustrate examples where the opposite approach was less successful: Solar PV products were initially marketed largely on the basis of their eco-credentials (and thus the market was niche). However, with the advent of feed-in tariffs, the economics of installation begin to make greater sense, thus widening the appeal and potential market size.

For low-carbon products and services for the business-to-business market, messages can be low-carbon focussed (although having an economic message also helps). This is because a strong motivator for taking low-carbon products for corporates is to enhance the CSR or sustainability positioning of the business.

To overcome the cost barriers associated with some low-carbon innovations, alternative budgets may need to be identified to encourage their purchase – the Modec case study highlighted that, procurement teams may not want to pay the premium associated with some low-carbon products, but the enhanced brand value (as sold to marketing teams) can help to justify the purchases.

In choice influencing, independent, third part partnerships are important. The trust barrier for consumers is high and therefore partnering with NGOs or independent 'verifiers' is a useful approach.

Choice editing is described by the WBCSD as: 'Editing out unsustainable products, product components, processes and business models in partnership with other actors in society such as policy-makers and retailers.' Choice editing is best evidenced in the case studies by the action taken by B&Q in removing patio heaters from the product offer. However, the distinction between some aspects of innovation and choice editing is not always obvious. For example, in supporting agricultural suppliers through innovative business models/partnerships, supermarkets are effectively editing out higher carbon inputs to consumer products by changing behaviours up the supply chain.

All of these actions - innovation, choice influencing and choice editing - can be seen to address consumer barriers, i.e. the need for products and services that offer lower carbon attributes at no compromise for the consumer on price, performance or convenience. Innovation and/or resource efficiency contributes to the removal of the cost/price premium barrier and also the performance/ efficacy barrier. Choice influencing and effective marketing messages contribute to engagement and understanding on the issues, making it more convenient for consumers to act on the intangible concerns over climate change and sustainability. Choice editing makes it even more convenient by removing the decision altogether.

1.25 Summary of case studies

	Drivers & Enablers	Strategy	Barriers
Modec	▪ Targeting unmet demand ▪ Cost of fuel ▪ Technology ▪ Regulation ▪ EU-wide homologation of Modec vehicles	▪ Targeted marketing ▪ Ensuring high visibility of products due to demand from consumers to improve CSR	▪ High price premium ▪ Slow/inefficient regulation
Zipcar	▪ Targeting demand for flexible car use ▪ Technology ▪ Partnerships with local authorities and councils ▪ Integrated transport system	▪ Target niche market ▪ Local government partnerships ▪ University schemes	▪ Reaching out to mass consumer including those that are less technology-savvy
Teleconferencing	▪ CSR benefits ▪ Technology development ▪ Cost and carbon reduction from lower business travel expenditure	▪ Offer full 'packages' that include teleconferencing as one element among several ICT services.	▪ Lack of technological infrastructure ▪ Large companies with decentralised budget need greater buy-in because the cross-functional benefits of teleconferencing are not captured by individual departments. Thus purchase often need to be approved by the board.
Solar PV	▪ Cost of energy Increasing awareness ▪ Technology ▪ Regulation, FIT, Grants, RHI	▪ Partnership with trusted organisation such as Energy Saving Trust ▪ Accreditation to the Microgeneration Certification Scheme for products and installers	▪ Perception ▪ Confusion/lack of awareness of technology ▪ Upfront cost ▪ Long payback period

	Drivers & Enablers	Strategy	Barriers
TV	▪ Energy Efficiency labelling ▪ Constant improvement of products which all lead to energy efficiency ▪ Technological development ▪ Competition	▪ Focusing on size, quality and design. ▪ Selling energy efficiency as a 'nice-to-have'	▪ Lack of consumer demand for energy efficiency on TV ▪ Increasing demand for larger screens ▪ Misleading focus on standby mode energy efficiency ▪ Lack of ranking for environmental performance of TV, therefore lack of comparability of products
Ariel	▪ Corporate purpose & culture ▪ Innovation ▪ Positioning/branding Competition ▪ Increasing customer awareness ▪ LCA insight ▪ Consumer insight	▪ Comprehensive marketing and awareness raising campaign. ▪ In-store, TV, billboard advertising ▪ Association with celebrities ▪ Partnership with authoritative institutions	▪ Behavioural resistance to change
Adnams beer	▪ Environmental leadership ▪ Resource efficiency ▪ Instant access to market and exclusive distribution by major retailer ▪ Energy efficiency technology in building, manufacturing, packaging and distribution ▪ Sustained long-lasting relationship with local suppliers	▪ Through large retailers ▪ Designing bottles with the East Green 'story' ▪ Ensuring increased single-facing in large supermarkets as a result of higher environmental credentials leading to value-addition for retailers.	▪ Lack of readiness to change especially in the case of draught beer in pubs ▪ Economic downturn limiting the disposable income and cash available for products with environmental features.
Patio Heaters (phase out)	▪ Environmental leadership ▪ Branding/positioning ▪ Long term economic viability	▪ Highly publicised, and mediatised announcement of the phase out among supporters such as environmental NGOs	▪ Behavioural resistance to change ▪ Smoking ban in pubs and restaurant pushing consumers to look for venues where there are comfortable outdoor smoking areas

	Drivers & Enablers	Strategy	Barriers
Kenco	▪ Increasing demand for waste reduction ▪ Identification of carbon 'hot spots' as a result of LCA ▪ Strong backing at corporate level ▪ Availability of technology ▪ Support for promotion from major retailers ▪ Availability of government guidance on green claims	▪ Focusing on waste reduction ▪ Lower price ▪ 'Fun' rather than value-driven advertising on the environmental credentials	▪ Not recyclable with household wastes
Energy supply	▪ Branding/positioning Competition ▪ Staying ahead of the market and government intervention ▪ Regulation ▪ Availability of affordable technology	▪ Focusing on cost saving	▪ Higher cost ▪ Government intervention that hinders competitiveness ▪ Confusion regarding offerings
Supermarkets	▪ Cost reduction ▪ Increasing consumer awareness ▪ Branding/positioning ▪ Media and NGO scrutiny and reputation risk management ▪ Competition ▪ Supply chain resilience	▪ Community programmes that engage children and families for wider uptake ▪ Focusing on cost reduction	▪ Consumer trust
FS	▪ Branding ▪ Risk mitigation ▪ Technology ▪ Availability of carbon market and other investment opportunities		▪ Lack of flexibility in offerings ▪ Lack of trust ▪ Lack of availability of relevant information

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Appendix A: Literature Review

Article	Authors	Summary
Drivers for business actions		
Sustainability: Are consumers buying it?	PwC (2009)	Key drivers are reducing operational cost and regulatory impacts As costs continue to rise, the payback period for green capital investment is reduced. Sustainability is used by retailers to add value and support their brand. It also allows supermarkets to develop range and price propositions that generate competitive advantage Competition is considered as a catalyst for business innovation
Green to the core? **How supermarkets can help make greener shopping easier**	Consumer focus (2009)	There are many 'low-hanging fruit' for retailers to decrease their environmental impact while achieving energy efficiency and cost reduction. Examples are closed door freezers in stores, which has been introduced by a majority of retailers. Supermarkets can also induce sustainable consumption. For example by increasing the availability of seasonal food while disclosing more information on how it can help reduce carbon footprint
The competition impact of environmental product standards	Frontier Economics (2008)	Product standards can often have pro-competitive effects. Successful standards will help to correct market failures such as excessive focus on up front costs, or an inability of firms to signal their products' green credentials to customers. Some types of product standard can open up new dimensions of competition, allowing customers to buy products that more closely reflect their preferences. This creates incentives for firms to sell products to match. Product standards can improve market transparency by ensuring that all firms provide lifetime cost data on the same basis and using the same metrics. Better information to consumers is likely to increase the degree of competition between firms as customers select products or services on the basis of lower lifetime costs and improved environmental performance.

Article	Authors	Summary
Competitive Strategy	Porter (2004)	There are three generic strategies for businesses to outcompete rivals: Overall cost leadership, differentiation, focus on a targeted market. Competition is driven by 5 forces: Threat of new entrants Bargaining power of buyers Bargaining power of suppliers Threat of substitute products or services Rivalry among existing firms These generic strategies can help understand the dynamics at play in the development, marketing and sales of low-carbon goods and services.
I will if you will	Sustainable Development Commission (SDC) /National Consumer Council (2007)	Companies can build brand value by: meeting and exceeding customer expectations with proactive and innovative product and services offerings operating efficiently within regulatory boundaries enthusing investors with a long-term strategy that ensures profitability building pride and satisfaction into the workforce and attraction for future employees demonstrating responsible behaviour
Barriers to business actions		
Consumers, Brands and Climate Change	The Climate Group, (2007)	Consumers often do not correctly identify the brand behind the propositions and messages. The lack of ownership may represent both a hurdle and an opportunity for brands seeking to challenge these current perceptions.
Strategy & Society: the link between competitive advantage and corporate social responsibility	Porter and Kramer, (2007)	CSR used to be driven by moral obligation, sustainability, licence to operate and reputation; CSR issues are however increasingly considered for strategic reasons as they are being recognised playing an important role in the growth of a business
Driving success: Marketing and sustainable development	WBCSD (2005)	Consumers have shown a general lack of trust in business, whereas NGOs and peers are regarded as most trustworthy

Article	Authors	Summary
Tipping Point or Turning Point? Marketing and Climate Change	Phil Downing and Joe Ballantyne. Ipsos Mori Social Research Institute (2007)	Consumers are cautious of commercial claims and business faces challenges convincing consumers that its efforts are beyond greenwash. Oil, investment and transport sectors face more scrutiny because environmental objectives are perceived to be fundamentally at odds with their modus operandi.
Sustainability: Are consumers buying it?	PwC (2009)	Ethical or environmentally friendly products account for only 4% of total consumer expenditure despite increasing market penetration. Consumers are distrustful of mainstream retailers and consumer goods companies. The distrust is much lower for niche manufacturers such as innocent and Ecover.
What Assures Consumers on Climate Change?	Consumers International/Accountability (2007)	Although there is a high level of awareness and acceptance of labelling schemes, the levels of use are low. In the context of current patterns of consumer action and the scale and urgency of change needed, the 'explosion' of consumer facing initiatives may fail to achieve mainstream uptake or have significant impact. Businesses are not seen as a trusted source of information
I will if you will	Sustainable Development Commission/National Consumer Council (SDC, 2007)	There is a 'value-action' gap between people's attitudes, which are often pro-environmental, and their everyday behaviours When people act as shoppers, they expect some issues to have been dealt with. They may not be aware that government and retailers are delegating to them much of the responsibility of choosing society's way out of unsustainability There is not enough evidence that green consumers on their own will change mainstream product markets. These consumers may, in some cases, have played a role as early adopters.

Article	Authors	Summary
The competition impact of environmental product standards	Frontier Economics (2008)	Low-carbon products and services are often introduced into markets that are characterised by imperfect competition – small numbers of firms or a few large firms facing a fringe of smaller firms. There may also be competition concerns including: asymmetric cost impacts policymakers picking winners encouraging co-ordinated effects (associated with voluntary agreements) asymmetric product impacts, and facilitating exclusionary behaviour.
Drivers for consumer actions		
Consumers, Brands and Climate Change	The Climate Group, 2007	Consumers give credit to perceived leaders from big retail and big energy in the UK instead of looking at actual environmental metrics Consumers are very sensitive to what others say about a brand, especially negative press.
Driving success: Marketing and sustainable development	WBCSD (2005)	Credible claims backed by independent verification, partnership with authoritative bodies and standards can remove barriers such as the lack of trust in commercial claims.
Sustainable consumption facts and trends	WBCSD (2008)	Surveys show increased willingness to change behaviour There is a propensity to buy from companies with a reputation for environmental and social responsibility, in developed and rapidly developing countries. Consumers trust each other more than other sources of information There is an emerging belief in consumers that they have power to influence how responsibly a company behaves The internet is a major source of peer-generated information.

Article	Authors	Summary
Tipping Point or Turning Point? Marketing and Climate Change	Phil Downing and Joe Ballantyne. Ipsos Mori Social Research Institute	The study of consumer behaviour requires the acknowledgement that there are different types of behaviour: Conscious behaviour and subconscious behaviour. Small behaviours likely to change rapidly and long term change likely to be less visible in the short term. Isolated behaviour and Interconnect behaviour that catalyse others. Personal wants and desires are strongly influenced and moderated by social norms. There are two types of social norms: descriptive norms that teach us how most people around us behave; and injunctive norms, which alert us to what is sanctioned or punished in society. Consumers want easier choices and more help differentiating environmentally sound products from others. Heterogeneity of households and consumers means it is critical to target messages, products and services at particular audiences. Consumers lack information, but information alone is not sufficient to drive change.
Sustainability: Are consumers buying it?	PwC (2009)	Change occurs when convenient: enabled by external action such as recycling and doorstep collection. Change also occurs when the issues are easy to understand and related actions save money.
What Assures Consumers on Climate Change?	Consumers International/Accountability (2007)	Consumers demand independent assurance of product information. Scientists, environmental groups and family and friends are seen as credible more credible than businesses or the government
Sustainable consumption facts and trends	WBCSD (2008)	In the marketing of low-carbon products and services, consumers are segmented according to their attitude towards climate change. Segmentation should also be determined by the best approach to communicate product specifications to different groups of consumers.
I will if you will	Sustainable Development Commission/National Consumer Council (SDC, 2007)	The symbolic values of products play an important role in a consumer's purchase decision. Environmental credentials should be tangible for a higher consumer buy-in. Consumers tend to engage more and influence market transformation through 'consumer pull' when a sustainability issue acquires emotional resonance.

Article	Authors	Summary
Barriers to consumer actions		
Consumers, Brands and Climate Change	The Climate Group, 2007	Brands are not connecting well with increasingly committed and diverse market. Consumers do not necessarily have perception of which brand is behind which propositions and messages. In terms of low-carbon products and services, there is higher willingness to change lifestyle and behaviour than to spend more money.
Consumers, business and climate change	The University of Manchester Sustainable Consumption Institute (2009)	Main barriers are: Cost: perceived higher cost of environmentally friendly goods and lifestyles Availability of environmentally friendly goods. Sometimes it is region specific, such as public transport or recycling facilities Lack of information Consumer attitude: Sense of hopelessness in the face of a huge problem.
Sustainable consumption facts and trends	WBCSD (2008)	Consumers adopt responsible behaviours only if both cost-efficient and convenient Lack of trust because early products have not met basic expectations leading to consumer scepticism.
Tipping Point or Turning Point? Marketing and Climate Change	Phil Downing and Joe Ballantyne. Ipsos Mori Social Research Institute (2007)	Consumers still seek to make changes at the margins of their lifestyles and do not perceive the need for a fundamental shift in behaviour. Research reveal that consumer actions often do not appear consistent, well planned or systematic. Consumers are often unable to identify any actions related to sustainability beyond recycling. The majority of consumers are not aware that some of their actions are associated with a relatively large carbon footprint.

Article	Authors	Summary
What Assures Consumers on Climate Change?	Consumers International/Accountability (2007)	Climate change is not a tangible threat for many developed world consumers. Concern about climate change varies on a daily basis. There is not enough information which allow consumers to know which products have higher environmental credentials than others Consumers are generally confused about what to do and sceptical about the fact that individual actions may have an impact. There is a general lack of understanding among consumers of where their material impacts lie. There is a common perception that low impact products are more expensive The lack of availability of energy efficient choices in some areas is identified by consumers as a barrier to action. Consumers are discouraged from considering global warming in their daily life because they do not believe the claims made about energy efficient products and services.
Sustainability: Are consumers buying it?	PwC (2009)	High price, confusion and lack of trust confusion about the implications of their choices and the social and environmental trade-offs of their purchases. Lack of availability of alternatives especially in non-food and clothing. Consumer trust is a major barrier. Levels of trust of manufacturer and retailer environmental claims is very low
I will if you will	Sustainable Development Commission/National Consumer Council (SDC, 2007)	Consumers are 'locked-in' to unsustainable consumption patterns' by perverse incentive structures (economic constraints, institutional barriers, or inequalities in access). Consumers are creatures of habit, reluctant to make changes that challenge our routine. They are preoccupied with short term household budgets and, for low-income consumers, with making ends meet on a weekly basis They often lack access to facilities like doorstep recycling or good public transport They often do not trust the government bodies and businesses that are exhorting or enticing them to change

Article	Authors	Summary
Business strategies		
Climate Business/Business Climate: Grist: A strategic approach to climate	Porter and Reinhart, (2007)	There is no one-size-fits-all: at a minimum need to manage carbon costs and vulnerability to impacts. There is a difference between 'inside out' and 'outside in' strategies.
Strategy & Society: the link between competitive advantage and corporate social responsibility	Porter and Kramer, (2007)	Need to identify points of intersection ('inside-out' and 'outside in'). Identifying these points help determine the relevance of business strategy with Responsive CSR and Strategic CSR
Business Responses to Climate Change: Identifying Emergent Strategies	Kolk and Pinkse, 2005	Typology of business strategies. There are broad approaches to business strategies around climate change: Improvement in business activities through innovation Compensation, including activities such as buying emissions credit. Each of the two approaches can applied in three dimensions of the business: Internally, vertically across the supply chain, or horizontally beyond the supply chain. These distinctions result in 6 'clusters' or types of business strategies. These are: Improvement approach: process improvement, product development and new product/market combinations, and Compensation approach: transfer of emissions reductions, supply chain measures and acquisition of emissions credits.
Pulling ahead: innovating for low-carbon leadership	CBI (2009)	Need to focus on technology and innovation in sectors with the greatest potential to create wealth for the UK. (Automotive, Electronics and ICT, Offshore operations, Building an Design, Intellectual Properties)
Sustainability: Are consumers buying it?	PwC (2009)	In-store point of sale and marketing to increase consumer awareness (eg Wal-mart light bulbs given additional shelf space, and reduced price) Choice editing using sustainability attributes (Sainsbury's using only fair-trade banana and absorbing the cost). Important to look at both internal and external strategy through a sustainability lense.

Article	Authors	Summary
What Assures Consumers on Climate Change?	Consumers International/Accountability (2007)	Small steps add up: If systems can be developed to inform, engage and enable concerned consumers, they will be able to be scaled up for wider adoption. This has been used to break the cycle of inertia. Businesses can assure consumers that they can and should take actions that also support wider cultural change and the development of national and international norms. Linking business claims to scientific consensus is important. Business strategies should recognise that information is not enough, and making sure to find ways to engage with consumers and make positive behaviours into unconscious habit. Desired features for business strategies include: consistency, sustained claims, showing serious intent, having informal and formal mechanisms to get messages across, linking responsibility, choice influencing, quality service and value for money. Emerging approaches: Mass awareness campaigns (an inconvenient truth) Communities of change (global action plan)
Driving success: Marketing and sustainable development	WBCSD (2005)	Reputation is the foundation of future success. Products with sustainability attributes will only appeal if they are consistent with the values and activities of the company Need to explore new ways of working with the developing markets, with partnership approaches
Role of government		
Pulling ahead: innovating for low-carbon leadership	CBI (2009)	Make carbon part of core business by including carbon costs in the bottom line. Assess technologies that have market and scaling up potential. Introduce long term policy measures and leverage private capital to ensure favourable innovation environment.

Article	Authors	Summary
I will if you will	Sustainable Development Commission/National Consumer Council (SDC, 2007)	Use four E's framework: Exemplify, Enable, Encourage, Engage Early announcement of legislation to set minimum standards drives a virtuous cycle of rapid innovation and further choice editing by retailers and manufacturers Fiscal incentives only work if they close the price gap for more sustainable products or create significant tax rebates for their use Where the market is not able to achieve this product parity spontaneously, then government intervention is needed (e.g. product road mapping)
What Assures Consumers on Climate Change?	Consumers International/Accountability (2007)	Enable individual actions by setting an example, supporting the development of credible standards etc. Foster international, national and sectoral commitment by setting clear, science based targets. Promote and help create a framework for 'one planet governance'
Tipping Point or Turning Point? Marketing and Climate Change	Phil Downing and Joe Ballantyne. Ipsos Mori Social Research Institute	Public look to government to orchestrate collective action Use social marketing: the 'systematic application of marketing concept and techniques to achieve specific behavioural goals'

Article	Authors	Summary
A Framework for Pro environmental Behaviour	Defra (2008)	UK consumers segmented according to willingness and ability to act. These are: Positive greens Waste watchers Concerned consumers Sideline supporters Cautious participants Stalled starters Honestly disengaged There is a set of 12 headline behaviour goals which the UK should aspire to achieve. The different segments would react differently in terms of ability and willingness to achieve each of these goals. Analysis found that common motivators for consumers are 'feel good factors', norms, personal benefits, ease, and being part of something. Identified common barriers include external constraints (cost, infrastructure, working patterns, etc.), habit, scepticism and disempowerment. From a social marketing point of view, the above behavioural framework should be used to inform policy making so that each segment is subject to targeted effort from the government.

Appendix B: Case Studies:

1. Modec

Key Findings

Company and product	Modec Limited, a privately owned manufacturer of electric commercial vehicles Based on an interview with Mr Roger Atkins, Sales and Marketing Director, and literature review
Market and competitive landscape	Modec was an early mover in this new and still niche market within the commercial vehicle market It is targeting the US and Europe as well as the UK and has a number of competitors in the international and domestic markets
Product differentiation	Purpose built electric vans, competing on green credentials, rather than cost
Carbon impact	Compared to petrol or diesel vehicles, Modec estimate that a Modec vans can save up to 9 tCO2 annually (based on a typical annual mileage of 15,000) over the lifetime of the vehicles (typically 5 - 8 years)
Enablers	▪ Emergence of battery and other technology, enabling the development of larger electric vehicles ▪ Grant funding to support the establishment of the manufacturing facility ▪ EU-wide homologation
Customer drivers and barriers	▪ Growing importance of climate change as a strategic issue and brand differentiator in the retail sector ▪ Higher capital costs, not outweighed by fuel and other cost savings ▪ Technological constraints (range, battery size)
Supply chain impacts	Close collaboration with mainly UK-based suppliers and strong interdependency - parts are specially designed and manufactured for Modec, mutual interest in environmental performance and sustainability
Impact of uptake on market	▪ Impacts on the UK are limited partly due to the immaturity of the product but also due to the relatively low level of sales in the UK compared to other countries. ▪ The product has nevertheless driven supply chain innovation in terms of design and battery performances ▪ The product also created a market for alternative energy commercial vehicles although the impacts on conventional fleet sector and on competitive rivalry has been minimal.

Success factors	▪ Positioning the product as an effective way for its customers to demonstrate their environmental credentials, rather than competing head on vehicle cost and performance ▪ Marketing through different channels to normal fleet sales ▪ Close collaboration with the supply chain to enhance the environmental credentials and attractiveness of the product
Role of government in encouraging success	▪ Early stage grant funding was critical ▪ Public procurement has bolstered demand (particularly in the US, as part of the green stimulus package; policy commitments in the UK are yet to deliver significant sales) ▪ Fiscal policies (eg fuel duties) are not yet material to the economics of the product

Introduction

Transport accounts for 21% of UK's total greenhouse gas emissions. Emissions reduction in the sector is the focus of the Low Carbon Transport strategy, a key feature of UK' s Low Carbon Transition plan. The strategy identifies that commercial vans are the fastest growing motor vehicle and account for 11% of transport emissions while HGVs contribute 20%. The plan identifies road freight as an important area of focus (DfT, 2009). The strategy includes a commitment of around £400 million to encourage development and uptake of ultra low carbon vehicles.

The Low Carbon Vehicle Innovation Platform and the Low Carbon Vehicle Public Procurement Programme are part of the government's support for lower carbon cars and vans. There are also plans to introduce the 'Safe and Fuel Efficient Driving' (SAFED) programme to educate van drivers on eco-driving. In addition, fiscal incentives to encourage fuel-efficient vehicle purchases such as lower fuel duty, company car tax and vehicle excise duty are potential policy levers.

Electric vehicles offer a low carbon alternative to conventional petrol and diesel powered transport. The market for personal, consumer-use, electric vehicles has enjoyed strong growth in recent years. There has been a significant rise in personal electric cars launched onto the market by mainstream car manufacturers, such as Nissan, Toyota, Tesla Motors and Ford, as well as start-ups such as Think Global. Many major players are introducing electrified versions of existing popular models. For example, BWM has introduced a pilot version of the Mini at this years Detroit Automotive show (the Guardian, 2010). The main market for these is currently the US, with China expected to be the second largest buyer. Toyota Prius for example reached sales of US$1 million in 2008, 10 years after its launch, with the US making up for half of its sales worldwide (USA Today, 2008). The UK market on the other hand only represents a small proportion of the world market for electric vehicles.

However, the market for electric commercial vehicles is still at the early stages of maturity, although mainstream manufacturers such as Ford are planning to introduce electric vans in the next few years (Environmental Leader, 2010). Research also reveal that although the current electric vehicle market is currently dominated by personal cars, commercial vans, buses and trucks are likely to account for 70% of the electric vehicle market by 2020 both in the EU and in North America (Business Green, 2010).

In the UK, two manufacturers of electric vans and Heavy Goods Vehicles (HGVs) dominate the market with a range of models, namely Smith Electric Vehicles and Modec. Smith Electric Vehicles is the world's largest manufacturer of commercial electric vehicles. Based in North East England, Smith Electric Vehicles converts conventional vehicles into commercial electric vehicles designed for intra-city applications such as retail and distribution, post and parcel

delivery. Smith Newton electric van is in fleets for companies such as Starbucks, DHL, TK Maxx.

Modec is a privately owned, UK-based manufacturer of electric vehicles. Founded in 2004 by a team of automotive engineering experts, Modec's first vehicles were launched in March 2007. The business claims it manufactures the world's first purpose-built electric vans. Modec sales vehicles across four electric commercial vehicle models: Modec Chassis Cab, Modec Drop-side, Modec Box Van and Modec Tipper. Modec has sold a total of around 280 of its vehicles globally to date.

Modec targets the UK and international markets, marketing to commercial and public procurement customers. It operates in the United States through a joint venture with Navistar, a commercial and military truck manufacturer. The company has purchased an equity stake in Borwick Group Limited, Modec's parent company. Navistar selected Modec based on it's purpose-built feature and plans to produce Class 2c-3 all-electric commercial trucks for sale in North, Central and South America.

Other electric vehicle companies that supply and support electric vehicles in the UK include: Aixam Mega Ltd (electric vans), Allied ZEV (commercial electric vans and minibuses), Epower Trucks (electric trucks, tow tractors, electric utility vehicles, golf buggies, electric tugs etc.) and Steven Vehicles (new British manufacturer of zero emission vehicles).

Drivers for Business

The main driver for the establishment of Modec was a respond to an unsatisfied market need. The business identified a market opportunity for electric commercial vehicles, created as a result of raising environmental consciousness and fuel costs. Market research predicted vans and trucks would take a large part of the electric vehicle market. Depot-based, light-weight trucks and vans are seen as having the greatest potential as they operate on a limited and predicable range (Business Green, 2010).

The availability of new technology was critical to the development of the product, namely battery-life development.

An important enabler for the business was start-up finding. The company received initial financial support from the regional development agency Advantage West Midlands (AWM) at its establishment in 2004. The AWM granted Modec close to £1.1 million from a £1.4 million Grant for Business Investment to enable the Company to set up its manufacturing operation in Coventry and take the product to market (AWM, 2009).

Key actions and strategies

Route to market

Modec initially used automotive shows as its main route to market. It was at the Birmingham auto show that Tesco commissioned Modec's first order for 15 electric vehicles for their home delivery service. However, these events have proven too expensive for a small start-up company compared to the relatively low conversion rate. Only a small proportion of buyers in automotive shows are willing and able to afford Modec's higher prices – the majority of buyers tend to be seeking "deals" at these events.

As a result, the main strategy now consists of direct marketing to companies that had expressed strong desire to adopt better CSR practices or engage in the low carbon agenda. Modec took the stance that customers that are most likely to purchase large commercial electric vans are large companies wanting to demonstrate their low carbon strategy to consumers. These companies are more likely to be able to invest in more expensive vehicles, sometimes drawing funding from their marketing budget. Most customers to date have purchased Modec vehicles as a result of strategic decisions at board level to strengthen the

firm's sustainability credentials. The fleet manager, despite being the buyer, is not necessarily the key influencer as they tend to face difficult decisions in balancing the costs of the fleet.

Along with Allied Electric, Ashwoods, Toyota and Smith, Modec is a successful bidder of the Low Carbon Vehicle Procurement Programme, an initial £20m Government investment aiming to trial a number of low carbon and zero emission vehicles in public sector fleets. The objectives of the programme are to:

- Quantify the benefits of low carbon vehicle
- Validate real world performance of low carbon vehicles.
- Foster a cultural change towards low carbon transport.
- Achieve economies of scale for low carbon vehicle manufacturers.

The involvement, in theory, should lead to orders of Modec vehicles to be trialled on a range of the public sector fleet. However, there have been relatively few opportunities that have been realised through this channel to date.

On the other hand, having obtained EU homologation for its vehicles in 2008 (TMR, 2009), Modec is increasingly targeting markets outside the UK and has experienced relative success in continental Europe as well as in the United States, where Modec believes there may be clearer long-term policies for investment in low-carbon vehicles. For example, within 6 months of President Obama taking office, his economic stimulus package resulted in $39M investment in the Navistar/Modec plan, whereas the April 2007 UK Government White paper 'Planning a sustainable future' that suggested an investment in public procurement of low and zero carbon vehicles has yet to put any Modec vehicles on the road.

Marketing strategies

Modec currently markets its vehicles primarily as a marketing tool that supports corporate positioning on environmental attributes. It allows customers the opportunity to be visibly acting on climate change and use its unusual design as a billboard for companies to advertise their commitment. This is visible on Tesco's delivery vans in London (see picture), and how UPS, a major logistics provider and owner of 12 Modec vehicles, has benefited from its hybrid and zero emissions fleet as a differentiator to win the bid for the official logistics and express delivery supporter of the London 2012 Olympics (Tonkin, 2009).

Aside from allowing a display of green credentials, Modec aims at providing "state-of-the-art electric vehicles without compromise on driver appeal" and is notable for displaying advantages such as high visibility, quietness, quick acceleration and high manoeuvrability. These features are designed to enable Modec to compete with the likes of the Ford Transit, Iveco Daily and Mercedes-Benz Sprinter in terms of functionality (Shiers, 2009). Modec vehicles also allow customisation according to customers' needs. For example, Tesco vans are fitted with refrigeration technologies that do not draw on electric current (What Van, 2008).

The business does highlight attributes such as long term cost saving from fuel as well as more immediate savings such as congestion charge, road tax and operator licence. However, these are less prominent as marketing message than CSR branding opportunities.

Customer adoption and behavioural change

Modec's customers typically order a trial number of vehicles to compliment an existing conventional fleet. The market potential is in repeat orders, for example among logistics companies such as FedEx and UPS who face increasing regulatory risk and customer scrutiny regarding their carbon performance. Large players in the logistic sector typically face challenges to reduce carbon footprint for air freight, and Modec and other commercial electric vehicles provide an opportunity to reduce ground fleet carbon footprint as a relatively low cost starting point.

In addition, because Modec primarily provides customers the opportunity to have a greener image and branding, its products are indirectly linked to awareness raising both among employees and consumers, as well as along its supply chain. The key reason that Modec has successfully targeted marketing teams rather than logistic teams amongst its potential customers is the value added to the brand rather than cost savings.

A low carbon van survey conducted by the Department for Transport reveal that:

- 65 % of conventional van owners were aware of the availability of low carbon vans.
- 68% of respondents stated that higher purchase cost was the main reason for not purchasing a low carbon van
- The reasons for purchasing low carbon vans among exiting owners were:
  - reduced operating costs (average score 9.1 out of 10)
  - environmental concerns (8.2 out of 10)

Supply chain impacts

Modec sources its parts from an extended supply chain, with all parts specially designed to meet Modec's needs. Owing to the specialised nature of its products and the limited number of specialist suppliers, Modec works closely with suppliers to communicate the required specificities.

In particular, the company has built a very close working relationship with Axeon, a UK based manufacturer that supplies the batteries for the vehicles. Through this relationship it is able to influence the development of the range and the design of the batteries.

The expansion of the business in the US and the opening of a US factory has the potential to impact Modec's current supply chain. In addition to sourcing batteries from Axeon, the company also sources battery cells from China.

Barriers/market failure

Policies

Modec states that it has been able to set up a joint-venture "within 6 months of President Obama in administration with substantial government backing", whereas take-up has still been "relatively slow in the UK despite the commitment articulated in the UK 2007 white paper". A consequence, Modec has been forced to prioritise growth in markets such as the US and continental Europe, where it perceives the regulatory and policy environment is more favourable for the take up of their products.

Price

At around £60,000, Modec's vehicles are approximately two- to three- times the price of a conventional van of equivalent carrying capacity, including the lithium-ion battery pack. Meanwhile, the longer term cost savings have yet to justify the price differential given current fuel prices and/or taxes. In addition, as a purpose-built manufacturing firm, Modec has not been able to benefit from economies of scale at current sales levels. Other competitors

focussing on vehicle conversion are also able to make available spare parts at lower costs. Modec is also in competition with hybrid vehicles, which could also be cheaper and allow companies to display green credentials (Tindall, 2008).

Technical and infrastructure constraints

Modec vehicles need to be recharged every 100 miles and are dependent on the availability of three-phase electric supply facilities. The range is considered fairly high given current technologies and investments in technology and infrastructure are increasing, but the general perception of electric cars remains largely negative. "Range anxiety" – or the concern that the power is insufficient to complete the journey or reach the next charging station – is identified as the dominant concern, followed by higher prices and perception that new and green technology requires compromise may also constitute barriers for the mainstreaming of Modec vehicles (Parpis, 2009).

Despite advances, batteries are currently heavy and space consuming, and therefore a significant barrier to the uptake. However, Modec has described its vehicles as 'future-proof', which means that its battery cassettes are designed in a way that allows improvements in battery technology and new batteries to be retrofitted.

Appendix B: Case Studies:

2. Zipcar

Key Findings

Company and product	Zipcar is a US based car club service provider. Based on 2 interviews with UK Vice President, Marketing manager, Sales and Marketing Director, and literature review
Market and competitive landscape	Zipcar started the first car club in the US and entered the UK market after competitor, Street Car. There is now an increasing number of car clubs, including City car club and Hertz
Product differentiation	Technology-focused services and design. Stronger focus on sustainability issues than competitors who mostly market cost saving.
Carbon impact	1 Zipcar is found to remove 20 personal cars from the road See section on carbon for overall impacts of car clubs
Enablers	▪ Increasing issues around congestion and pollution in city centres have catalysed partnerships with local authorities and councils. ▪ In addition Integrated transport system and the availability of technology such as Radio Frequency ID (RFID) were important enablers of a car sharing scheme ▪ Emergence of online networking opportunity brought about by the creation of the Zipster community and the possibility to share user experience has greatly contributed to overall consumer satisfaction and greater uptake of the service.
Customer drivers and barriers	▪ Growing concern over the cost and hassle of owning a car and car club's innovative alternative to car ownership has been a key driver. ▪ Cultural change making the ownership of a car less essential. ▪ Consumer perception is also a barrier to uptake.
Supply chain impacts	▪ Zipcar is in close contact with manufacturers on sustainability issues. The car club provides car manufactures a platform to trial and pilot new technologies, such as electric cars.
Impact of uptake on market	▪ Zipcar has provided the UK car club market with competitive rivalry. Market was previously dominated by Streetcar. ▪ The services also stimulated Innovation for the ease of use (i.e. iPod application).
Success factors	Flexible membership fee, bright and 'fun' design and the marketing of the membership as a 'community' appeals both to the customer's practical and emotional sides.
Role of government in encouraging success	Partnership with local council can play a role in encouraging car sharing schemes in general by making car sharing more convenient and cheaper, while taking away parking spaces from privately owned cars for shared cars.

Introduction

Car clubs are commercial or not-for-profit schemes that are essentially short-term car hire service providers (University of Leeds, 2010). Typically, car club members pay an annual membership fee to an operator who provides and maintains a range of vehicles. Members then pay by the hour and/or mile when they use a vehicle. Cars are generally distributed around cities, can be booked electronically or over the phone and accessed by 'smart card' technology which facilitates all inclusive pay-as-you go charges[1].

The combined costs of membership and use are intended to be cheaper than personal car ownership for car owners who do not have a high mileage, and to encourage the adoption of relatively diverse personal transport strategies.

Studies suggest that the uptake potential for car clubs highly depends on age, level of education and income.

Zipcar is a leading car club service operating in major cities through North America, with the view 'to the future where car sharing members out-number car owners around the globe' (Zipcar). It has most recently entered the London market in 2006. Globally, the company now has 350,000 members, in 28 US states and provinces and 13 cities, including London. Although successful and well known in the US, the concept and Zipcar in particular is still relatively new to London, with incumbent competitors in the UK, and more specifically in London, including Streetcar, City Car Club and WhizzGo (TfL, 2008). Today's car club members are usually city-based 'early adopters', since car clubs are relatively new in the UK and have mostly been developed in cities (Cairns et al, 2004).

As issues around car ownership such as costs, regulations, congestion, parking space and pollution are becoming increasingly evident, Zipcar is a successful example of how the desire to seek out cost savings can lead to positive spill-overs in terms of low-carbon behavioural change.

Market context

Market development in the UK pre-2004 has been limited to two operators, one through a consortium of London boroughs and the other as part of an EU programme (which has since exited the market). In June 2004, Carplus, the umbrella organisation for UK car clubs, was aware of at least 25 car clubs in the UK and a total of 1165 members. Clubs range from city-wide schemes run to independent clubs with only a few cars based in villages and market towns (e.g. Moorcar in Ashburton, Devon) (Cairns et al, 2004). Some of the UK clubs have been developed from the bottom up: projects emerging from local interest. Usually, vehicles are distributed around the local neighbourhood in convenient locations, members are attracted by advertising and word-of-mouth, new cars are added to the scheme as membership grows sufficiently to support them, and there is a sense of belonging to a "community club". Car clubs in the country can be accredited by Carplus, who clearly distinguishes between car hire and car clubs and sets minimum standards for delivery and monitoring.
As fuel costs, congestion, other driving costs and limited availability of parking spaces increases, the potential for car sharing has also increased over the past two years.

The 2008 Car Club Strategy sets out Transport for London's plan to develop car clubs through to 2011. It identifies the lack of parking space as the main limiting factor and commits to work with local authorities in undertaking their planning and highway functions to stimulate the development of car clubs and promote low emissions vehicles. The scheme would only support schemes that are accredited by Carplus, a charity promoting better car use namely City Car Club, Streetcar, Zipcar and WhizzGo.

[1] This concept is generally known as 'car sharing' elsewhere in Europe and in the USA.

Drivers for business

The scheme was developed 10 years ago in the US where problems of congestion and pollution were becoming apparent. Following its successful developed in the US, Zipcar expanded to the UK where the market and consumer attitude were perceived to be two years behind the US. The scheme was also enabled by the development technologies such as car sharing softwares and Radio Frequency ID (RFID).

More recently, Zipcar has begun to take advantage of other market opportunities: specifically around using technology to increase the attractiveness of car clubs and using car clubs to pilot or test new, more fuel efficient vehicles. For example, it has been marketing its car tracking technologies, which can allow governments and other entities to expand the concept of car club. In addition, car manufacturers such as Ford and Toyota are investigating collaboration opportunities with Zipcar, such as using its members to test electric cars or designing vehicles especially designed for car clubs (Keegan, 2009).

Key Actions and Strategies

Route to market

The marketing of Zipcar relies on referral and word of mouth, as well as street marketing, but little on direct advertising. Because the main driver for uptake is cost saving, both research and the interview reveal that Zipcar's main target customers are internet savvy city dwellers who are inclined to rent vehicles for occasional use, or families who already own one car but have occasional need for a second one. It also appeals to politically, socially and environmentally conscious customers.

A study found that car club programs are more likely to succeed when they provide a dense network and variety of vehicles, serve a diverse mix of users, create joint-marketing partnerships, design a flexible yet simple rate system, and provide for easy emergency access to taxis and long-term car rentals. They are also more likely to succeed in urban and affluent areas where: environmental consciousness is likely to be higher; there exists driving disincentives such as high parking costs; traffic congestion are pervasive; car ownership costs are high; and alternative complementary modes of transportation are easily accessible (Shaheen, 2002). Zipcar reinforces this finding by focusing its services specifically on central London, and includes in its tariffs fuel and congestion charging costs. However, as per their US operators, Zipcar will look to target outer London universities to further service adoption.

In the US, Zipcar has also targeted university campuses with car club schemes that are also open to non-university members. This is also mirrored in the UK for example with the University of Greenwich. Locating in campuses with high concentration of university students that fit Zipcar's targeted customer profile has proven to be a successful strategy. In the case of University of Greenwich, this also provides easy access for local residents.

Another set of target customers includes city councils. Zipcar has recently entered into a partnership with Westminster council to run the council car scheme. With the aim of cutting congestion and pollution, it is the first scheme of its kind operated by a local council. In addition to traditional car sharing services, the council offers a wider range of parking bays than are offered for cars operated by private companies, and offers discounted annual membership and 1 hour of free parking space. The scheme incorporates a "green" element by promoting the launch of electric and hybrid cars. With the investment of £200,000 from Westminster Council and £50,000 from Transport for London, the car club, operated by Zipcar will include a fleet of 20 hybrid vehicles and will also offer members access to the country's first all-electric car club vehicle, a Citroën c1. Users will have access to more than 100 vehicles in locations across Westminster including Covent Garden, Mayfair, Soho, Regent's Park and Marylebone as well as a number of residential areas. The council and Zipcar aim to have 400 vehicles by 2012 - approximately 30% of which will be hybrid vehicles. Partnerships with local authorities similar to Zipcar and Westminster city council and Streetcar with the council of Camden have helped secure local market shares.

Marketing strategies

Zipcar's marketing strategy targets those who have a need to reduce cost and remove the hassle of owning and maintaining a car. This echoes the CEO Scott Griffith's plan to move from a mission-orientated culture to a performance based one (Keegan, 2009). Zipcar offerings are thus characterised by flexible membership policies and value oriented plans based upon usage needs. It also appeals to technology savvy customers with continuous technological improvements as new functionality becomes available. An example is the Zipcar for iPhone application, which provides a Zipcar vehicle database to display a list of available Zipcars near a member at any moment. Members can then make reservations direct from the phone (Griffith, 2009).

While not core to its marketing strategy, Zipcar's has continued to promote an image of environmental consciousness. Other aspects of Zipcar's strategy include ensuring that they have invested in a user-friendly website which is designed for a specific younger target audience. The design and messages of the website frequently link the brand with the target audiences' lifestyle and values. The *de facto* membership to the Zipster community provides "a sense of belonging and moral gratification for investing in 'green-friendly' car club schemes". Similarly it enables Zipcar to benefit from using their members as ambassadors and attract new joiners through word of mouth (Parekh, 2009).

Customer adoption and behavioural change

Although UK's car ownership has increased over the last decade, up by 30%, studies show that the length and frequency of journeys have fallen (BBC, 2009). This creates a favourable condition for the introduction of car schemes. New joiners, particularly younger people, are predominantly motivated by cost saving and removing the hassle of owning a car. This has been catalysed with the increases in motoring taxes and other costs associated with car ownership. The majority car club members surveyed by TfL (2008), consider cost saving as the overriding reason for people to join car clubs. All surveyed members also identify convenience in terms of having a car in a good location an important factor.

Because fees are counted by the hour, and fixed with a certain mileage limitations before additional charges apply, Zipcar membership is said to increase customers' propensity to be aware of their carbon footprint, forcing users to think twice about whether their car trips are necessary or substitutable. Studies demonstrate car mileage drops by 60 – 70% among members who give up on car ownership to join a car club (DfT, 2004). In addition, the "Zipster community" acts as a platform for members to communicate and share, which also helps to develop and raise awareness on the environmentally-friendly aspect of the membership. At the same time Zipcar has been actively running campaigns to increase awareness as well as programmes to encourage the use of public transport and cycling, such as having more Zipcars near public transport stations.

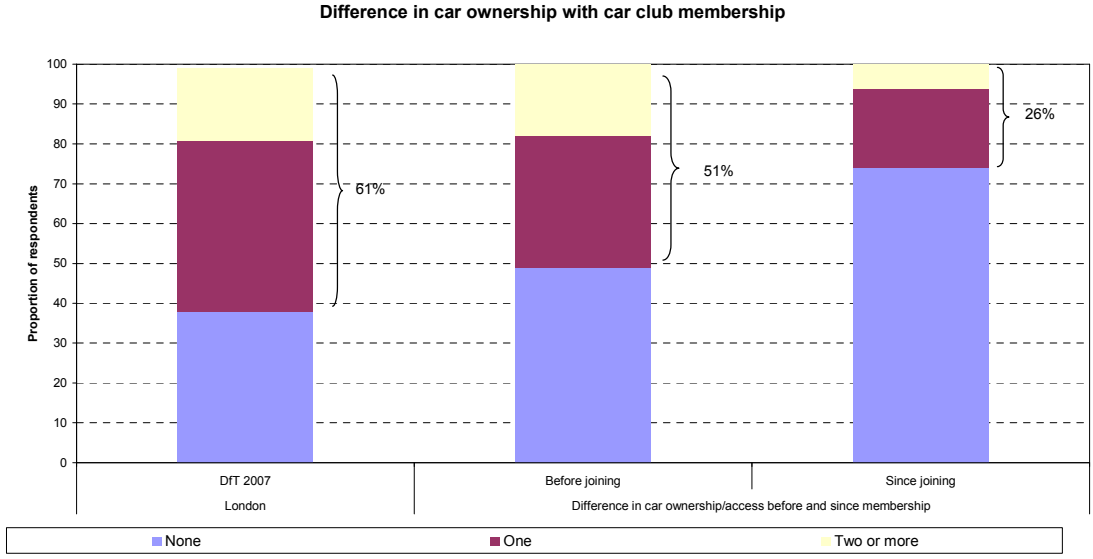
Zipcar's surveys have also revealed that customers are now increasingly choosing to use hybrid cars, both as availability increases and because there is an increasing demand. This trend clearly indicates that as businesses respond to greener demand, they also increase awareness and change behaviour by making alternative available to general consumers that might not initially prioritise green lifestyles.

An annual survey by Carplus found that around a quarter of car club members in the UK would have bought a new car if they had not joined a car club, while 39% have reduced the number of cars owned by their household. The average car club car is estimated to result in 14 private vehicles being sold by members, and a further 9 not being purchased (i.e. 23 cars taken off the road)[2]. Figure 15 shows the results from a TfL study on car club members' change in behaviour. Although only half of the car club members do not own a car compared

[2] Estimates vary, for example a study by TfL in 2007 suggested that a car club car removes up to four private vehicles off the road and defer the purchase of six more.

to roughly 60% of the London, the scale of change in car ownership is still fairly substantial, as car ownership falls to just over a quarter of car club members.

Figure 15: Changes in car ownership with membership to a car club



Source:TfL for car club members, DfT for London
Base: All car club members (n=1375)
How many cars in total did you own or have access to in your household before joining the car club?
How many cars in total do you currently own or have access to in your household, excluding the car

Source: TfL (2008), DfT (2009)

The survey also found that:

- Car club membership doubled over 2008 in the UK, now amounting to 64,000 members, driven by growth in London, and to a lesser extent, other major cities in the UK.
- Compared to the average person, car club members make more trips by public transport, walking and cycling, and fewer trips using personal vehicles (less than a quarter of their journey, compared to two-thirds for the average person).
- Car club vehicles tend to be newer and more fuel efficient, with the average CO2/km at 64% of the private vehicles they replace.
- Based on assumptions on car fuel efficiency, mileage, and car ownership, it is estimated that a car club member achieves a carbon savings of 0.7tCO2 a year (UKERC, 2009).
- By scaling up car club membership to 118,000 (from the 28,000 members in 2007) and making assuming similar driving behaviours, a UKERC report (Ledbury 2007) estimated that 0.02 MtC (or 0.07 MtCO2) could be saved each year as a result of scaling up car clubs to this level. If car clubs were to reach participation of 15% of the population (9m people), this could produce annual savings of almost 8MtC (29 MtCO2).

However the incremental impact of car clubs is still questionable. In particular, sceptics argue that membership reflects self-selection in terms of travel behaviour, i.e. car clubs allows users to realise their pre-existing suite of travel preferences, rather than truly changing travelling behaviour.

Barriers/Market failure

The uptake of car club membership has been increasing over the last few years. However the main barrier remains behavioural. Most UK households consider car ownership an important lifestyle choice.

Customers' lack of trust for new technologies and the availability of charging points as well as the time needed to recharge cars. Although car clubs are considered a good way to introduce electric vehicles into the market by allowing members to test them on short trips, current statistics from Zipcar surveys seem to show that there is currently not enough demand for the roll out of electric cars into the fleet (Garthwaite, 2009). In particular, Zipcar needs to cater for the different needs of customers, including providing a range of vehicle types – whereas there is, at this stage, not enough variety in electric vehicles e.g. MPVs. Also, from a business perspective, even with enough demand for electric cars, the time required for charging the cars would represent a loss of income stream (Keegan, 2009).

A key challenge for Zipcar and car clubs is ensuring the availability of vehicles to customers, as each location tends to have very small number of cars available (in many cases only one or two vehicles) this is exacerbated by the lack of parking space in densely populated cities such as London. Demand and use management therefore plays an integral role in the attractiveness of a car club (TfL, 2008), and this is why car clubs such as Zipcar are working with partners such as London councils as well as parking contractors to ensure the possibility of future expansion.

Appendix B: Case Studies:

3.Teleconferencing

Key findings

Company and product	Teleconferencing services and equipments Cisco, Smart 2020 (The Climate Group), Computenix (teleconferencing systems supplier for BT) Based on 4 interviews and literature review
Competitive landscape	▪ There are multiple product solutions for a number of providers. Main UK suppliers of Telepresence are Cisco TelePresence and HP Halo. ▪ The complex value chain, the required level of skills and infrastructure, competitors can also be collaborators in the teleconferencing sector.
Product differentiation/Key strategies	▪ Key target segment is medium to large businesses, but increasingly moving into small businesses, consumer market and non-traditional business e.g. telepresence in Health. ▪ Different modes of teleconferencing (audio, web, video) are suited to different types of customers. Product range offered therefore varies by requirement. ▪ Direct marketing of products to customers, but mass market advertising for brand awareness. ▪ Tend to be all-rounded solutions provider ▪ High profile clients e.g. UNFCCC in Copenhagen
Impacts on carbon reduction	▪ Smart 2020 study suggests that videoconferencing could prevent 30% of all business trips worldwide, saving 80 million tones of CO2.
Enabler	▪ Rising transport costs during the recessionary year ▪ Strategic partnership to highlight role of ICT
Customer key drivers	▪ Increased flexibility ▪ Reduced travel costs and time ▪ Greater connectivity ▪ Enabler of remote working
Customer key barriers	▪ Technological requirement for higher end product ▪ Rebound effect & behaviour change challenges
Supply Chain Impact	▪ Cisco and BT are strategic partners in the high end TelePresence offering. Other players in the industry tend to be both competitors and partners. ▪ Compunetix is the supplier of teleconferencing systems for BT and manufactures most of its equipments.
Impact of uptake on market	▪ The potential for teleconferencing to impact the travel sector is relatively high. Smart 2020 report estimates that teleconferencing can reduce up to 30% of business journeys. ▪ Innovation to overcome technological and infrastructural barriers.

Success Factors	▪ Cost reduction potential ▪ Technological advance
Role of government in encouraging success	Increased measures to reduce business travelling, such as airport and flight taxes, and other carbon taxes.

Introduction

Teleconferencing can substitute physical meetings through the use of audio, video and web conferencing. The equipment that facilitates teleconferencing can also be used for seminars, conferences, presentations and other group activities. Research by the Communications Management Association (CMA) found that of 85 companies surveyed, 58% use audio conferencing, 47% use video conferencing and 46% use web conferencing, with each employee typically making a total of 50 conference calls per year (CMA 2009).

Main market players are HP, Cisco, BT, and ACT. The sector has grown in the past few years, stimulated by cost saving measures introduced by companies during the economic downturn. It has been estimated that the global teleconferencing is one of the few technologies that have benefited from the downturn, recording a 30% growth from 2008-2009 (Winston, 2009).

This case study focuses on how teleconferencing solution providers market the services to their primarily business consumers, and the role of teleconferencing in reducing travel, by considering two core providers, Cisco and BT.

Cisco TelePresence™ is a remote conferencing tool that is relatively high quality in terms of consumer experience, with associated higher cost than alternatives. Telepresence describes high-quality, specialised equipment used for web-conferencing where the user can have the impression that he or she is present in another location. The virtual meeting is set up to resemble a physical meeting using advanced technology and life-size images, high-definition video and spatial audio. The product is designed to re-create a physical meeting environment. Traditional issues in teleconferencing such as delays in responses, ability to read body language and nuances, have been overcome to a large extent through advances in technology. Cisco continues to provide low to medium range products and is flexible enough to compete with less sophisticated teleconferencing offers.

BT Conferencing provides audio, web and video conferencing, with multiple products and solutions underpinning these capabilities:

- Audio – BT Express, BT Plus, BT Premium, BT MeetMe
- Web – WebEx, Live Meeting 2007
- Video – TelePresence Video Conferencing

BT provides the necessary hardware, software, systems, integration, security, professional services and management tools to implement and manage customer requirements. Specifically, BT is one of Cisco's Unified Communications Partners globally, and BT Cisco TelePresence demonstrates the strategic relationship between BT and Cisco on higher end teleconferencing technology.

Drivers for Business

The ICT industry in general is a highly innovative industry, constantly seeking to improve their offerings. Cisco, for example, focuses on improving connectivity in business. Their own experience also helped them recognise the difficulties in bringing groups from different departments and geographies together. In the context of TelePresence, Cisco is also looking to enhance the "in-person" experience, which has led to the development of high end and sophisticated video conferencing.

Increasing pressure for cost reduction, increased employee welfare and carbon reduction are the main factors making up the business case for Teleconferencing providers. The sector has grown by 30% in the last year and is expected to continue growing.

Carbon and costs saving

Dematerialisation

Teleconferencing contributes to dematerialisation – the substitution of high carbon products and activities with low carbon alternatives – by replacing face-to-face meetings with videoconferencing. The Climate Group estimated that 30% of business travel can be avoided through videoconferencing, generating carbon savings of 80MtCO2e.

Key companies that have introduced teleconferencing and reported substantial benefits include:

Company	Provider of conferencing	Savings in travel (for sites with facilities)	Carbon savings if quantified
Cisco	Cisco Telepresence	Reduce by half, from over $700m	Estimated carbon savings of 7%
BT	BT	Avoid over 860,000 meetings worldwide. Each call saves around £178 in travel costs and frees up £120 in management time (2007) Total financial savings from conferencing c. £240m	Saved over 97,000 tons or 15% of CO2 emissions. (2007)
Vodafone	Tandberg	Fell by 100 trips per month per site in 2006	Estimated carbon savings of 5520 tonnes of CO2.
Deutsche Telekom and subsidiary, T-Mobile	unknown	200,000 hours of time	Between 2004 and 2007 saved 7000 tonnes of CO2, from air travel
Department for International Development (DFID)	Carillion	Avoided at least 735 meetings in 2005	303 tonnes of carbon emissions in 2005
Atkins	unknown		259 tonnes of carbon emissions annually
NHS	unknown	5% of NHS business miles. Cut costs by almost £14m.	Almost 7,000 tonnes of carbon emissions annually

Sources: WWF 2009, EEA 2008, CMA 2009

Teleconferencing also generates further avoided trips by facilitating teleworking. Employees could work part- or full-time from alternative locations, such as their homes or telework centres (offices with communications access to the main workplace, but closer to employee's home).

However, installation of teleconferencing does not necessarily imply a greater utilisation rate. In particular, Pearson, a media company, found that its video conferencing suites were used for a total of 9,000 hours in 2006, but make up only a small proportion of time relative to air travel. Its average employee used less than 20 minutes of video conferencing. Earlier versions of teleconferencing suites, especially those run in-house rather than as part of outsourced, "managed services", were often unreliable and led to some mistrust among

customers. Some users are therefore still concerned about the effectiveness, e.g. picture and sound quality, ability to perceive body language, and only a small number of high end video conferencing products are available, which are also usually substantially more costly than lower end products.

The carbon savings estimates may also overstate the benefits of teleconferencing. In particular, emissions caused by electricity use could offset the benefits, and full life-cycle emissions may not have been taken into consideration in calculations (for example, the manufacture and disposal of required equipment). Recent increases in the use of high-definition video-conferencing and the development of telepresence equipment has led to a perception of increased energy use by these facilities, although research found that even under worst case scenario, the energy use is less than 10% of CO2 savings from avoided travel (CMA 2009).

Specific applications

One area where teleconferencing is perceived to drive substantial change is in healthcare, specifically for remote areas. In Australia, there is a lack of specialist care in many of Australia's rural areas. Recruitment of rural practitioners is difficult due to patient numbers and a lack of general resources. Rural patients therefore may require long trips for specialist diagnosis. There are considerable travel costs and therefore carbon emissions created by patients and family for treatment and aftercare support. Some hospitals and health agencies that offer home visits also suffer similar problems. The geography and dispersion of patients across a wide area mean that nurses are driving 800km for a single patient visit. A 3 month trial of video conferencing in Victoria found the network could achieve savings of around 175,000kms per year equivalent to 45.5 tCO2e (Climate Risk 2008).

Starting point to other services

ICT companies increasingly realised that there may be substantial commercial opportunities within their sector in the low carbon space, and are actively seeking out these opportunities. Teleconferencing, as a service/technology, is relatively mature and seemingly "obvious", and frequently features as a starting point for communication companies when thinking strategically about climate change. BT, for example, was a strong sponsor among others for a high profile study by the Climate Group, the Smart 2020 project. This looked at the role of the ICT industry in the low carbon space. On the one hand, the project revealed the role of teleconferencing has a relatively small role to play in carbon reduction; but on the other, it demonstrated other areas where ICT could play a larger part, specifically around energy efficiency. This has helped galvanised interest in the sector to look at other areas where market opportunities built around carbon savings may exist.

Key Actions and strategies

Customer drivers and marketing

Carbon as only one of many benefits

Cisco, BT and other solutions providers tend to act as a full service provider to their clients, for example as teleconferencing advisors, consultants and contractors, and tend to involve looking at technologies to meet both short and long-term goals. Teleconferencing also tends to be one of many other types of services provided.

Therefore, providers tend to present a number of benefits of teleconferencing to customers rather than any one element. For example, BT Cisco TelePresence marketing brochure offers:

> *"Increased agility, Reduced travel requirements, Improved business continuity, Faster decision making, Enhanced staff productivity and job satisfaction"*

Source: BT Cisco TelePresence, Business View

Environmental benefits and carbon savings are part of the offering but have rarely been marketed as the core driver. For example, "improving corporate social responsibility (CSR)

credentials through reduced environmental impact" is part of the follow-on benefits from reduced travel requirements. Costs of travel, in particular business travel, on the other hand, help drive the take-up of teleconferencing. Cisco's own commissioned research also confirmed that UK businesses are motivated by cost savings to reduce carbon emissions. However, virtualisation tools such as teleconferencing appear to suffer from a lack of general awareness (Cisco/Greenbang, 2010).

Providers are concerned about rebound effects, where conferencing could lead to, for example, increased virtual meetings even when all of the participants are in the same office. Another rebound effect relates to additional activities undertaken as a result of saved travel time. A survey of BT employees showed that respondents felt that the effects of increased use of conferencing and therefore greater connectivity has sometimes led to additional face-to-face meetings and associated travel.

Creating awareness and marketing around carbon

Targeted marketing implies that the green credentials and carbon impacts are highlighted only when it corresponds to customer's needs. The carbon angle is raised in more generic advertising and marketing for Cisco. For example, Cisco launched a Global Climate Change Meeting Platform (GCCMP) to link the United Nation Framework of Climate Change Conference (UNFCCC) in Copenhagen to more than 70 locations around the world. The COP15 main conference facility, the Bella Centre in Copenhagen, Denmark, featured four Cisco TelePresence™ rooms, connected to worldwide locations. Cisco also frequently supports organisations such as the Climate Group in facilitating high profile meetings.

Self experimentation and impact measurement

As a large business, Cisco has been able to experiment with and demonstrate new technologies internally. For example, by identifying city-pairs where communication traffic has been highest, Cisco installed Telepresence in those offices. The company measured a reduction in air travel by half (from around $720m to $350m) since the installation. Group-wide meetings are increasingly held via Telepresence, even at the executive level. The move has enabled Cisco to test its technology, but more importantly they are able to demonstrate to its customers potential savings and to appear to be "walking the talk".

BT's experience is similar. The development of technology, infrastructure and awareness around these measures was important both for internal use and as product offerings to customers. BT Conferencing also launched Engage Tracker, a travel and carbon savings tool that helps companies document monetary savings resulting from the use of video conferencing from avoided travel costs and carbon emission reductions.

Cisco's own experience also revealed further benefits of teleconferencing, specifically the ability to gather experts on specific issues. By enabling easier multi-way communication, Cisco has "discovered" experts from other parts of its geographical operations that they did not know existed.

Part of the attraction of audio, video and web-conferencing to customers is that it is relatively straightforward to link the resulting reduction in air or car miles to teleconferencing[3]. In terms of an internal environmental audit, this makes conferencing an attractive technology compared to other initiatives which may not deliver such direct benefits.

Realistic expectations

Companies that have used videoconferencing to help reduce travel are also realistic about the achievements, and the types of travel that can be displaced. For example, Vodafone, with 200 globally connected video-conferencing units, found that multi-point facilities (suites where more than two units could participate simultaneously) are essential, and gained a better understanding of when video-conferencing is an appropriate substitute for travel. Also,

[3] There are, however, methodological challenges to measuring the impact.

despite a general enthusiasm in companies for conferencing technologies, companies are reluctant to make their use mandatory. A survey revealed that less than 10% of respondents thought a prescriptive approach the best one for meetings with customers and partners, although the proportion rose to nearly one in four (22%) when the choice was for virtual meetings with colleagues internally (EIU, 2008).

In particular, some regions may not have the right technological infrastructure to support sophisticated systems. For example, the UK Department for International Development (DFID) has the majority of offices situated in developing countries with a lack of reliable telecoms infrastructure. Installing video conferencing in some of the overseas sites is therefore challenging. The rollout of solutions was therefore a very mixed range of connection facilities including ISDN, leased line and satellite.

Impact on supply chain

BT sources its teleconferencing service from a US based company which installs and maintains all of its teleconferencing offerings. The company provides equipment, software and expertise, and trains BT employees for the operations. The main criteria for the selection of this company from a highly competitive market are said to be the stability, and durability of the products. In addition, it is one of the few companies that manufactures a majority of its components and has high visibility and quality control over its supply chain. The sustainability-related characteristics have not been explicitly looked at during BT's purchase decision making process.

Barriers/Market failure

Importance of personal touch in business communication

The key barrier to wider take-up of teleconferencing is the perception that the impact that a physical meeting can make. Business executives are reluctant to substitute key meetings with teleconferencing, particularly if they are part of a process of securing sales or business. High-end teleconferencing technology has helped change this perception, but teleconferencing is likely to complement rather than fully substitute core meetings.

Technological requirements for high end solutions

High end teleconferencing solutions, such as telepresence are conditional on some technology requirements. Many, especially smaller, organisations will not have the infrastructure required for a telepresence suite – indeed some may have barely enough bandwidth for good quality videoconferencing.

Behavioural change and rebound effect

Increasing the use of teleconferencing will also require behavioural change. Specifically, where carbon reduction objectives are linked with business objectives on productivity and cost savings, teleconferencing has been a relative success. However, without specific objectives on travel or reduction in greenhouse gas emissions, staff may be less aware of the linkages between use of teleconferencing and reducing carbon emissions. Furthermore, staff that frequently travel longer distances, particularly abroad, tend to view travel as a 'perk' to the job and may be reluctant to change behaviour.

Another rebound effect may be caused by increased travelling for due to the time saved via teleconferencing and the expansion of networks.

Integrated thinking within business

The benefits of teleconferencing tend to be cross-functional – where investment from a company's ICT department translates to savings in its travel costs, and in some cases, carbon costs. Thus, larger companies with decentralised budget would require greater buy-in than just one department, particularly for higher end teleconferencing solutions. Thus IT departments tend not be able to commit to these products and services without approval from the board. While this has not been a barrier to providers of teleconferencing, it highlights the importance of an integrated approach to procurement of low carbon solutions – where investments in one department could deliver carbon savings for the wider business.

Appendix B: Case Studies:

4. Solar PV

Key findings

Company and product	Solar PV electricity
	Solarcentury, Navitron (SME), Renewable Energy Association, Energy Saving Trust, Southern Solar (SME), EvoEnergy (SME installer) Other: industry commentators and speakers from EcoBuild event Based on 6+interviews and literature review
Competitive landscape	The market leader for solar PVs is Solarcentury but small providers and installers of solar PVs are increasing.
Product differentiation	▪ On-site Microgreneration at the point of need ▪ Renewable power supply and income stream
Key strategy / actions	▪ Technology development, choice influencing through education and awareness, cost reduction and income stream messages
Impacts on carbon reduction	▪ Each kilowatt-hour (kWh) of electricity produced can save approximately 0.568 kilograms of carbon dioxide emissions compared with electricity generated from fossil fuels. ▪ For a range of typical sizes of domestic PV system, the savings range from around 680kg to 1,020kg of CO2.
Enabler	▪ Feed-in tariffs and other grants and incentives from Government are major enablers ▪ Pay As You Save schemes and low interest loans to overcome the barrier of high upfront costs
Consumer key drivers	▪ Energy savings ▪ Environmental concerns ▪ Security of energy supply and costs ▪ Long term warranty ▪ Financial benefits (feed-in tariffs)
Consumer key barriers	▪ Up front cost ▪ Payback period ▪ Lack of information and awareness ▪ Trust and performance issues
Supply chain impacts	Key issues required in the supply chain include: ▪ Accreditation and standards ▪ Shortage of silicon ▪ Manufacturing at scale ▪ R&D: thinner crystalline silicon wafers; efficiency of thin film polycrystalline materials
Impact of uptake on market	▪ Impact limited until government introduce measures and incentives ▪ The Feed-in Tariffs and technological development have changed the nature of competition in the market ▪ Creation of a need for MCS/skilled installers, leading to market for capacity building as well as job creation
Role of government in encouraging success	The government plays a crucial role in reducing the upfront cost and payback period of solar PVs.

Links in supply chain	▪ Key issues required in the supply chain include: ▪ Accreditation and standards ▪ Shortage of silicon ▪ Manufacturing at scale ▪ R&D: thinner crystalline silicon wafers; efficiency of thin film polycrystalline materials

Introduction

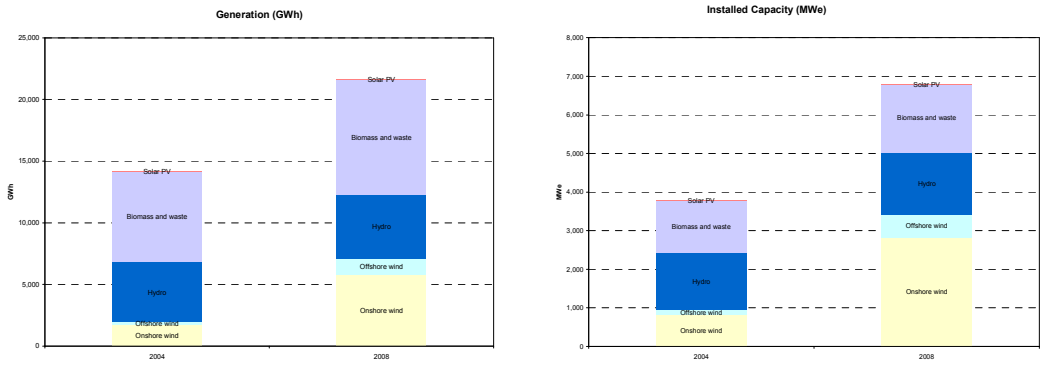
Low Carbon Transition Plan and microgeneration

The Low Carbon Transition Plan, along with wider policies, aims to cut carbon emissions from homes by 29%, on 2008 levels, by 2020. Specifically, the domestic sector has an important role in improving energy efficiency in the UK and in contributing to targets on renewable energy use and generation. Microgeneration, or low carbon and renewable onsite energy technologies, is a core part of this strategy.

Solar photovoltaic (PV) technology works by using solar cells or photovoltaic arrays to convert sunlight into electricity. Due to the growing demand for renewable energy sources, the manufacture of solar cells and photovoltaic arrays has advanced significantly in recent years. Each kilowatt-hour (kWh) of electricity produced can save approximately 0.568 kilograms of carbon dioxide emissions compared with electricity generated from fossil fuels.

The key benefit of PV technology is that it delivers electricity at the point of use, for example panels can be integrated into buildings to supply the buildings themselves. However, as a share of total renewables, the take-up of solar PV remains relatively low both in terms of generation and installed capacity (see Figure 16).

Figure 16: Generation and installed capacity of renewables in the UK



Source: Digest of UK energy statistics (DUKES), July 2009, DECC.

Market context

Several established producers, installers and integrators of PV products operate in the UK, for example Sharp, Romag, Crystalox and Solarcentury. A large and growing base of smaller firms, in particular installers, also form a critical part of the industry.

In terms of installed capacity, the UK PV market has tripled from 2004 to 2008, with solar energy related patents filed under the patent cooperation treaty rising from 460 to 1,411 (WIPO, 2009). A main focus for the UK PV market is developing grid-connected solar PV systems on commercial and large scale buildings, but growth in small-scale solar PV systems in new and existing domestic buildings, which is the focus of this case study, is an integral part of decarbonisation of the domestic sector.

This case study also focuses on consumer incentives and behavioural barriers, in particular how manufacturers and installation companies help influence consumer behaviour. It also considers the impact of regulation, specifically the recently announced Clean Energy Cashback scheme (more commonly known as Feed-in tariffs) that has been driving substantial growth in the interest on the technology.

Drivers for business

Solar PV market in the UK is mostly driven by regulation such as the Low Carbon Building Programme grant and the Feed-in tariff.

Key domestic users include developers for new builds, and individual consumers on the retrofit of existing homes. Prior to 2010, the key driver for individual consumer take-up on solar PV was environmental consciousness, with mainly the 'positive greens' (following Defra's consumer segmentation) as key customers. Developers for new builds, on the other hand, tend to adopt solar PV as a result of complying with regulation, for example, the Code for Sustainable Homes and formerly the Merton Rule[4].

Key actions and strategy

Individual retrofit consumers

The upfront cost of solar PV is relatively high compared to other measures to reduce carbon in a home, suggesting that the reason for take-up on the technology is largely non-cost related, or only for consumers who have benefited from the quick wins of low cost carbon reduction measures. In particular, domestic consumers may be able to benefit from a series of energy efficiency measures (for example insulation), before embarking on more expensive technologies. For example, the Royal Institution of Chartered Surveyors in 2008 (RICS, 2008) controversially claimed that solar panels are uneconomic and that consumers should instead focus on "insulating lofts and cavity walls, installing efficient light bulbs and sealing windows." However, once the consumers have exhausted the quick wins on energy efficiency, and are prepared to invest in further energy (or carbon) savings, they tend to look at renewable technologies. Solar PV, despite its high upfront costs, offers a number of benefits which makes it attractive:

- solar PV systems tend to have long guarantees on performance, e.g. 20-25 years at 80% efficiency, and an even longer lifespan;
- the systems are relatively low maintenance;
- they can be integrated into roofs, and don't occupy living spaces;
- planning permission is not required in most instances.

However, the key issue is that the economics of the product remain weak. More precisely, high capital cost and low fuel costs means that consumers are unlikely to achieve payback on their initial investment. This is reflected to some extent on how solar PV companies tend to market their products: the key selling point for solar PV, prior to 2010, has been on the environmental benefits, carbon savings, energy self-sufficiency and security from increases and fluctuations in energy costs, and for some companies, an increase in the value of the house. Companies market PV as:

> *"a very stylish way of generating some, if not all, of a building's electricity requirements with no running costs and no pollution"*

[4] The Merton rule, established in 2003, requires any new residential development of more than 10 units or any commercial building over 1,000 sq m to reduce its carbon emissions by a certain percentage through the use of on-site renewables. Around half of UK's local authorities introduced the Merton rule, applied to different degrees.

enabling "a typical household … to be self-sufficient over a year with a 3kWp system and save nearly 1.4 tonnes of C02"

"can increase the value of your property by up to 10%".

Source: websites of solar PV providers / installers

A small number of solar PV providers have suggested that further behavioural change has been observed in domestic customers, especially when equipped with appropriate metering to measure the amount of electricity generated. The metering helps provide customers a means to measure and manage electricity consumption, especially when there is an added financial incentive when unused electricity are sold back to the grid. It has also been suggested that households that have installed the panels tend to act as stewards on the technology, and helps raise awareness and share experiences with neighbours.

The industry, however, does not depend on orders by individual consumers for mass deployment. Retrofitting to an existing building would need to take into consideration a number of issues such as orientation and pitch of the roof (with the ideal site being a south facing roof with a slope of 30-40^{o}). The size (and therefore capacity) of the systems is also restricted by the existing roof design and space. The benefit of solar PV, however, compared to other technologies, is that PV systems are modular, which means that there is some degree of flexibility in design.

New build developers

Developers for new builds are able to place larger orders, with the opportunity to influence and incorporate the design at an early stage. However, as developers tend to be profit motivated, solar PV systems are not perceived to be attractive given the costs. Thus, the primary reason for uptake in new build tends to originate from compliance with regulations and building codes. Solar PV might, however, be perceived as part of a suite of technologies that developers could use to differentiate themselves, and to be recognised as leading the UK's aim of zero carbon new homes by 2016. For example, Barratt, a leading UK house builder, has built a "Green House" and an eco-village utilising some of the technologies to demonstrate zero carbon housing. Solar PV is part of a suite of other microgeneration technologies used including ground source heat pumps and micro combined heat and power units. Similarly, uptake of large scale solar PV can be motivated by environment assessment benchmarks such as BRE's Environment Assessment Methods (BREEAM) ranking.

Barriers/market failure

Perception

Companies interviewed commented that the take-up of solar PV is still restricted by a general lack of awareness of the benefits of solar panels, as well as lack of confidence in their cost-effectiveness, for example thinking that "there is not enough sun in the UK". Government schemes such as the Feed-in-Tariffs (FIT) and efforts from organisations such as the Energy Saving Trust have contributed in educating the consumers in this area and helped increased consumer confidence.

Cost effectiveness

In 2010, the solar PV market received a substantial boost from the government scheme – known as Clean Energy Cashback or Feed-in tariffs. Households and communities who install micro-generation technologies such as solar panels will from April 2010 be entitled to claim payments for the low carbon electricity they produce (known as feed-in tariff). The scheme is aimed at driving small scale renewable installations to meet 2% of electricity demand by 2020.

From 1 April 2010 householders and communities who install solar PV panels will be paid for the electricity they generate, even if they use it themselves. They will get a further payment for any electricity they feed into the grid. These payments will be in addition to benefiting from reduced bills as they reduce the need to buy electricity. The scheme will also apply to

installations commissioned since July 2009 when the policy was announced. Thus, a typical 2.5kW solar PV installation could offer a homeowner a reward of up to £900 and save them £140 a year on their electricity bill, which offers a return on investment of up to 8-9% at a cost of around £12,000 for a solar PV of that size (DECC, 2010; marketing brochures of solar PV installers, 2010). The 25-year FIT also coincides well with the typical 20-25 year warranty provided by most solar PV suppliers.

The introduction of the scheme has effectively changed the sales proposition of solar PV, and is expected to drive mass market take-up of solar PV and other microgeneration technologies. Companies interviewed for this case study reported up to four to six-fold increase in the level of interest by customers, albeit from a small base for some companies. Future growth is expected to be even greater. The industry is reporting a significant jump in the take-up with the introduction of FIT, even though the scheme has yet to commence (at the time of writing). Solar PV is now branded as:

> *"the most cost effective and straightforward low carbon energy solution"*
>
> *"a solar PV system now provides a typical annual rate of return of around 8% on the initial investment"*

Source: solar PV providers / installers

The industry's outlook is generally strong. The FIT is expected to give a strong boost to take-up, mirroring the experience in other countries.

Rebound effect

It has been argued by some interviewees that there could be a tendency for some households that have installed Solar PV to increase energy consumption in the knowledge that it is green. Similarly, some consumers may capitulate on the 'feel good' factor and increase other energy intensive activities such as long haul flights.

Payback period

Even with the improved financial incentives, however, payback period remains relatively long compared to other investments for domestic customers. The average payback period is around 8-12 years, with upfront costs for average system of between £8,000 and £14,000, depending on its size and type (EST website, 2010).

The long payback period is a key issue, with the average UK household living in the same home for five to ten years before moving. FIT alone may not be a sufficient incentive – as experience in Germany has shown that while take-up has been largely driven by large scale PV systems, rather than small scale domestic systems. Therefore, for the average household, there is a financial barrier, unless house owners could recoup the investment of the solar PV system when moving home. Anecdotal estimates by solar PV providers place the increased value of a home from a solar PV system by up to 10%, which could justify the investment. The FIT could improve this further, as future house owners also benefit from the income stream of the scheme. The long lifespan of the system (typically 25 years or more) also helps protect the value of the investment. In practice, however, there is a lack of independent information and evidence on the increased value of a solar PV system to a home – thus scepticism remains for financially conscious consumers.

In early March 2010, a further announcement of other schemes to boost greener homes might further support the industry, specifically a Pay As You Save (PAYS) scheme. Instead of paying for an investment to decarbonise a home upfront, householders will be able to 'pay as they save', by covering the cost of the installation out of bill savings, and usually with a further monthly surplus as well. Details of the scheme are still unclear, in particular its linkages with FIT, but the concept would help address the key concern for solar PV customers, the upfront cost and long payback periods.

Social housing landlords and councils are also helping to drive down capital costs to end consumers. Some of the first projects to take advantage of the FIT are social housing schemes which capitalises on partnerships between local authorities and suppliers. Partnerships with local authorities, in particular, can improve the deployment of retrofitting solar PV systems to existing homes. For example, some providers are helping local authorities and councils to install solar PV for whole streets of housing. Others are offering to pay for and own the systems, especially for e.g. council tenants. Tenants reap the benefits of lower electricity bills, but the investor or councils will profit from the FIT.

For private households, the likely buyers of solar PV systems have traditionally been those who are relatively cash-rich, and plan to live in their homes for a long period of time. Those lacking the required capital tend to find it difficult to obtain low cost loans. Commentators of the industry have observed that, in the near future, alongside Pay As You Save schemes by the government, the large energy suppliers may also step in to reduce the barrier of upfront capital costs. In particular, energy suppliers are able to offer mass scale installations which could help lower costs, and offer loans to finance the solar PV systems. Many of the largest energy suppliers have seen a shift in strategy to providing energy "services", which includes offering the implementation of energy efficiency measures. Financing renewable technology could be an extension of these services. These companies may also benefit from greater consumer loyalty. However, there is a perception by observers that there is a 'late mover' advantage for energy suppliers, where those who are first to launch new schemes see their offer bettered by subsequent schemes.

Another emerging trend for the sector, specifically commercial installations, is the role of investors with long time horizons such as pension fund investors. These investors tend to be more accepting of the long payback period and could prove to help mitigate the issue of high upfront costs. However, domestic customers are unlikely to be able to benefit from such scale in the near term.

Confusion over planning permission

In England and Scotland, a home owner does not require planning permission for most home solar PV systems up to a certain size of system. However, regulations vary for listed buildings, conservation areas and World Heritage Sites. In Wales and Northern Ireland, current legislation requires house owners to obtain planning permissions for solar PV systems. Leaseholders and renters also may require the approvals of the owners before installation.

Therefore, although the process for most installations should be relatively straightforward, the complexity of planning permission means that some local councils and planners are not up to speed on the eligibility. For example, interviewees reported that there have been instances where local planners have mistakenly asked for a planning application. Also, as the technology of solar PV systems have improved, solar PV systems can be installed as integrated solar roof tiles, averting concerns in conservation areas that the systems may not be "in keeping with the appearance". Planners, however, may not be aware of such technologies.

A similar concern would be the lack of trust in the continuity of policies with changes in government. Some companies or individuals would be discourage to make such long term investment due to the fear that policies such as the FIT would not be carried on over the payback period of the their Solar PV.

Impacts on supply chain

Global industry

The solar PV supply chain is still a relatively young industry, but the supply chain is maturing with new firms entering and established players integrating vertically. Solar PV has a particularly global supply chain; installation, production and sourcing of raw materials occur across Europe, Asia and US and most stages of the value chain are characterised by a small

group of often multinational manufacturers. This case study is focused on the relationship and role of solar system suppliers in influencing end consumer demand; however the impact on upstream suppliers clearly depends on the market demand for solar PV.

Globally there are only a handful of silicon suppliers that supply the total growing PV market, but the industry still faces shortages of silicon. Significant silicon production capacity increases have been planned by current suppliers, and new parties are planning to enter the market.

Worldwide, some 50 companies supply wafers suitable for solar cell manufacturing. Solar cell production, a technologically advanced step in the production chain, is still a relatively fragmented market with an estimated 40 or more active suppliers.

A larger base of market players operates in assembling the solar modules and solar system production and installation. Competition at the installations phase, in particular, tends to be local. Solar system suppliers and installers also tend to be more closely linked with end consumers, and are therefore closest to be able to drive consumer demand.

Some of the key evolutions identified in the solar industry include: vertical integration and the forging and strengthening of relationships through joint ventures and long-term supply contracts, cost reduction through increased technology driven efficiency and less waste in silicon wafers, and access to high-quality raw materials.

Because of the global nature of upstream suppliers, local demand or smaller markets, such as the UK at this stage, tend to have little impact on the (global) supply chain. Collectively, the UK solar PV sector accounts for around 10% of the total number of employees in the entire UK renewable energy industry, and is the biggest employer in terms of renewable electricity micro-generation. Thus, current trends in the upstream market tend to be driven by the growth in installations in markets such as Germany, Japan and Italy. More recently, the Chinese “Golden Sun” program and a positive push from the United States on larger PV power plant projects are also driving demand in wafer and silicon.

Several key manufacturers are based or have operations in the UK, for example Sharp (crystalline silicon), G24i (dye sensitised) and Solarcentury. With the feed-in tariffs, potential growth of the UK market could make the UK both a larger influencer along the supply chain as well as growing the industry within the UK. In particular, as feed-in tariffs in other European countries such as Germany are scaled down, the UK could be the next growth market for manufacturers, specifically lower down the value chain where local assembly could help reduce transport costs.

Emerging new technology to improve efficiency

Over 90% of current PV production is based on crystalline silicon. A recent development in the solar technology is “thin-film”, which may improve efficiency of performance as well as resource efficiency, in particular the materials required for each cell. Thin films could help reduce the cost of PV systems as they are also cheaper to manufacture, but it is still in its development stages. Some demonstration of the technology at St Asaph, Wales has been the largest of its kind outside the US, and generated in its first year a total of 65,000 kWh of electricity, saving 28 tonnes of carbon emissions (Irvine, 2008).

The technology sector has also been active in developing software interfaces to help integrate solar technologies with other energy solutions. IBM, for example, has developed a semiconductor wafer reclamation process, to re-use 3 million semiconductor wafers annually. It employs a specific technique to repurpose scrap semiconductor wafers into a form that can be used to manufacture silicon-based solar panels. This helps manage the silicon shortage that is affecting the solar industry (Intellect, 2008).

Accreditation and administration

At the installation level, the solar PV industry is also concerned about accreditation, certification and reputation. The growth in demand generated by the FIT could encourage the emergence of “cowboy” installers, prompting a greater need for accreditation and certification. However, this needs to be complemented by improved consumer knowledge of different standards and accreditation.

An interviewee shared the experience during the set-up of the Microgeneration Certification Scheme (MCS), an independent scheme that certifies microgeneration products and installers in accordance with consistent standards. Many installers applied at a late stage, creating a surge in application leading to substantial backlog, and therefore creating a negative impression of the process. A number of administrative issues for the FIT, for example the ease and speed of the application process, the consistency of tariff payment and ability to respond to requests or complaints are perceived to be important in building trust of consumers on the technology, and need to be resolved in the early months of the FIT coming into place.

Appendix B: Case Studies:

5. Energy efficiency improvement in televisions

Key findings

Case study **Interviewee (s)**	Television energy efficiency Intellect and leading manufacturers Based on 4 interviews and literature review
Competitive landscape	Manufacturers compete on price, technological innovation, audio-visual performance, design and brand attributes
Product differentiation	▪ Focused on design, size and price. Energy efficiency is not yet core competitive battleground ▪ Further differentiation will be achieved with the introduction of energy efficiency labelling
Carbon impact	Different features and innovation lead to different levels of carbon reduction: e.g. LED 40%, brightness control 20%
Enabler	▪ Energy efficiency index (both enabler and barrier) ▪ Competition on building brand and corporate identity ▪ Synergies with other technologies
Key strategy / actions	▪ Energy is potentially a future differentiator for corporate identity and brand ▪ Incremental improvements – technologically driven ▪ Eco-branded marketing as part of wider promotion
Consumer key drivers and barriers	▪ Consumer decision making process is not focused on energy efficiency ▪ Key focus is price and product quality (picture, sound) ▪ Main barrier is the lack of awareness: TV viewing not associated with energy usage
Supply chain impacts	▪ Leading manufacturers help shape product improvement through specification of products ▪ Design phase is likely to be the key driver of change
Impact of uptake on market	To date, energy efficiency concerns have not impacted the TV market the same was as the domestic appliances market. The introduction of energy efficiency labelling for televisions could impact competition, innovation and increase consumer awareness and expectation.
Success factors	Positioning the product as having 'state-of-the art' technology with lean design and energy efficiency as a differentiator
Role of government in encouraging success	Energy efficiency labelling will stimulate improvement in energy efficiency and competition.

Introduction

According to DECC's energy statistics, televisions account for nearly 10% of domestic electricity consumption in 2008. Almost all households (98%) in the UK own at least one television, and the number of televisions in households is expected to rise from 59.5 million to 72.2 million (by 21%) between 2009 and 2020. Furthermore, there is an increasing demand for larger screens, and more sophisticated televisions, for example LCD or plasma screens and high definition TVs, which are more energy intensive than the traditional cathode-ray televisions (CRTs). Sales of CRTs accounted for about 50% of total television sales in 2007 – down from more than 90% in 2000 in the UK. Over the same period and EU-wide, sales of TV with screens larger than 40" rose from less than 1% of total TV sales in 2000 to nearly 20% in 2007.

With the improved picture quality, enhanced viewing experience and wider content availability, consumers are spending more time watching the television. Average on-time for the main television in the home is also expected to increase from 4.9 hr/day to 5.1 hr/day by 2020. The ability to combine peripheral products – for example set-top box, DVD players, game consoles and computer applications – are also contributing to increased on-time. These collectively contribute to a forecast of energy consumption increase of 17% by TVs by 2020.

In the UK, the digital switchover process between 2008 and 2012 is expected to lead to a substantial replacement of analogue TVs during this period as consumers use the opportunity to upgrade (in some instances ahead of life expectancy). An early study estimated that 200,000 TVs could be disposed (and replaced) over the switchover period (or a 3.5% increase from a business-as-usual scenario). Anecdotal evidence suggested the actual replacement rate could be higher, with regions such as Cumbria county council reporting that the number of TVs dumped at waste and recycling sites has risen by 70% in 2009[5]. As the life expectancy of TVs ranges from 7 years and up to 15 years, the substantial rise in TV purchase and the technologies available today and in the next few years could lock in the rate of energy consumption to 2020 from televisions bought during the digital switch.

Drivers to business

Improvement of energy efficiency

Business as usual technological improvements

As the TV manufacturing industry benefits from the increased value-added from the improved products, it is also working to improve energy efficiency. The increased energy efficiency for TVs is result of technological evolution designed to increased performance and the desire for cost reduction. Innovation to reduce operating temperatures, improve reliability, to produce slimmer and lighter TVs all also reduce carbon emissions, either in the production or use phases. Energy usage and raw material or resource efficiency is therefore aligned with these objectives – e.g. lower heat would tend to mean a design with lower energy consumption; improved reliability would imply less components and therefore greater raw material efficiency; slimmer and lighter TVs would reduce packaging and waste (as well as shipping and transport costs).

Energy efficiency varies across different models. A common perception is that plasma TVs are less efficient than LCD. However, it has been argued by TV experts that because of the difference in technologies used, energy efficiency varies when the image is dark or bright. Consequently, it is difficult to compare two different models in terms of energy efficiency unless it is compared with two exactly similar images.

Interviewees mentioned that many customers tend to keep the TV on the default setting after the purchase. The default setting could also to some extend impact the overall energy consumption of a TV. For example a SONY KDL (LCD 46 inch) has a default setting 125.31 watts, while a Panasonic TH-46PZ85U (PLASMA 46 inch) has default setting of 454.51. and a Samsung HL61A750 (RPTV 61 inch) has a default watt setting of 171.24 (review-net, 2010).

Many of the incremental changes in the features of a television are aligned with energy efficiency improvements. More substantial technological improvements include new backlighting technologies and variable brightness control, expected to improve the efficiency of liquid crystal display (LCD) televisions substantially. Plasma screens, the most energy intensive technology of modern TVs, also expect major re-engineering to lead to a doubling of plasma efficiency.

[5] In theory, analogue TVs do not need to be replaced with TV digital switchover, as an additional set-top box or digital receiver can be purchased as an alternative. In Cumbria, 60% of the disposed TVs could have been switched over with a set-top box.

Another evolution of TV manufacturing has been the use of standby functions, driven by consumer demand for the ease of switching TVs on and off from with the remote control. Most interviewees expressed that a disproportionate amount of focus has been on the energy consumption of the standby modes, even though in practice the energy consumption level of the standby mode is a very small fraction of on time. However, partly as a response to the public perception, modern TVs have considerably reduced energy consumption in standby modes.

Driven outside of the UK and bounded by technology

Many of the largest TV manufacturers are multinational corporations based outside the UK, and tend to produce other consumer electronics and electrical goods. Therefore, a substantial amount of decisions are made outside the UK, although the local offices would also take into account domestic regulatory and market context.

The design of the product, which is the main source of innovation, is also frequently bounded by technological constraints. Manufacturers are, however, constantly seeking to innovate and improve on their product features and design. In particular, larger brand owners also producing other consumer electronics and are looking at cross-product synergies.

Regulatory standards and labelling

TV makers may also be working to pre-empt new energy regulations. In the US, the voluntary national Energy Star standard is complemented by the mandatory energy standards from the California Energy Commission on TVs from 2011. Given the global market for many of these manufacturers, standards are driven by the strictest regime, which in the case of television is currently the EU.

In the UK, Defra and the Market Transformation Programme (MTP) have also been developing an energy efficiency index (EEI) for televisions, similar to the A to G energy ratings for white goods. An interviewee commented that the latest proposed standards for the different grades will mean that many existing models of televisions on the market will be graded B and below. This could drive investments in leading manufacturers to ensure they are supplying grade A televisions as part of their offering – in line with their brand position as leaders. Over the short term, therefore, the energy labelling system could drive further improvements in energy efficiency. Projections by the MTP have suggested that CO2 emissions savings could be around 700 ktCO2 in 2020. The projections also suggested that by 2020, all TVs could have the better or the same efficiency as the most efficient models today[6] (MTP, 2010).

However, there are several caveats. Firstly, manufacturers may only invest in improvement if it will lead to a "boundary change", i.e. an improvement to a higher grade. For example, models that are on the low end of a B grade may find it too costly to invest in marginal improvement as it will not move them onto an A grade. Thus, those that invest may already be 'high' B grades.

Secondly, leading manufacturers are also concerned about the margin of error around labelling. There is typically some deviation in the performance of TV sets, so the energy efficiency measure may vary to some extent during tests. For TV sets that are on the lower end of e.g. an A grade, manufacturers tend to be cautious in marketing the product as an A grade to avoid potential negative publicity if being tested otherwise.

Finally and more importantly, over the longer term, manufacturers may lack the incentives to drive energy efficiency improvements if the labelling no longer serves as a differentiator when, for example, all mainstream brands have reached the highest standards achievable. A

[6] Figures on the distribution of sales across the different scale of the EEI suggest that TVs today have an EEI of 0.4 or greater. Projection under the policy scenario forecast that 99% of TVs could have an EEI below 0.4.

periodic adjustment of the grading to reflect the general industry trend is therefore important to drive innovation continually and to provide the industry a clear metric to differentiate energy efficiency.

This trend contrasts with white goods, which are also subject to energy efficiency labelling requirements. Defra data show that labelling has significantly promoted energy efficiency improvement and it is expected that overall energy consumption from domestic appliances will reduce by 8.7% between now and 2020 with further policy intervention.

Building corporate identity and market leadership

Although historically driven by other aspects of product innovation (e.g. weight, size and reliability), the leaders in the industry are beginning to target energy efficiency. The main motivation of the increased focus is to help create flagship products to enhance corporate identity – which would feed through to other products if successful.

Key actions and strategies

Active measures are incremental but deliver carbon impacts

Thus far, the efforts leading to substantial reduction in energy consumption of TVs have been largely incremental in terms of investment required by manufacturers. For example, improving energy consumption in standby modes and changing default settings have delivered significant reductions in energy consumption (see example on Sony). The standby mode efficiency improvement is largely driven by legislation, as a 2006 law banned all TVs and videogames with a standby mode exceeding a power consumption standard of 1 watt. In general, improvements have been driven by current, larger investments. For example in LED technology, are aimed at securing competitive advantage more widely in terms of picture quality and size (thickness) of TVs, but could also help deliver energy savings.

Sony: Reduction in standby energy demand of 93% since 1996 and reduction of 20% in operation mode simply by changing default settings

Standby mode

As of February 2007, all Sony BRAVIA LCD televisions sold in Europe achieved a standby power consumption below 1 watt, while many models are below 0.3 watts – substantially below the industry average. This has led to a reduction in TV standby power consumption by over 90% over the last ten years.

Operating Mode

Sony has also drastically reduced the power consumed in operating mode. TV producers historically ship their products in a bright picture mode suitable for display in brightly-lit shops, which leads to higher power consumption. The brightness setting helps differentiate models of TVs, but is not required when viewing at home where the ambient lighting is less bright.

As independent studies have shown that the majority of customers do not modify the picture settings from those in which they were originally shipped from the producer, Sony offers the user a choice of “home” or “shop” modes upon first switch-on. This results in a saving of more than 20% in power in operating mode and raises awareness among consumers about the fact that they can actively contribute to reducing power consumption of electronic products.

Many BRAVIA models also consume less in on mode when the power-saving ambient light sensor is activated.

Source: Intellect 2008

Samsung: LED TVs

First model marketed as energy efficient TV

LED TVs by Samsung, launched in 2009, have been marketed as "ultra-slim" and "combine breakthrough picture quality, eco-friendly design and advanced connectivity". This is the first active marketing of a model as an energy efficient TV, although the focus is on the package of new features rather than a focus on energy efficiency.

The Energy Star-Compliant LED TVs use 40% less power than similar size 2008 Samsung LCD TVs in standard mode. Samsung planned to increase the proportion of TVs it makes using LED technology.

Marketing

The marketing promotion for the LED TVs have included a £200 "eco cash back", which is effectively a discount for the sets, and designed to encourage uptake in the models. The cash back scheme has been rolled out to several retailers. The cash back helps promote the take-up of the models, which tend to be more expensive at the beginning of a launch of new models (see below).

Source: Samsung website

"Invisible" measures to consumers

Some improvements in energy efficiency are not actively marketed or visible to consumers. In the Sony example above, the light sensor technology automatically adjusts brightness level with the ambient light to enhance viewing experience. The feature leads to up to 20% difference in the energy consumption levels between the brightest and darkest settings, but consumers are not made aware of the feature.

A manufacturer also commented that the average consumer does not necessarily understand the different types of settings. Enabling an "eco" setting, for example, may affect the viewing experience and therefore brand perception unless the consumer is aware of how the ambient lighting could affect the perception of brightness. It is therefore more consumer friendly to install default measures that self-adjust to the ambient lighting, rather than rely on an optional setting.

Innovative measures in the pipeline

Market leaders are looking at ways to differentiate themselves on energy efficiency, and are looking at innovative technologies. For example, Sony is introducing "presence sensor", which turns off the picture when no one is present in the vicinity of the TV set (Sony website, 2010). This would reduce the power consumption of unattended TVs. Samsung are also focussing on innovating and marketing their LED TVs.

Influencing consumers

The price, picture size and quality are the most important decision factors

In general, the market is extremely price sensitive with manufacturers under pressure to offer products at the lowest possible initial cost. A research questionnaire posed to leading European manufacturers of TVs found that manufacturers believe price is the most important issue of concern for the consumer, once the recent market trends towards larger flat screen TVs are taken into account. Technical aspects such as display technology, picture quality (e.g. contrast, moving picture resolution, viewing angle, and colour reproduction), high definition ready and hard disk recording capability are also important factors influencing the consumer's buying decision in addition to the product price. An interviewee commented that consumers tend to have a budget range when considering TV purchase, and would look for their most preferred TV they could get within the budget.

Energy consumption is evaluated as important as functionality, but consumers are not actively evaluating environmental aspects when buying a new device. Research by Ofcom, the UK broadcasting regulator, also found that while a third of people are aware that their household devices consume more power now than they did two years ago, fewer than four in ten (39%) consider the impact on the environment when buying a communications device, far lower than in other sectors. For example, the environment was a factor for more than half of consumers purchasing white goods. Eco labels, and other environmental features such as use of materials, the recycling, or hazardous substances are also of little interest to consumers.

The role of energy efficiency labelling

The proposed energy efficiency labelling of TVs would help make energy consumption a more visible feature of TVs and product selection. In-store consumers, for example, tend to compare key product features that are clear and/or visible (picture, sound, price) – but currently are unlikely to be actively comparing power consumption levels, as compared to for example white goods where energy standards are clearly displayed.

A key challenge to the industry would be the pushback from retailers which are reluctant to stock TVs and other appliances below a certain energy efficiency grade. There is likely to be pressure on manufacturers to improve their energy efficiency.

Marketing strategies of leading TV manufacturers in other issues

As a highly competitive industry where product differentiation is key to sustained or increased profitability, the TV industry has been relatively successful in innovating and marketing new features of TVs to consumers. For example, manufacturers began selling and marketing high-definition TVs (HDTVs) before the majority of programmes and movies are shot and made in HD (a programme would only appear in high-definition if it is made in HD technology and watched on HD-enabled TVs). On the other hand, the mass availability of HDTVs has also helped driven the move by programme producers to use HD technology.

Barriers/Market failure

Comparability of features and energy efficiency

Even with labelling and standards, TV manufacturers face difficulties in differentiating themselves on energy efficiency. Different models and brands of TVs tend to have different bundles of features, making comparison difficult. For example, smaller TVs tend to have lower energy consumption, but a different brand larger TV may have greater energy efficiency in terms of e.g. Watt per square inch of screen. Consumers will be trading off absolute energy consumption against relative energy efficiency.

Profitability and incentives

As a highly competitive industry, falling prices and the emergence of low cost labels have led to several market players exiting the industry. The industry is therefore driven by profitability and long term viability of the business, making non-profitable initiatives and ventures unlikely to receive high priority. Thus, while energy efficiency is one of many differentiators for consumers, because it is unlikely to be the top differentiator, the sector is also unlikely to invest significantly above the business-as-usual technological improvements. In particular, one manufacturer commented that the features and investments which could improve energy efficiency are likely to be rolled out for the high end products which commands greater margin.

One manufacturer also shared their experience of an eco-model launched. The model has considerably higher costs than the equivalent standard model, and therefore has been priced at a premium. The take-up of the product has not been high, as consumers remain price sensitive. However, the exercise has enabled the manufacturer to trial different types of eco features and to identify those that would be built into their standard model. Despite the low take-up, the experience has been described as a useful exercise to pilot different features with the outcome of bringing "successful" features mainstream.

Impact on profitability and supply chain

As mentioned earlier, the key source of innovation is in the design phase, where innovations in new models focus on improvement in features such as weight, slimness, picture and sound. In several areas, these improvements also coincide with increased margin and costs reduction objectives – which are strong incentives to improve energy and resource efficiency. An example is the reliability and the use of components, such as precious metals, which incur high costs of recycling. By cutting down the number of components and the required interaction between components, reliability could be improved. This also helps to create lighter slimmer TVs and manage the costs of waste management.

One manufacturer remarked that televisions at the end of the range, particularly high selling models, would tend to be more efficient than those sold at the beginning of the range. At the beginning of new ranges, there is some tendency for "over-engineering" to reduce the risks of failure or malfunction. As the product is launched and tested, the supply chain (including component suppliers) benefits from feedback and greater specificity, which could mean efficiency not just in energy, but other resource concerns such as materials, packaging or waste.

Role of government

With the different paths and pace of development across countries and jurisdictions, larger manufacturers tend to be driven by developments in large markets. For example, in California, regulators adopted in November 2009 the first energy-efficiency standards for televisions in the US. While this represents a solitary move in a state, the size of the consumer market in California suggests that the new standards could bring positive spill-overs for the rest of the US. The Californian energy commission previously set aggressive energy-efficiency standards for refrigerators, washing machines and other household appliances, which paved the way for more efficient models sold nationwide.

The regulations require televisions up to 58" to be more efficient, phasing in from 2011. The standards in 2013 are currently met by only a quarter of all TVs on the market. Thus, under the rules, all new 42-inch TV sets must use less than 183 watts by 2011 and less than 116 watts by 2013. The commission estimated that each energy-efficient TV would save a household roughly $30 a year in electricity costs. But the ruling has also received some criticisms, specifically that it could cripple innovation, limit consumer choice and hurt California stores.

In the UK, the focus has been largely around better information provision and alignment with EU policies and standards. The Market Transformation Programme (MTP) has been developing an energy efficiency index for televisions, normalised by screen size. In 2006, the Government announced a voluntary initiative with major retailers and the Energy Saving Trust to encourage the purchase of more energy efficient consumer electronics, facilitated by a Red/Green Calculator Tool. The Red/Green Calculator enables retailers to test, easily, if individual products or a basket of goods would meet current or future Government efficiency targets. Users enter details of their product range (including the energy consumption of each product) and the tool translates the technical standards into a simple result: green for products, or a basket of goods, that exceed average performance levels for any given year and red when these standards are not met.

Appendix B: Case Studies:

6. Low temperature detergent – Ariel

Key findings

Company and product **Interviewee (s)**	Procter and Gamble's Ariel low temperature detergent Based on 1 interview the Sustainability Affairs Manager and literature review
Market and competitive landscape	P&G is a well established brand in a mature, highly competitive laundry product market. Competitors, including own-label brands, offer concentrated and low temperature products
Product differentiation	Energy and cost saving as well as less tangible environmental benefits.
Impacts on carbon reduction	Ariel Cool Clean = 41% reduction in energy consumption if the user washes at 30°C degrees instead of 40°C Ariel Excel Gel = 30-40% less energy used in manufacture, 20-50% less energy in consumer use, plus eco-efficiencies of 14-40% less packaging, 40-57% less road transport
Enabler	▪ Alignment with company values and commercial strategy: including strengths in innovation and consumer insights ▪ Life-cycle analysis insights ▪ Rising cost of energy ▪ Endorsement from independent parties and other trusted brands (e.g. retailers)
Customer drivers and barriers	▪ Contributing to environmental protection while saving costs. ▪ Distrust in 'green' products and in the efficacy of low temperature washing are the main barriers to uptake
Supply chain impacts	Interaction with laundry machine manufacturers to promote low temperature functionalities.
Impact of uptake on market	▪ Created/contributed to competitive rivalry in the sector ▪ Created consumer awareness and shaped expectations and behaviours
Success factor	▪ Existing brand and distribution power ▪ Targeted mainstream consumers demand for sustainable cleaning products without compromising performance or price. ▪ Induce incremental change (first 30 ºC then 15 ºC)
Role of government in encouraging success	▪ Limited

Introduction

P&G is the world's largest manufacturer and marketer of branded consumer goods, with annual net sales revenues of $79 billion (year ended June 2009), down 3% on the previous year. The Fabric and Homecare division accounts for the largest share of the net sales and net earnings, at 29% and 26% respectively.

The company is the textile washing (laundry) products market leader in the UK, with a share of 41% in 2008 (41.7% in 2007), considerably ahead of the second largest operator, Unilever which has a share of 28.4% (Datamonitor). The company's key laundry care brands in the UK are Ace, Ariel, Bold 2in1, Bounce, Daz, Dreft, Fairy, Lenor. The Ariel brand is well established in the UK.

Procter & Gamble's (P&G) Ariel Cool Clean detergent is a formulation that is designed to perform at lower wash temperatures (30 °C). The company claims lower temperature washing can achieve up to 41% reduction in energy use compared to the average 40°C wash, significantly reducing cost and greenhouse gas emissions associated with it.

Following the successful take-up of Ariel Cool Clean, P&G launched Ariel Excel Gel. This was an entirely new formulation, designed to clean at 15°C. Excel Gel also contains 20% fewer ingredients and uses less packaging materials per wash than conventional powders. There are improved distribution efficiencies by allowing more bottles per case, pallet, and truck. Thus, the business was able to achieve eco-efficiencies and carbon saving. P&G claim that in the UK, 23% of households now wash at 30°C, up from 2% pre-Ariel Cool Clean launch.

P&G invests in innovation through research and development, with:

- **annual R&D budget of about $2 billion which supports 8,000 engineers and scientists at 25 research centers in 12 countries;**
- **external innovation partners to boost its internal innovative capability, an approach called 'Connect and Develop.'**
- **engaging external opportunities: e.g. in the last year evaluating more than 5,000 innovation opportunities from small entrepreneurs, universities, research institutes, and large companies.**

(Datamonitor, Proctor & Gamble Company Profile, November 2009).

The business is also distinguished by its consumer insight and marketing activity as well as its international distribution capabilities; with "an impressive product development capabilities, marketing prowess, and a strong global distribution network" (Zachs Investment Research, February 2010).

The company's communicated corporate 'purpose' is to 'provide branded products and services of superior quality and value that improve the lives of the world's consumers, now and for generations to come.' In 2007, the company pledged to develop and market at least $50bn in cumulative sales of "sustainable innovation products" up to 2012. The products must have at least 10 % less impact on the environment than previous or alternative versions.

The Ariel 'Turn To 30' and subsequent Ariel Excel Gel launch are major developments from this strategy and meet the criteria on energy and, in the case of Excel Gel on packaging.

Market context

The laundry and textile cleaning market in the UK was worth £1.17 billion in 2008, according to Datamonitor. It is a highly competitive, mature market and does not offer high levels of sales growth:

"Laundry care markets in established consumer economies are mature and are unlikely to experience significant value gains in the next five years. This is not principally due to recession (although this will have some effect). but is more a result of effective saturation of the market and consumers having little need for more laundry care products."

(Datamonitor, 2010)

Successful product innovation/extension and consumer advertising are critical strategies for branded goods market leaders. These strategies are designed to maintain market share and brand values in the face of lower-cost, generic products, including supermarket own-label alternatives.

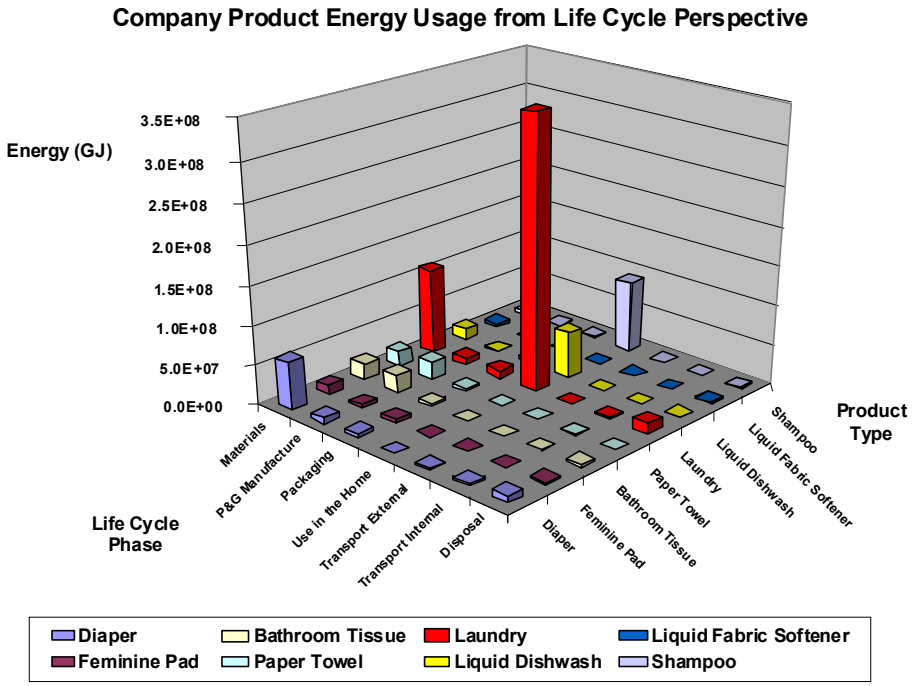
In addition, there are a number of brands in the laundry and household care aisles that are marketed on the basis of their ethical and environmental credentials. Among the leading players in this market in the UK are Ecover and Method.

Consumer behaviour when purchasing laundry care products presents a challenge. In our interview, P&G noted that consumers spend very little time, under 15 seconds, making the purchase decision. There is a 'lack of emotional involvement' (Datamonitor) in purchasing laundry care products, likely the result of washing clothes being seen as a chore.

Drivers for business

Research insight – technical and consumer

P&G considers innovation as a major commercial strength. The company takes a scientific approach and extensive lifecycle analysis across P&G's impact in terms of the material, energy and water requirements revealed that for granule detergent, up to 75% of the energy is consumed in the consumer use phase, through the heating of the water in the washing machine.



Source: P&G

P&G has thus positioned the Ariel brand as a low-temperature wash detergent across Europe since 2003, including Ariel 'Turn To 30' and the Ariel Excel Gel product in the UK.

These product innovations are a direct result of the attempt to influence mainstream consumer behavior and reduce the environmental impact of its product in the consumption phase – i.e. outside of the company's direct control.

The consumer insight gained from understanding the 'sustainable mainstream' needs, i.e.: environmental/low carbon attributes at no compromise on cost or performance, enabled the positioning of the marketing and communication materials. It also contributed to the development of the Excel Gel communications that also stress the value proposition – lower temperature washing saving the consumer money.

Corporate purpose and commercial strategy

The development of low temperature, concentrated washing solutions is aligned with P&G's wider corporate "purpose" and strategy. In addition, they have proven to be successful products commercially.

The Arial 'turn to 30' campaign and the development and launch of Excel Gel both represent major investments by the business. The development of Excel Gel was resource intensive: millions of formulations were tested and nine of the company's top people were diverted from other projects to develop the product. The dedication of the company to the project is also a reflection of the commercial success of Ariel CoolClean.

Competition

Unilever launched the 'small and mighty' high concentration laundry detergent. Partly as a response to competitor pressure, P&G not only launched Ariel Excel gel, but also announced in early 2009 it would narrow the many formats for its laundry detergents, eventually only selling them in concentrated and compact versions (GreenDesign, 2009).

Key actions and strategies

Drivers for consumers

Price appears to be the most important factor influencing the laundry purchasing decision, although product efficacy and ease of use is also seen as critical:

Overall importance of product attributes in deciding purchase intentions, across 15 countries, 2008

Attribute	Very low	Low	Medium	High	Very high	All 'high'
Price	3.4%	5.2%	25.4%	36.7%	29.4%	66.1%
Ease of use	3.6%	5.7%	29.0%	42.1%	19.6%	61.7%
Scent/fragrance	4.0%	9.0%	33.6%	36.5%	16.9%	53.4%
Habit/preferred brand	4.4%	9.6%	34.2%	35.0%	16.9%	51.9%
Time-saving convenience	4.9%	10.4%	34.1%	34.5%	16.1%	50.7%
Multi-function convenience	4.4%	9.2%	35.8%	34.8%	15.7%	50.5%
Promotional offers	6.1%	11.9%	33.5%	30.1%	18.4%	48.5%
Ease of storage	5.9%	12.3%	36.3%	31.2%	14.4%	45.6%
Product effectiveness	6.7%	14.4%	35.9%	28.5%	14.6%	43.0%
Free product samples	8.2%	15.8%	33.6%	25.1%	17.3%	42.4%
Natural ingredients	7.3%	15.9%	37.2%	26.0%	13.6%	39.6%
Peer recommendations	8.6%	16.0%	36.0%	27.5%	11.9%	39.4%
Household preferences	12.8%	18.0%	35.1%	23.3%	10.8%	34.1%
Ethics	9.1%	18.2%	39.1%	22.4%	11.2%	33.6%
Brand image	12.3%	21.9%	35.6%	20.5%	9.6%	30.1%

Source: Datamonitor Consumer Survey, August 2008

" The biggest factor in their decision to buy any given laundry brand is the price. With this factor dominating consumers' tacit views, the extent of their price sensitivity is clear. Innovation is required to shock consumers out of this mentality…

Ethics are deemed to be less important in laundry care… Producers are best advised to consider the use of water and energy as their leading issues to address in relation to ethics. The importance of ethics is greater for women than men in most countries, as is the case with many 'softer' societal issues related to consumer packaged goods.

One of the more concerning findings for laundry care producers is that consumers rate brand image as a low priority in affecting their choice of product. Consumers may prefer to use a famous brand but will happily swap between brands or trade down to private label if they consider these offerings to represent a viable trading down option."

Source: Datamonitor, The Future of Laundry Care, 2009

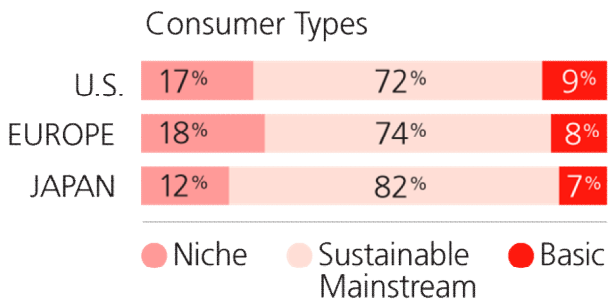
P&G acknowledged that there was not a strong consumer driver for a 'low carbon' laundry detergent, and that the low temperature detergent was "definitely a corporate push" in bringing the product to market. Underpinning the corporate push, however, was the

consumers' high levels of concern about climate change, and the willingness to take action to lead more sustainable, lower carbon lifestyles if it is easy to do and if there is a direct (economic) benefit to them from doing so. For example, 75% of consumers in the UK claim to have made changes to their lifestyle as a result of concerns about climate change. When asked what changes they had made, 73% claimed they were recycling, 32% were turning off lights/appliances and 28% had changed light bulbs to energy saving bulbs (PwC Consumer research, 2008). P&G's own consumer research identified that there is a large proportion of consumers who would respond to sustainable product innovation if there are no trade-offs on price or efficacy.

"We know that most consumers are unwilling to make trade-offs on performance or value to be more sustainable. This insight is consistent in regions throughout the world. We have found that two relatively small groups exist on the ends of a decision-making spectrum. On one end, "niche" consumers are willing to sacrifice performance or value for a more sustainable product.

On the other, a small segment is focused on providing "basic living" for their families and do not make purchases based on Sustainability factors. The vast majority of consumers (around 70%) we call the "sustainable mainstream"— want choices that have improvements in their environmental profile. But they will only alter purchasing decisions when they can have the performance they require and the value they need."
P&G Sustainability Report 2009

Figure 17:P&G consumer profile on sustainable innovation



Source: P&G

Barriers to low carbon consumer products

In general, consumer awareness and the lack of understanding of the real issues surrounding sustainable consumption are identified as a barrier to uptake of the green products.

More particular to the detergent market, the consumers' mindset is a major barrier to new product uptake. Consumers are extremely loyal to the format they commonly use. This is exacerbated by the fact shoppers spend on average 12 seconds in the laundry detergent section. A major barrier is thus getting a relatively complex and important marketing message (i.e. cost, convenience and environmental friendliness) across in a relatively short time span. The launch of Ariel Excel gel is particularly challenging in this respect. Gel detergent is a new format and requires significant investment.

There is also an inherent barrier in encouraging behaviour change, particularly surrounding cooler washing. Consumers need to be reassured that it works, and then they need to remember to do it. In particular for the Excel Gel, many older washing machines do not have functionality available to wash at 15^{o}. The default setting for some washing machines were also set at 40^{o}, which requires an active effort by consumers to set the washing at a lower temperature.

Marketing

Ariel Excel Gel came to the UK market in October 2008, and claimed a range of benefits for consumers including energy and cost-saving *(*Datamonitor, 2009).

The main sales channel for laundry care is through grocery supermarkets. The company claims these have been supportive of the efforts and the commercial success of the products is testament to this. Supermarket retailers that are active on the sustainability agenda are also key enablers to P&G's marketing strategy.

For example, the US-based Wal-Mart, the world's largest retailer, is a hugely influential customer for P&G. Sales to Wal-Mart and its affiliates represented approximately 15% of its total revenue since 2006.(Datamonitor, 2009). Wal-Mart has a well publicised programme of supplier engagement on the issues of sustainability and is looking to its supply chain to deliver significant sustainability innovation in the market. P&G plays well to this agenda through its product offering.

Marketing strategy

Both the Ariel products have been supported by extensive R&D expenditure and considerable through the line promotional and advertising expenditure.

The company has been keen to stress that in communicating with consumers on the product attributes, it is vital to focus first on the efficacy of the product. In 2006/07 the company's communications emphasised the brilliant cleaning results and value for money that consumers would achieve, despite the lower temperature.

Compared to the other P&G "sustainable innovations" products, which tend to involve reduced consumption of energy and water in the production phase, Ariel Cool Clean's green credentials heavily relies on consumer behaviour after the purchase of the product. As a consequence, the launch of the product is backed by comprehensive advertising and consumer awareness campaigns (WBCSD, 2008).

Focusing on marketing the product primarily as a means to save costs, P&G established mainstream appeal by translating the sustainability benefit directly into a primary consumer benefit. This "benefit-led sustainability" approach overcomes one of the key limitations associated with marketing "ethical" or "green" products as it communicates simultaneously a performance and a sustainability message to the consumer (Birchall, 2009).

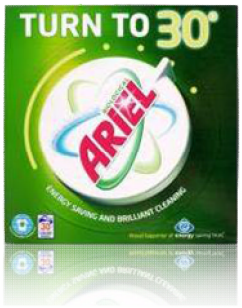
Also, following a first less successful attempt at launching a similar product in 2003, P&G found that in addition to increased awareness, consumers needed small, incremental steps. As such, its marketing campaigns were formulated around a simple action – "Turn down a click" or "Turn to 30". Similarly, once consumers are attuned to the "Turn to 30" concept, it is easier for consumers to consider "turn to 15^{o}" when the Excel Gel was launched.

P&G was careful not to market environmental benefits as the primary message. The British "Turn to 30" detergent packs stated the clear, consistent message: "Energy Saving and Brilliant cleaning" (Birchall, 2009).

P&G also used simple, straightforward language, backed by an impartial, respected organisation:

"Switching to 30 degrees can save up to 40% of the energy used"

energy saving trust



Ariel Excel Gel

Even Cooler Cleaning!

"Brilliant results even in cold water; and saves you £1/wash off your energy bill"

Source: P&G

To encourage the right behaviour in the use phase of its product, P&G combined TV and billboard advertising, direct marketing, internet campaigns, in-store events, and promotional activities. More specifically, strategies include:

- Repeated awareness rising through comprehensive advertising and campaigns. For example, the "Turn To 30" message was very evident on the Ariel box, on TV and print publicity, and in-store signage.
- Use messengers the lay consumer trust and associate with. Whenever credible experts and public figures were speaking on the Ariel initiative, they referred to the "Turn To 30" call to action.
- Careful choice of language to enhance communication. Consumers were made aware of the energy savings of washing at 30° in layman's terms: savings of 2 Terawatt hours does not mean much to a typical consumer. It was expressed rather as: "If all of the UK turned to 30°, the annual energy saved could power over 500,000 homes for one year."
- Focus on cultural characteristics. P&G has learned that quantifying energy savings is a cultural process: in Italy, Ariel Coolclean energy savings were better perceived as the amount needed to light up the beautiful "piazzas" (central squares), whereas in the UK, the annual energy savings of a single home were materialized in equivalents like: watching 1,400 TV soap operas or preparing 2,500 cups of tea.
- Backed by authoritative and impartial views. In each country where the Cool Clean technology was introduced, P&G partnered with important climate-oriented and energy saving third parties. In the UK, P&G partnered with the Energy Saving Trust who launched the Ariel Energy Saving Promise, an individual commitment challenge with prizes and regional competitions. ETS also ran the Ariel Great Energy Savings Experiment in 2006, having 122 households "Turn To 30" for two weeks, and auditing their washing machine energy consumption compared to the previous two weeks. The Energy Saving Trust, as a third party, validated the results of this field test: the average energy savings were 41% per household. Given the significant reduction, the Energy Saving Trust communicated this in its own activities.
- The company has also emphasised its awards, in particular from the likes of Which:
- Future friendly partnership: a consumer education partnership between NGO organizations with the intention of inspiring and enabling consumers to become more sustainable in their daily life by saving energy, water and packaging without compromising on performance or convenience
- Support from retailers: 'Become part of a movement': Retailers such as M&S have included 30 ºC wash on the washing instruction label of their cloths.

It has been argued the awareness raising campaigns have been critical in driving the uptake of the product and in changing long term behaviour. The other key component of success is arguably the partnership with the energy saving trust which the public trusts to provide reliable and unbiased information.

Consumer behaviour

Consumer research showed that a considerable fraction of consumers are willing to wash at slightly lower temperatures, i.e., by turning the temperature dial of their laundry machines "one unit" lower than they had done before.

The resulting marketing and advertising campaigns are considered to have been successful at changing consumer laundry behaviour. Studies found increasing the number of household washing at 30 ºC from 2% to 17% of the population in from 2002 to 2007, a large proportion of which is claimed to be a direct result of Ariel's 'Turn to 30' advertising campaign (WBCSD, 2008). Main factors of success lie in the fact that consumer are reassured about the cleaning performance and if there are independent reassurance of the benefits. More recent reports from P&G state that, in the UK, 23% of consumers now wash in 30°C, which translates to over 58,000 metric tons of carbon dioxide emissions prevented.

Anecdotal evidence also shows that the consumers that were sceptical about 30 º C detergents have adopted it after the launch of the 15 ºC Ariel Excel gel. It is perceived that the availability of detergent working at even lower temperature has proven the market success of the 30 ºC washing powder and provided the assurance for its performance.

Barriers/Market failure

A key barrier for the lack of consumer uptake is the lack of trust among consumers towards green claims and marketing. The current 'green claims code' under consultation is considered a major step towards genuine and meaningful claims which would drive companies towards more sustainable practices beyond 'green wash'.

Appendix B: Case Studies:

7. Low carbon beer – Adnams

Key Findings

Company and product	Adnams is a privately owned brewery which introduced East Green, a carbon neutral beer
	Managing director Andy woods, and Bottle manufacturer, O-I
	Based on 2 interviews and literature review
Market and competitive landscape	▪ Extensive competition in UK's Ale market ▪ No direct competitor in the sphere of low carbon beers, especially in terms of energy efficient infrastructure.
Product differentiation	▪ Carbon neutral beer with lighter bottles, with no price premium
Carbon Impact	▪ 25% more carbon efficient compared to conventional beers
Enablers	▪ Availability of technology to enable low carbon brewery and distribution ▪ Tesco's promotion and take up of low carbon products ▪ Retailer's increasing demand for carbon disclosure
Consumer drivers and barriers	▪ Targeting perceived increase in environmental consciousness ▪ CSR marketing
Supply chain impacts	▪ Worked with Hop Association to develop variety that requires less pesticides usage. ▪ Locally sourced barley ▪ Early adoption of light weight bottles
Impact of uptake on market	▪ Provided niche market alternative ▪ Stimulated local malt and hop market ▪ Stimulated light weight technology for ales
Success factors	▪ Market leader in the increased resource efficiency and carbon neutrality for ales ▪ Distribution relationship with Tesco
Role of government in encouraging success	▪ Incentives for the uptake of energy efficient equipments.

Introduction

Adnams is a Suffolk-based brewery, established in 1872. The company has an estate of 75 pubs, two bespoke hotels and a chain of high end wine and kitchenware stores. The brewer produces a range of cask and bottled beers that are available in pubs and supermarkets nationwide. It is a medium sized company with around 350 employees. In 2006, it opened its new energy efficient brewery and distribution centre, the result of £21 million investment over 3 years. Subsequently, in addition to increasing resource efficiency and decreasing carbon emissions of its operations, the company became known as a green brewer with the introduction of East Green ale, the UK's first ever carbon neutral beer.

According to Adnams, the new brewery facilities enables the carbon neutral East Green to be 25% less carbon intensive to produce than other beers. The remaining carbon is offset

through a partnership with Climate Care. The beer also won the Carbon Trust 2007 innovation of the year award, allowing Adnams to put a Carbon Trust logo on the bottle.

The company has also worked with Cambridge University and SMEs investigating anaerobic digestion (using microorganisms to break down biodegradable material), which can be used for vehicle fuel. This will enable Adnams to further reduce its carbon footprint and subsequently reduce the need for offsetting.

Market context

The market for beer in the UK was worth over £21bn, in 2008. Adnams has faced difficulties in 2008 due to the recession. After a decade of steady growth, the brand's year-on-year sales fell in 2008, from £47.4m to £47.1m (Brownsell, 2009). Profitability also plummeted by 64% to £1.5m. However the company asserts that because of its investment in resource efficiency, it has benefited from higher predictability in manufacturing costs, allowing them to maintain lower prices during difficult times. According to managing director Andy Wood, this has allowed the business to bounce back relatively easily in 2009 with increased sales including on-trade sales.

Drivers for business

Long term sustainability of the business as a core strategy

Sustainability of the business and its impact on the built, natural and social environment are identified as two of the eight core values of the business by Adnams. As such, a fundamental driver for the greening of the business' operations in general is to maintain such credentials and create differentiation. At the same time, both consumer and employee opinion surveys revealed a desire for greener practices. As a result, the decision to invest in green infrastructure was made when renovation of the brewery and warehouse were required. A major enabler in this initiative was the access to finance at the time of the investment in 2003-2004.

Resource efficiency

In addition to concern over energy and fuel costs, the east of England is also subject to water scarcity. The new investment aimed at reducing water usage per pint of beer from eight to down to three. Research revealed that the new production equipment reduced gas bills by 31% and uses over 60% less water per pint produced compared to conventional beer. Although the distribution centre cost 15% more than a standard building, electricity bills have been reduced by £49,000 p.a. compared to an equivalent 'standard' unit and uses 58% less gas and 67% less electricity per square metre than the old centre (Evans et al, 2008).

Explore new market opportunities

With regards to the East Green in particular, the main motivation for Adnams is to explore new market opportunities, such as being part of Tesco's low carbon offerings. This has also reinforced the brand's positioning and allowed the brand to maintain high ethical credentials. It has been claimed that the introduction of East Green has fundamentally changed Adnams' relationship with its retailers, and the positioning of Adnams products has moved to "value-adding" rather than "conventional". The introduction of East Green is seen to be responsible to 29% growth in sales through a major supermarket who committed 72 single facing shelves to Adnams products.

Relationship with suppliers

The reduction in carbon intensity of East Green is achieved through increased efficiency and reduced waste throughout the supply chain. In designing and creating East Green, Adnams leveraged on its long standing relationship with existing suppliers to improve their products rather than switching to new ones. The initiative has minimised extra costs, while increasing supplier support and loyalty.

More precisely, the beer uses locally sourced barley to reduce food miles, and aphid resistant hops to limit the need for petroleum-based pesticides. Further down the value chain, the brewery is equipped with an energy recovery system, recycling 100% of the steam created during brewing, which is then used to heat 90% of the next brew. The site is also characterized by renewable and locally sourced building materials, and reduced reliance on steel. The beer is also handled by a distribution center claimed to be 50% more efficient than its old warehouse. Adnams also created a new lightweight bottle reducing its CO2 footprint by 415 tonnes per year through reduced material usage and transportation.

Key actions and strategies

Route to market

Partnership with key retailer

Adnams' low carbon beer was co-developed with Tesco, and in partnership with the University of East Anglia. The retailer's right to exclusive six months distribution guarantees an instant market for Adnams. Adnams had already invested significantly in green infrastructure and operations when Tesco approached the company to design a carbon neutral beer to be included in its low carbon products (green basket) promotion. East Green has as a second stage moved into on-trade, with the launch of the draught version, sold alongside bottles. However, the uptake of draught beers has not met expectations and the product has subsequently been withdrawn from pubs.

Marketing strategy

Low carbon innovation as a value addition to retailers

Although its effort involves all aspects of resource efficiency, East Green's marketing focused on the carbon neutrality of the product, with the emphasis that there is no compromise on the taste or on price. The introduction of the products has been backed by extensive marketing campaign, with wide media coverage and poster and magazine advertising. The marketing campaign is also supplemented by social networking sites such as Facebook and Twitter.

To a lesser extent, the brand positioned itself as a beer with good environmental practices and ethical community schemes. Adnams has indicated that East Green will move away from the carbon focus towards a more general theme as a resource efficient product, as resource scarcity issues especially in the East of England are becoming more prominent.

Maintaining brand integrity and customer loyalty

Although all beers benefited from higher resource efficiency in manufacturing and packaging, Adnams has maintained the brand's integrity by creating new products rather than making existing ones carbon neutral. In doing so, the company has safeguarded its existing customer base while experimenting with a potential new market. Similarly, the development of the product also focused on maintaining the taste of the beer while keeping the price the same as more conventional products.

Partnership

Partnership with academic institutions with strong reputation in the development of the projects has also been an important factor in the uptake of East Green. Adnams worked with

the University of East Anglia's carbon reduction team throughout the project to ensure scientific rigor behind its initiatives and claims. More precisely, the team enabled Adnams to conduct its product's carbon lifecycle assessment from farm to shelf which helps Adnams target key elements in the process and reduce the emissions of the overall product. The company believes that as consumers become more carbon literate, the requirement for authoritative and independent information becomes more important. Therefore the project was developed in partnership with the University of East Anglia to ensure the validity of its claims.

Supply Chain

Light weight bottles

Reducing the weight of beer bottles has been evolving in the industry for several years, mostly to increase resource efficiency and reducing transportation cost. Adnams' bottle supplier, O-I is a leading bottle manufacturer known for its sustainability credentials and strong light weight technology. It approached Adnams in 2006 with a customised light weight bottle which Adnams bought in as part of its general effort to become more efficient. It is the first example of light weight bottle in the ale sector. Although Adnams has used light weight bottles since then, the feature was extensively advertised during the launch of East Green and became an important part of its marketing. It has been claimed that the uptake of light weight bottles by Adnams has prompted wider uptake across the industry, mainly based on environmental grounds. It is thus an example of how a niche product can indirectly lead to the mainstreaming of low carbon products through its supply chain.

The major barrier to further uptake is technology. It has been argued that the light weight technology imposes more restriction in terms of design, so that some required shapes cannot be as easily achieved as with conventional heavier bottles. In addition, the technology is currently costly and requires runs of large volumes for custom designed bottles. Therefore smaller breweries tend to find it too expensive to invest in. O-I is overcoming this barrier by manufacturing a series of standard bottles that small manufacturers can choose to purchase.

Another barrier to uptake is consumer perception. Ales are usually associated with heavy and steady bottles in contrast to lighter designs for lagers. Lack of consumer acceptance of lighter designs was expected to limit the uptake. However evidence has shown that these barriers can be overcome as many beer providers have registered growth in sales with the introduction of light weight technology.

Barriers/Market failure

Lack of awareness

Following the launch of the bottled beer in supermarkets, Adnams introduced on-site draught East Green, which has subsequently been withdrawn due to lack of uptake. The main barriers identified for this lack of success is that its green credentials could not be effectively communicated on draught as easily as on bottle labels.

Lack of readiness

The lack of consumer readiness for environmental features around beer is another major impediment. This can be translated into a lack of consumer concern facing carbon focused characteristics in beers. Unlike household products or cars, beer is a product that is typically non-essential and removed from areas of concern around social and environmental responsibility. Therefore consumers may not consider carbon footprint as a priority when choosing the beer they consume.

Similarly, the uptake of the product is slowed down by its 'niche' product characteristics. The introduction and marketing of East Green as a carbon neutral beer primarily appeals to environmentally conscious consumers rather than mainstream beer consumers, characterised by male consumers from 33 to 55 years old as was initially expected. Research on the uptake of the product revealed that that the main purchases were made by female consumers and

increasingly by the student community. Behavioural marketing research has shown that women and younger population are more likely to purchase sustainable goods. This possibly suggests that although ales in Britain is a mainstream good, low carbon beer is still taken up largely by a niche market.

Exacerbating this trend is the economic downturn. Although Adnams decided to maintain the same price as conventional beers, recession-hit consumers did not consider buying what they perceived as a ‘luxury good’ (Brownsell, 2009).

Appendix B: Case Studies:

8. Patio Heaters

Key findings

Company and product	B&G's phasing out of Patio heaters from its stores
	CSR director and PR Assistant Based on 1 interview and literature review
Market and competitive landscape	Main competitors (Focus DIY, Travis Perkins, Homebase) have not phased out patio heaters. Wyevale, specialising in gardening is not a direct competitor but has phased-out patio heaters
Product differentiation	Offering cheaper and more eco-friendly alternatives
Carbon Impact	No quantitative estimates on the carbon saving resulting from the phasing out of B&Q's patio heaters
Enablers	▪ Increasing awareness ▪ Availability of alternative technologies ▪ NGO support
Consumer drivers and barriers	▪ Raising environmental consciousness with emergence of high profile reports on the environmental costs of patio heaters ▪ CSR positioning
Supply chain impacts	▪ Removed a major route to market for the products ▪ Other products follow buyer guidance such as sustainable timber sourcing such as use of FSC wood for alternatives to Patio Heaters ▪ Market creation for alternatives such as fire pits and chemineas
Success factors	▪ Well advertised sustainability focus of the phasing out. ▪ NGO backing
Role of government in encouraging success	None

Introduction

Outdoor patio heaters commonly use radiant heat technology to send heat into a localised area, generally in large or outdoor spaces where heating the entire space becomes uneconomical. The most commonly used are electric and propane patio heaters. The most efficient electric outdoor heaters use infrared, shortwave technology to deliver radiant heat which is absorbed by people and things nearby. These are available in many different styles and designs, including floor model and tabletop style lamp. The main advantages of electric patio heaters over propane, are efficiency, and ease of use and availability of designs and models. Propane heaters are more portable as they do not need to be plugged to an electricity source.

Market Context

The patio heaters gained great popularity in the UK, as a means to extend the usually short lived summers. It has been described as "beacon of aspiration" for those keen on enjoying outdoor dining, in the UK's unpredictable climate (BBC 2006).

The smoking ban in 2007 sparked a rise patio heater sales as pubs attempted to retain smoking customers by providing a conformably warm outdoor smoking area. 40% of pub-going smokers claim they would choose a pub with an outdoor heater (EST, 2007).

At the same time, such heaters became increasingly affordable for domestic consumers and a 'must have' garden accessory. A study by The Energy Saving Trust in 2007 estimated that 10% of home owners (2.3 million) own or were planning to purchase a patio heater in the near future.

As the use of outdoor gas heating rapidly rose, the true cost of using these comfort appliances became a subject of scrutiny. Many environmentalists pointed out that patio heaters were superfluous heating devices. There is no insulation and they are used to literally heat up the open air and any heat that is produced soon rises and escapes along with the polluting gases into the atmosphere. The Energy Saving Trust study shows that a patio heater emits around 50kg of CO2 a year for an utilisation of two months a year and three hours a week. This corresponds to 6 months usage of a gas cooking hob, for only 21 hours of outdoor heating. (EST, 2008). Research in 2008 from British Gas predicted that increased sales of gas-fired patio burners to pubs as a consequence of the smoking ban would see carbon emissions from pub heaters alone reach 160,000 tonnes of CO2 a year, representing almost ten percent of the annual carbon reduction the UK needs to meet its Kyoto commitments by 2012 (Business green 2008).

It is against the background of increased press attention on environmental credentials that mainstream brands have become weary of their reputation and environmental performance. Of critical importance is the need to demonstrate, visibly, that taking sustainability seriously doesn't mean business as usual. As part of this movement, retailers such as Notcutt and Wyevale, B&Q and John Lewis in the UK all have started the phasing out of outdoor patio heaters (Guardian, 2008).

B&Q is UK's largest home improvement retailer, and the market leader in sales of patio heaters. The removal of patio heaters from B&Q's offering has been largely welcomed by environmental NGO's and the public in general according to the company, as a demonstration of environmental commitment and proactive corporate push on environmental issues through effective choice editing.

Drivers for business

Leadership

B&Q claims a long history of innovation and leadership in the area of corporate sustainability. The move to phase out one of its most popular products is said to be part of a wider commitment to cut the environmental footprint. The company is a founder member of the Forestry Stewardship Council (FSC) and works with suppliers to have FSC certification on all its timber based products. B&Q has also joined the WWF-backed One Planet Living initiative which commits organisations to cut carbon emissions and waste to a sustainable level.

In 2008, B&Q also achieved the Carbon Trust Standard – an award that requires an organisation to measure, manage and reduce its carbon emissions.

With millions of visitors going into the stores each week looking to improve their home, B&Q has a huge opportunity to communicate green and sustainable values and lifestyles to its customers, and to help them reduce their environmental impact. The initiative to phase out patio heaters came alongside many other environment related actions. For example, the business led the introduction of a VOC labeling system on paint that is now adopted as industry standard. It further demonstrated its commitment to sustainable alternatives through its procurement of peat-free products. B&Q has ambitious commitments to reduce its reliance on peat and is helping drive this across the industry through its lead membership of the Growing Media Initiative.

Stakeholder scrutiny

Bioregional, a sustainability focused charity that conducts yearly independent environmental audits for B&Q flagged the issue of patio heaters, bringing it to the forefront of CSR concerns at the business. At the same time, issues around the sustainability of patio heaters had been increasingly looked at both in the media and in research from consumer facing organisations such as the Energy Saving Trust. Despite having constantly tried to decrease the environmental impact of their patio heaters through stringent energy efficient specifications and strong choice influencing, the phasing out of the product was considered as the only long term solution to maintain the company's sustainability integrity and reduce CSR risks.

Economic viability

Although recognised as a flagship choice-editing story, the phasing out of the outdoor patio heaters entailed removing from the market a highly successful product generating £4 million a year for B&Q. However, it was argued within the business that in addition to the initiative being judged important in terms of doing 'the right thing', patio heaters were regarded as having relatively low long-term viability. Sales had been gradually declining before the announcement of the phasing out, believed to be partly caused by increasing environmental awareness. In addition there was possibility in growing alternative products such as chimeneas and fire pits. The business claims that the garden and leisure part of the company has seen the greatest growth in 2009 and so the commercial rationale of the decision appears not to have had a detrimental effect on the category.

Competition

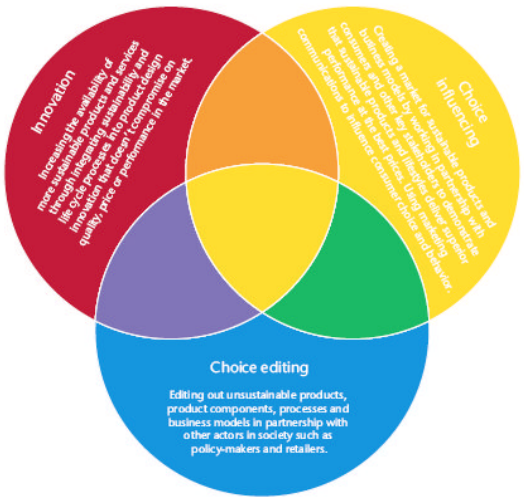
The announcement of B&Q's phase out project came about amidst rising criticism over patio heaters and earlier initiatives for phase out from garden center Wyevale as part of its commitment to become carbon neutral in 2010 (Osborne, 2007). Recognising that DIY is well positioned to address the growing market for green products, credibility and integrity by phasing out products at odds with this positioning allowed the company to better explore the emerging opportunities.

Key Actions and strategies

Marketing Strategy

The decision to remove patio heaters from sale was announced with strong PR support and the decision was profiled in the company brochure the year before action was taken. In addition, several employee engagement initiatives involving the distribution of a jumper/sweatshirt promoting the removal of patio heaters also gained popularity, generating additional positive publicity for the initiative.

The move has been welcomed by many environmental NGOs who played an important role in growing public approval and trust in the initiative.



In this particular instance, the marketing strategy focused on choice editing with choice influencing used in a supporting role. In other words, choice influencing was used when informing customers who came into the shop for patio heaters on the alternative products in the store. This ensures the adoption of cleaner alternatives rather than letting them go to another retailer to purchase patio heaters.

Consumer behaviour

The reaction of consumers after the announcement of the product phase-out has been positive according to B&Q, although no market studies have been made available that demonstrate how buying behavior has changed. However, the business offers the anecdotal evidence that, except for a minority of consumers who had a particular patio heater product in mind, many customers come into the shop with an idea and would be open to considering alternatives. B&Q claims that sales of alternatives such as chiminea and fire pits have steadily increased, largely compensating for the reduced revenue generated by patio heaters.

Switching from gas or electric patio heaters has also been stimulated by the fact that alternatives have cheaper upfront cost. Use of FSC certified wood as fuel is also encouraged, providing customers with additional sense of having done something good for the environment.

Barriers/Market failure

Resistance to change is a main behavioural barrier to the reduced usage of patio heaters. As studies reveal, smokers in pubs highly value the presence of patio heaters in pubs. From this perspective the smoking ban has created a major barrier to the effective phase out of patio heaters. A good example is the recent victory of a pub over attempts by councils to ban pub patio heaters on environmental grounds by refusing planning permission (McKenna, 2009).

From a policy perspective, a major barrier is considered lack of clear incentives for such choice editing as a barrier for companies abandoning high carbon successful products.

Similarly, the lack of visibility on the market, especially on how the market has changed after the phase out of a product of an important player may hinder choice editing due to fear of losing too much to competition.

Impact on Supply Chain

Despite having been given 18 months advance notice for the phasing out, the initiative has caused a certain level of dissatisfaction among suppliers, especially those who exclusively supply to B&G. However, the move has prompted them to explore new variants of patio heaters, such as those that burn ethanol instead of electricity or propane. B&Q has also proposed to explore upstream opportunities and use some metals used in the manufacturing of the patio heaters for other products.

More generally, B&Q has developed stringent sets of procurement guidance though which it can influence its suppliers to comply with various environmental and sustainability standards.

Appendix B: Case Studies:

9. Kenco reduced packaging Eco-Refill

Key findings

Company and product	Kraft foods a leading confectionary food and beverage manufacturer's introduction of Kenco Eco Refill pack
	Based on interview with Kenco Marketing director, Kraft foods sustainability corporate affairs officer, and literature review
Market and competitive landscape	Highly competitive product category
Product differentiation	Packaging and waste reduction at a lower price point
Carbon impact	97% less packaging and 81% less energy required to produce compared to equivalent jar.
Enablers	▪ Corporate strategy ▪ Increasing consumer demand ▪ Availability of packaging technology ▪ Availability of government guidance
Customer drivers and barriers	▪ Environmental awareness ▪ Reduced cost ▪ Accessible marketing campaign ▪ The package is not recyclable with other household waste, which constitutes a major barrier to uptake
Supply chain impacts	▪ Working with Rainforest Alliance on improving the livelihood and environment of coffee bean suppliers ▪ Working with Teracycle to upcycle used refill packs ▪ Additional suppliers in the existing supplier base
Impact of uptake on market	▪ Shown early signs of success, and created competitive rivalry on a new agenda in the sector ▪ Market share growth for the brand ▪ Stimulated Terracycle upcycling activities ▪ Raised consumer awareness and expectations
Success factors	▪ Mass-market strategy with focus on waste reduction rather than carbon ▪ Upcycling scheme to overcome the problem of recycling ▪ Introducing incremental change
Role of government in encouraging success	▪ Provision of guidance for companies to make credible and comparable claims, such as DEFRA Green Claims Code and ISO 14021 Environmental Claims and ISO 14021 Environmental Labels and declarations

Introduction

Kraft Foods, the owner of UK coffee producer Kenco, is one of the largest confectionery, food and beverage brand owners. Kenco launched the second phase of its sustainability strategy for coffee brand Kenco in September 2009, with a £7.5m campaign promoting the launch of a product extension created to reduce its amount of packaging.

The new Kenco Eco Refill pack was claimed as a UK first and has 97% less packaging weight than the conventional glass jars pack. The product has been developed to encourage consumers to switch to the more environmentally friendly pack as part of its sustainability

strategy. The latest push follows the brand's commitment to source the coffee for its entire range from Rainforest Certified farms by 2010.

The Kenco model, as well as a range of other consumer goods, differs from the traditional refillables model as the reusable packaging remains with the customer who tops up at home. This avoids customers having to remember to bring old containers back to the site of retail, there is no requirement of an empty container before purchase of refill, and manufacturers can retain their branding, as no generic jar is required.

Market context

The coffee market is characterised by high price volatility and oversupply. After coffee prices hit a 30-year low in December 2000, the coffee market has managed to remain strong during the economic downturn, achieving an in-home growth of 17% in value between 2005 and 2009.

70% of the world's supply is provided by smallholders cultivating less than 10 hectares in 80 countries in Africa, Asia and Latin America.

The current important oversupply is caused by increased production brought about by new technologies such as higher yielding trees and new producers such as Vietnam. In addition, the imbalance between demand and supply is caused by the lack of viable alternatives for small coffee producers, as other crops are experiencing decline in price.

In this highly uncertain environment, companies are attempting to differentiate and add value through premium elements such as origins and occasion. As a consequence High-end coffee is characterised by an increasing level of segmentation. However, despite an observed willingness among consumers to trade up, there is a forecasted decline in user base among younger consumers who are becoming more interested in cold beverage.

Drivers for business

Corporate level sustainability strategy

In 2005 Kraft developed a comprehensive sustainability strategy setting out six key areas including waste and carbon emissions. The strategy was developed as a result of the company's desire to achieve long term sustainability an manage overall brand image. The strategy also comprises a series of targets to be achieved by 2011. The implementation of the strategy is driven by separate business categories within Kraft foods such as Kenco. Corporate backing has therefore played an important role in driving the development of the products..

A cradle to grave lifecycle assessment was conducted in 2007 to look at the overall impact of the Kenco products. The study revealed that agricultural input and packaging were the two main areas where the business can have the most influence in to decrease their environmental impact and achieve sustainability targets.

Stakeholder demand and market differentiation

Surveys have shown that consumers increasingly want to do more for the environment but without compromising on cost, quality or convenience. The negative perceptions of excessive packaging has created favourable environment for Kenco to introduce Eco Refill. Research into consumer sentiments also revealed that the economic downturn might have accentuated consumer's aversion to waste.

The product also represented an opportunity to differentiate from its main competitor Nescafe.

Since the launch of the campaign, public data shows that Kenco Instant Coffee is worth £116 million, a YOY increase of 16.2% and is now the premium coffee brand brought by the most households.

Development of sustainable packaging

Under constant pressure from government, media, customers and consumers, the packaging industry is increasingly being forced to consider how its products can be made more sustainable. In addition, concern over resource efficiency has also sparked demand for decrease in waste along the supply chain of a product. The technology for Kenco Eco refill pack was therefore already available when the brand decided to introduce measures to reduce waste.

Government guidance

An important enabler identified in the interview was the availability of government guidance, which allowed Kenco to gain confidence in making environmental claims, applying well researched tools and methodologies and using the accurate terminology. Among others, the development of Kenco Eco Refill and its marketing material were in line with DEFRA Green Claims Code and ISO 14021 Environmental Claims and ISO 14021 Environmental Labels and declarations.

Key actions and strategy

Marketing strategy

Comprehensive advertising

Kenco has received substantial corporate backing for the promotion of the new product. The £7.5 million campaign includes TV and outdoor advertising, PR, in-store and digital promotions. The Eco Refill packs feature the 97% less packaging label with Kenco's Rainforest Alliance certification. The 150g refills are also claimed to be cheaper, with a £3.58 retail selling price that was cheaper per gram of coffee than both the 100g (£2.58, cheaper by 7.5%) and 200g (£4.98, cheaper by 4%) jars.

The marketing campaign is designed to be light hearted and funny rather than ‘preaching’ an environmental message. The tongue-in-cheek TV advertising campaign dramatises the humorous concept that a reduction of packaging by 100% did not quite work, so Kenco had to “settle” for 97% less packaging.

The PR activity was also coordinated with a nationwide “Waste Less Challenge”, driving consumers to a brand new Kenco website, where they are be able to watch films featuring Amanda Holden and Oliver Heath and enter an online competition to win eco breaks and coffee canisters.

The advertisement ranked fifth in TNS's Most Effective Ad Campaigns of 2009, with feedback that the campaign engages and informs consumers, and reflects concerns about too much packaging.

Simple message with focus on waste rather than CO2

Kenco conducted extensive research to understand consumer needs and acceptance of new products to be able to effectively communicate its marketing message. Although the development of the product was driven both by waste and carbon concerns, the marketing messages were focused mainly on the more tangible aspect of waste reduction. Carbon reduction on the other hand is perceived to be a less motivating factor for the consumer who may not fully comprehend the concept or who may experience ‘climate change fatigue’. Similarly, although carbon saving is an important aspect of the Rainforest Alliance certification, the marketing messages focus on the wider resource efficiency aspect of their work.

No compromise incremental change

The introduction of the Eco Refill also took into account the fact that consumers are not willing to pay more for an environmental feature, nor will they accept lower quality of the product. Although the profit related to Eco Refill is not known, it has been argued that consumers typically consider increased resource efficiency and waste reduction as being linked to cost reduction. Kenco therefore responded to this perception by making Eco Refill 4% cheaper than glass jars.

Consumer response

Consumers have responded positively to the introduction of the product. Research shows that currently 48% of UK household are aware of the product and 7% now buy Eco Refill. Consumer uptake has been encouraged by support from retailers. Tesco in particular has provided full support with extensive display and promotion of the product.

The fact that 75% of consumers still buy glass jars shows that incremental change has been identified as another important issue around the successful uptake. Eliminating glass jars completely would not be commercially viable at this stage.

Supply chain

Agricultural input

Kenco works in improving the environmental performance of its suppliers by having Rainforest Alliance certifying all of its products. The organisation takes a holistic approach to the sustainability addressing a wide range of issues including forest protection, use of fertiliser, and resource scarcity.

Packaging

The solution for the packaging technology was already available, so no R&D was required. Since Kenco did not eliminate glass jars from their offerings, they have not removed these suppliers. The introduction of new products has meant adding new suppliers to their supply base to provide and fill the new eco packs.

However, the Eco Refill pack is not recyclable with the rest of household waste. Kenco addressed the issue by teaming up with TerraCycle®, allowing consumers to send the packaging back to TerraCycle® for free, which will address the end-of-life issues by converting the packs into bags or picture frames. Kenco has further committed to donate 2p to the consumer's chosen strategy for every pack sent it, thus more than "compensating" for the perceived shortcoming in product design. 16,000 individuals have now joined the programme and sent back 30 tonnes of packaging.

Barriers/Market failure

Perception of consumers is a major barrier to the uptake of Eco Refill. On the one hand, consumers may feel that soft packaging do not preserve the aroma of the coffee as well as jars. On the other hand, the fact that the packaging is not recyclable is perceived to be a major weakness in Kenco's sustainability credentials.

The business has supported the product launch with extensive investment in marketing and education to influence consumer behaviour and encourage up-take.

Appendix B: Case Studies:

10. Supermarkets

Key findings

Case study Interviewee (s)	Supermarkets, various low carbon initiatives, products and services Relevant representatives from Sainsbury, Asda, Kenco, P&G, The Carbon Trust and The Institute of Grocery Distribution Based on interviews and literature review
Market and competitive landscape	The supermarket sector in the UK is concentrated and highly competitive. The leading four players (Tesco, Asda, Sainsbury and Morrison) account for over 65% of the total grocery market in the UK according to Verdict Research (Source: Verdict, UK Food and Grocery Retailers 2009). Actions on sustainability in this sector is a key competitive platform
Product differentiation	▪ n/a
Carbon Impact	Most retailers have their own carbon reduction targets with varying baseline and target year. Because they have access to the mainstream consumers, their carbon reduction potential can be significant
Enablers	▪ Technology, LCA understanding ▪ Increased consumer awareness ▪ Corporate targets on carbon reduction
Consumer drivers and barriers	▪ Cost saving ▪ More sustainable lifestyles
Supply chain impacts	▪ Retailers are enabling, encouraging or mandating innovation by suppliers ▪ Retailers work with the agricultural suppliers and third party organisations to perform life-cycle analysis to understand where in the process of production the emissions are greatest
Market Impact	▪ All major retailers are competing to enhance their CSR positioning, leading to impact on supply chain ▪ By introducing green initiatives above and beyond regulation and government incentives, retailers acted as ‘de-facto’ regulators. ▪ Raised consumer awareness and expectations ▪ Provided critical route to market for low carbon products such as Adnams East Green, Kenco or energy efficient light bulbs. ▪ Potential contribution to economies of scale and decrease in prices of low carbon goods.
Success factors	▪ Linking carbon and cost saving ▪ LCA insight
Role of government in encouraging success	Limited

Introduction

Supermarkets in the UK serve tens of millions of visitors every week in a variety of store formats from virtual internet shopping to hypermarket developments with parking for hundreds of cars. These visitors represent the full socio-demographic breadth of the UK and the national chains, by definition, connect with consumers across all regions in the country.

As a result, Supermarkets are among a unique group of institutions, including the NHS, education establishments and other government agencies that have a huge opportunity to influence and educate UK consumers, on a face-to-face basis, on carbon and climate change.

Supermarkets are also able to exert huge influence up the value chain, encouraging innovation and eco-efficiency in suppliers. The retailers are in control of their product assortment and therefore able to 'choice edit' damaging and high carbon products from the offer. The powerful communication and marketing tools at the retailers disposal (including the retail outlets and products themselves) offer the opportunity to 'choice influence' and educate consumers on energy and carbon in all phases of the product lifecycle, including usage and in disposal.

Most operators in the sector are advanced in their approach to sustainability. They are integrating sustainability and climate change strategies with core strategies relating to product, stores, marketing and communications, risk and cost management and strategic planning processes. In taking these actions, for commercial and reputational gain, they are also 'mainstreaming' the issues, raising consumer awareness and expectation of brands and corporate behaviour on the issues and changing the nature of competition in the retail sector.

Given its access, exposure and ability to mainstream consumers' lifestyles and behaviours, the supermarket sector is among the most critical routes in the UK to encouraging and delivering lower carbon lifestyles.

However, Supermarkets are only taking action that works for them commercially. The highly competitive nature of the sector means that these retailers will not take risks with their shoppers and so action is taken cautiously. They will not push a message that does not resonate with their shoppers.

Market Context

The supermarket sector in the UK is concentrated and highly competitive. The leading four players (Tesco, Asda, Sainsbury and Morrison) account for over 65% of the total grocery market in the UK according to Verdict Research (Source: Verdict, UK Food and Grocery Retailers 2009).

These retailers now operate from a range of store and non-store formats and have expanded product ranges to include non-food lines such as clothing and electrical goods, In addition, the retailers have developed extensive own-label products;

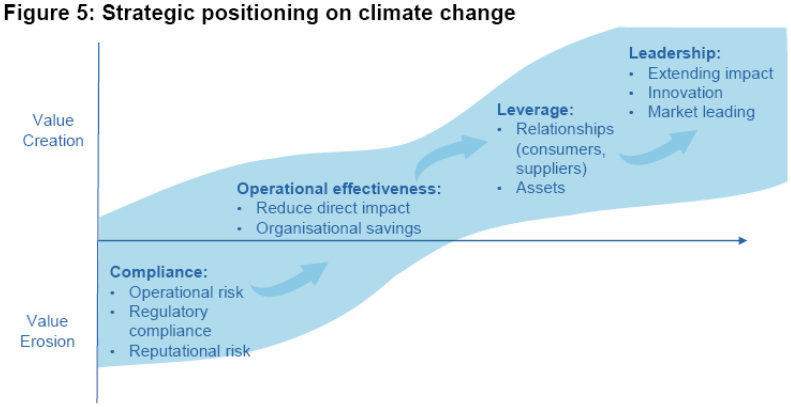
"The leading players have added substantial new space to their store estates and have diversified aggressively into the wider retail market through the introduction of comprehensive non-food ranges. Tesco and Asda have led the way in non-food development, with Sainsbury building pace more recently. Grocers' non-food ranges now comprise most non-food categories including clothing, electricals, health & beauty, homewares and music & video. These ranges have benefited as the likes of Tesco and Asda have ramped up their multichannel, multi-format strategies. Both now have non-food only store formats and online propositions." (Source: Verdict, UK Food and Grocery Retailers 2009).

Drivers for Business

Our analysis of the sector suggests that most of the leading supermarkets in the UK are taking a 'leverage' position on at least one sustainability issue, these sector leaders claim to

be integrating sustainability into core strategy, taking actions on the issues relating to product, stores, marketing and communications, risk and cost management and strategic planning processes.

Figure 5: Strategic positioning on climate change



Source: PwC

The maturity of the response to climate change issues at the leading supermarkets is therefore, to a greater or lesser extent, fairly high; at least at leverage and in some cases demonstrating leadership.

Sustainability claims:

	Sustainability claims	Carbon actions
TESCO	• Leading by example – reducing our own direct carbon footprint; • Working with our supply chains and partners to reduce emissions more broadly; • leading a revolution in green consumption We use the Steering Wheel to emphasise that corporate responsibility (CR) is not a specialist function in Tesco – it is part of everybody's job every day 	• Reduce the footprint of our existing buildings by 50% by 2020 (compared with 2006) • Ensure all new buildings, on average, emit 50% less CO2e by 2020 compared to an equivalent store in 2006 • Continue to map the total direct carbon footprint of the Tesco business across all the countries in which we operate and publish this carbon footprint for all to see • Seek to restrict air transport to less than 1% of our products
ASDA	Use a 'common sense' approach making sustainability more affordable to its customers 'At Asda saving money and keeping costs low is part of our culture. *Saving you money every day* isn't a marketing slogan; it's the single-minded focus of everyone at Asda' We believe that supporting sustainability can make our products even more affordable for our customers, while helping to safeguard the world we all live in.	•Cutting fleet emissions by 40% •Create a toolkit to reduce the embedded carbon of its supply chain • Greener new stores
Sainsbury's	We aim to be environmentally responsible in the way we run our business and we also want to make it easy for customers to be environmentally responsible	We have been refining the measurement of our operational carbon footprint and are working hard to reduce it by improving the energy efficiency of our store and distribution network
MORRISONS	Leading by example: 'We believe carbon reduction strategy has to reach all parts of the business and therefore all of its people. Standardised staff training has helped to galvanise our activity, created new ideas, opportunities, feedback and support.' At Morrisons we believe in 'Taking Good Care' of our planet. Morrisson's environmental strategy focuses on climate change, waste reduction and sustainability.	Carbon reduction cumulative target of 36% met one year early. The carbon footprint includes direct emissions as well as business travel and staff commute.

Sources: Retailers

The actions taken by supermarkets to encourage demand for low carbon goods and services are extremely varied. In many cases they are not designed to be consumer-focused but are taken further up the value chain.

In addition, the actions are not always purely carbon focussed; emissions reductions are additional benefits or part of a suit of outcomes. As such, there are multiple drivers and motives for taking action on the issue of carbon emissions.

Cost saving

A key motivation for reducing carbon emissions in either direct operations or in the value chain is the drive to reduce current costs or manage anticipated future cost increases. Most of those interviewed as part of this case study referred to a recognition that carbon is seen as a cost. Within this is recognition that policy and regulation is increasing in the area of environmental sustainability and that this will represent a cost risk. Interviewees highlighted land fill taxation on waste as an example of this. Carbon as a cost also leads to concern over to embedded carbon and resource efficiency along the value chain. The push for cost saving could therefore drive increased efficiency of material and resource use.

Corporate sustainability

A number of the interviewees in our analysis have stated that a strong driver for taking action to reduce carbon in the supply chain and in direct operations is the need to create 'corporate sustainability'.

This is linked to cost saving, but also about recognising longer terms threats from adapting to climate change and other sustainability mega trends require changes to business as usual operating models.

Competitive position

The public commitments made by the leading supermarket operators on sustainability and carbon have created a platform on which all are competing. There is a strong reputational angle for supermarkets in this; they cannot be seen to be doing something that is detrimental to the environment. In addition, there is a great deal of scrutiny and pressure on the sector from NGOs and the media. This could potentially play and important role in terms of consumer perception and thus the image of the company. Retailers are especially vulnerable to bad press and thus an important element of their competitive positioning.

The actions and messages are used to reinforce the market position in which the business already operates. In some, this involves a cost message – reinforcing 'cost leader' positioning. In others, the focus in on softer CSR messages relating to environmental responsibility.

Key actions/strategies

Direct footprint:

Choice influencing and educating

The focus of this research is on the actions taken to influence demand for low carbon goods and services. It therefore concentrates on the strategies employed to bring lower carbon goods to market. However, it is important to highlight that actions taken by supermarkets to reduce carbon emissions in their direct footprint also have an influence on consumer demand and behaviours, primarily because supermarket retailers have made them part of the consumer proposition and communication.

Execution of this varies according to market position and maturity on sustainability, but examples include:

- Development of eco-stores: All the major players have a portfolio of eco-stores (outlets featuring environmentally friendly technologies). These represent an important showcase for the business' CSR credentials, including carbon reduction, such as prominent micro generation equipment, and feature extensive in-store literature promoting the actions.
- Distribution costs: Most of the leading operators in the sector are employing multiple solutions to reduce distribution costs and carbon emissions. In the case of vehicles powered by alternative fuels, the operators aggressively use the opportunity to advertise this fact, both on the vehicles and elsewhere. Thus, making part of the marketing and competitive position

- Energy use reduction: All key players have communicated corporate targets on energy in CSR/sustainability reports and in-store literature. Some have taken it further and are linking actions in this area directly with existing consumer propositions. A strong example here is Asda's TV advertising campaign of January and April 2009. Store employees were featured on screen taking actions to reduce energy consumption, the resulting cost savings from resource efficiency were linked to 'Green Rollbacks' i.e. the savings enjoyed by the business were being passed on to consumers in the form of lower priced products. 'Rollbacks' are the company's standard price communication tool. The company claimed that this was the most successful advertising campaign of 2009. The advertisements did not specifically focus on carbon emissions, but on energy and cost savings, and ultimately price reductions.
- Carbon labelling. Tesco announced in 2006 a plan to carbon label its 70,000 of products, in order to enable consumer visibility on the issue. In addition to informing purchase decisions, the scheme also aimed at focusing on retailers broader effort to manage and reduce their carbon footprint (Murray, 2008).
- Tesco is working in partnership with the Carbon Trust in developing methodologies for product carbon footprinting and labelling.

The retailer has to date labelled around 100 of its products. Surveys of Tesco customers in 2009 revealed that:

- Over two-thirds express a clear understanding of the term "carbon footprint";
- Over 60% actively seek out a product with a low carbon footprint if it's convenient and not more expensive;
- 95% of customers take specific actions to reduce their carbon footprint; and
- 85% of shoppers think about the environmental impact of the products they buy

Supply Chain

Innovation, choice influencing, choice editing

In addition to actions in direct carbon emissions reduction, supermarket retailers are influencing demand for low carbon goods and services through their interaction with suppliers. In particular, retailers are enabling, encouraging or mandating innovation by suppliers.

The interviews conducted as part of this case study identified addressing working with suppliers to reduce the emissions in the production phase as an important strategy in bringing lower carbon products to market. The carbon disclosure project's supply chain initiative is an important step in pushing companies to engage with their supply chain to manage their extended carbon footprint. Tesco Plc has participated in the pilot project and committed to ask suppliers to provide carbon data. Another good example is the supplier index introduced by Walmart. The retailer announced in 2009 a plan to develop a worldwide product index for its suppliers globally. The index will establish each product's sustainability, including resource and energy efficiency.

On February 25, 2010 Walmart publicly announced its newest supplier sustainability initiative - the Supplier Greenhouse Gas (GHG) Innovation program. Under this program, Walmart plans to eliminate 20 million metric tons of GHG emissions from its global supply chain by the end of 2015, a level equal to the total amount of GHG emissions produced by 3.8 million cars in a year.

All interviewees identified life-cycle and carbon footprinting expertise as a key enabler in providing the insight to direct activity in the supply chain through the identification of carbon 'hot spots' for example. Two leading retailers highlighted collaborative models in agricultural supply chains, specifically milk and dairy and meat.

Sainsbury Dairy Development Group Case study (SDDG):

"During 2008, the SDDG pioneered the first carbon footprint measurement system of its kind in the dairy industry. This is the first agricultural carbon footprinting model to be certified by the Carbon Trust and to achieve compliance with PAS 2050 (a supply chain measurement specification established by Defra and BSI British Standards). It has the potential to reduce farmers' energy costs and also their carbon footprint by 10% a year.

The project involved an independent environmental consultant, funded by Sainsbury's, auditing each SDDG farm. The audits looked at every aspect of the farm and measured inputs such as electricity, feedstuffs, machinery and fuel use. From each audit a carbon footprint report was produced for individual farms, along with an environmental scorecard. The scorecard identifies areas for improvement and a detailed greenhouse gas emissions reduction programme. Each farmer is then given guidance on how to implement these.

Some of the reductions in energy and emissions have come from simple measures, such as harvesting rainwater for re-use. Other farmers have achieved higher yields per cow by using feed more efficiently, or managing their fertiliser and manure applications differently.

The project found that some of the highest yielding farms are not the most carbon intensive. Through the scheme we have demonstrated how more efficient farms can be better for the environment as well as being more successful businesses.

We strongly believe that the SDDG will help drive new efficiencies in the sector and could act as a benchmark for improving long-term sustainability in the dairy industry as a whole."

Source: Sainsbury

ASDA low carbon beef case study:

"ASDA has become the first British retailer to sell low carbon beef. As part of a ground-breaking programme to measure the carbon footprint of its meat, it has developed a range of beef with a carbon footprint over a third lower than the standard 24 month beef. This is the lowest carbon footprint in the industry.

Working closely with its dedicated British dairy farmers, the ASDA low carbon scheme uses dairy bulls, which would ordinarily be exported or slaughtered, and rears them for between 9-11 months so they can be sold as low carbon beef. Technically classified as a 'by-product' of milk production, the CO2 emitted by the calf is offset against the existing dairy farming process. What's more, as ASDA's low carbon beef is slaughtered at 9-11 months, it emits significantly less CO2 during its lifetime than cattle more typically reared until 14-30 months of age. As it is smaller in size, portions are easier to manage, and it is available at a lower price point than standard beef.

With beef inflation at an all time high, this is welcome news to ASDA's value conscious customers. Low carbon beef is on sale at ASDA stores nationwide.

Pearce Hughes, ASDA's agriculture development manager, said:
"We've been working on this programme for a number of years and are proud to finally see it come into fruition. We wanted to create a low carbon beef that was both accessible to our consumers and viable for our farmers. Should the product prove successful, we could be looking to extend it into our successful 'Respectful' low carbon range of free range eggs.""

Source: ASDA

In both cases, the retailer worked with the agricultural suppliers and third party organisations to perform life-cycle analysis to understand where in the process of production the emissions

are greatest. The retailers invested in the costs of the footprinting and in up-skilling the farmers on the issues and possible actions to change practices. The retailers claim significant carbon and cost reductions as a result.

The motives for developing these collaborative solutions relate primarily to cost reduction and/or supply chain resilience from having more efficient suppliers and closer working relationships with them. Carbon emission reduction is not the sole benefit.

The level of collaboration with branded goods manufacturers relies less on the supermarket retailers providing the expertise and investment, as with the (SMEs) agricultural own-label suppliers outlined above.

However, there is evidence of action to encourage supplier action to create low carbon alternatives. The Adnams Low Carbon Beer case study is a good example. Adnam's low carbon beer was co-developed with Tesco, and in partnership with the University of East Anglia. Tesco approached the company to design a carbon neutral beer to be included in its low carbon products (green basket) promotion .The retailer's right to exclusive six months distribution guaranteed an instant market for Adnams.

Both Kenco Eco-refill and the Ariel low temperature washing detergent case studies conducted as part of this research cite support from supermarket retailers as important in the development of consumer awareness, acceptance and sales.

One interviewee identified that retailers are able to create 'a race' for lower carbon and more sustainable goods and services among suppliers.

Barriers/Market failure

Complexity

The interviews we conducted as part of this case study identified complexity relating to carbon emissions as a key barrier, both for business and for consumers.

There can be huge variations in the embedded carbon of food products across the seasons. Changes in the country of origin, the way they have to be processed, transported, packaged and stored means the footprint of the same food item can vary widely throughout the year.

The complexity is amplified by the huge number of food products sold through supermarkets. This is one of the reasons why many of the leaders on this have looked to footprint products like milk first, as they are present as an ingredient in many other composite food products and can provide the basis of understanding the footprint of these composite items.

While it is extremely difficult to measure footprints consistently, it is even more difficult to communicate to consumers. The variation through the year makes consistent labelling and messaging problematic and confusing for shoppers who are spending very little time selecting the product – and are not considering embedded carbon in the decision.

The complexity means that simple and direct action and messages do not work as they would for other sustainability issues. One retailer suggested they were not choosing to communicate on carbon as a single issue because of this complexity. Other sustainability issues are easier to deal with 'unilaterally' like making a commitment to use 100% sustainable palm oil or FSC certified products. The lack of a certification platform on carbon makes it difficult for retailers to make such effective, simple consumer marketing messages on the issue.

Another complicating factor is that carbon emissions cannot be considered in isolation. Interviewees commented that other sustainability issues need to be balanced alongside carbon. An example given on this issue was the need to consider international development benefits of overseas sourcing, balanced against air-freight emissions.

Another interviewee suggested that solutions to tackle carbon emissions are not obvious. The example given was the need to consider issues like local sourcing carefully. Products processed in France and transported by road, for example, may have a lower carbon footprint than the equivalent UK processed items due to the lower carbon (nuclear) French energy grid.

A number of interviews identified that there is lack of infrastructure and data standards on life cycle analysis and footprinting, making comparability of data difficult.

Cost & lack of infrastructure

Just as insight gained from carbon footprinting and life cycle analysis is a critical enabler of actions above, the complexity barrier outlined means that measuring the carbon emissions across the full range offered by supermarkets is an extremely costly and laborious exercise.

As approaches mature and become more standardised, so the cost is expected to come down. However, the current cost prohibits wider application of the analysis.

Cost was also a barrier highlighted by supermarket retailers in taking further action in the supply chain. One in particular highlighted that to develop lower carbon agricultural practices further requires considerable investment in hardware. This investment is currently difficult to make without increasing consumer prices, which is something the retailers are not prepared to do at this stage.

Uncertainty

Interviewees highlighted that making the capital expenditure decisions highlighted above would be made easier if there was certainty on carbon prices and on policy instruments to encourage investment or discourage negative behaviours.

There is much uncertainty on the effectiveness of carbon labels for consumers. While labelling is a key strategy for some actors in the sector, others are not convinced they resonate or even provide the right message for consumers. This uncertainty is compounded by the lack of government legislation on the issue.

Lack of consumer understanding and 'pull'

All interviewees highlighted the issue that the majority of UK consumers do not respond to carbon emissions as a single issue. Carbon emissions and energy was highlighted as being very low down the list of priorities when buying food products in particular.

Importance of image and branding

The importance of image and reputation to a supermarket's competitiveness means that supermarkets maybe more prone to introduce strategies and measures to mitigate reputational risks. As a consequence, concentrating on what may affect its reputation may mean that supermarkets may introduce measures that focus on the wrong issues or take a a less efficient strategy for emissions reduction, to favour actions that are more visible or popular.

Appendix B: Case Studies:

11. Energy suppliers

Key findings

Company and product	Low carbon and energy efficiency products and services
	British Gas, The Climate Group, uSwitch Based on three interviews and literature review
Competitive landscape	The UK energy supply market was privatised in the late 1990s and is now a highly competitive sector. It is dominated by six large companies, namely E.ON, Centrica, npower, British Energy, EDF
Product differentiation/Key strategies	▪ Cost saving ▪ Convenience & Ease of adoption
Impacts on carbon reduction	▪ Impact potential is very high
Enabler	▪ Government incentives critical in removing some of the financial barriers for the uptake of microgeneration technologies
Customer key drivers	▪ Cost reduction ▪ Tangible and visible environmental benefits
Customer key barriers	▪ Price ▪ Lack of awareness and availability
Supply Chain Impact	▪ Investment in renewable energy has helped develop the market.
Impact of uptake on market	▪ Awareness raising ▪ Decreased cost of new technology ▪ Innovation
Success Factors	▪ Enables cost reduction and increased employee satisfaction
Role of government in encouraging success	▪ Providing competitive and stable framework for growth

Introduction

The energy industry contributes 4.2% of UK's GDP, accounts for 8.6% of total investment and 5% of industrial investment (national statistics, 2008). From a carbon perspective, domestic energy usage is responsible for 28% of the UK's total CO2 emissions (Energy Business Review, 2010).

As energy is responsible for a large proportion of a UK resident's personal carbon footprint (UK energy, 2010), energy suppliers are facing increasing pressure to take part in mitigation measures. For many energy companies, these pressures are seen as potential business opportunities. They responded with a large array of energy saving and carbon reducing products and services and created the common perception that green offering in the sector is largely characterised by corporate push rather than consumer pull.

Although energy suppliers offer a large variety of green products, they can be divided into three broad categories:

- Green tariffs
- Government-incentivised renewable energy technologies such as heat pumps and solar panels
- Energy efficiency products and services, such as light bulbs and smart metering

Market context

UK's energy market was deregulated in the late 1990's The market is now dominated by the 'big 6', E.ON, EDF, British Energy, Centrica and npower.

Aside from the major suppliers increasingly providing higher renewable mix and green energy services, the country has seen the emergence of the 'Green Three' green energy suppliers. Among them, Good Energy offers 100% of its fuel mix being from renewable sources. Ecotricity provides a fuel mix containing 37.4% renewables and Green Energy has 32% renewable energy as part of its mix. These players currently only represent 5% of the total market share in terms of energy supply.

Drivers for Business

Taking a leadership role

The energy sector is often the focus of scrutiny with regard climate change, both due to its direct link to carbon emissions and to its exposure to the mass-market consumers. Interviews have revealed that energy suppliers are taking the stance that there will be increasing push to reduce conventional energy usage, both from a consumer and regulatory point of view. As such, interviewees have suggested that the best strategy for energy suppliers is to take the lead in pushing the agenda forward while gaining competitive and reputational advantage, rather than react only when the pressure and related risks become too important.

Therefore, in addition to investing in renewable energy and offering grants and offers for microgeneration, energy suppliers have increasingly developed energy services such as energy usage 'health checks' to help household identify 'hot-spots' and reduce costs. The services are argued to play an important role in retaining existing customers and also allows suppliers to better differentiate themselves from competition.

Regulation and fiscal incentives

As a heavily regulated industry, fiscal incentives and regulation play an important role in driving companies' green initiatives. The renewable obligations impose a requirement on licensed electricity suppliers in the UK to have an increasing proportion of their electricity sourced from renewable sources. In 2010/11 it is 10.4%. Energy suppliers need to present their Renewable Obligation Certificates to meet their obligations, failing which a payment will have to be made into the buy-out fund. Arguably, desire to lead the market and out-perform competition have led to the development of Green tariffs, which typically involve commitment from suppliers to buy energy from renewable sources in addition to their Renewables Obligations.

Feed-in Tariffs are measures introduced by the government to encourage the uptake of household renewable electricity generation such as solar PVs. The scheme requires energy companies to buy renewable energy generated by households. In other words, it is a financial incentive for homeowners to install renewable energy equipments. It helps to remove some of the financial barriers, such as the long payback period of micro-generation solutions. The scheme provides participants with three streams of income. First the energy supplier pays the household a price per kWh generated, regardless of how much of this energy is used. This price is higher than the average grid electricity price. Secondly, the excess electricity generated can be exported to the grid at 3p/kwh. And the third stream of income is the money saved from not buying grid electricity. Energy suppliers weary of broadening their business outside conventional fuel have welcomed the scheme. Although still at an early stage, it is seen as a major opportunity for British Gas to develop its newly acquired Solar PV installation business.

Similarly, both the Carbon Emissions Reduction Target (CERT) and the Community Energy Saving Program (CESP) are government measures that energy suppliers see as important business opportunities.

CERT requires energy companies to take steps to reduce carbon emissions from homes. For example these can be grants offers to promote loft and wall insulation as well as micro-generation installation. As a response, British Gas has launched its in-house insulation business and achieved a conversion rate from visit to conversion of 50%.

Similarly, CESP, is a program funded through an obligation on energy suppliers and generators to help households in areas of low income to reduce their energy costs. This program provides an opportunity for energy companies to demonstrate leadership and develop the program in partnership with local authorities (DECC, 2008).

The UK government introduced in 2009 plans to equip every house in Britain with smart meters by 2020. This is aimed at reducing cost of inaccurate meter estimates, and increasing energy efficiency. Energy companies welcomed the switch, which will reduce their running costs by making meter readers obsolete and eliminating time spent on dealing with estimated bills. Studies have shown smart meters encourage homeowners to cut energy use by 3% to 15%, although experts interviewed for the case study warn the technology requires consumer education and is not an "install and forget" energy-efficiency measure such as loft insulation.

British Gas New Energy and AlertMe.com, a provider of smart energy saving systems for homes, announced in 2009 an agreement to pilot home energy management technologies, and help British Gas customers reduce their energy and carbon consumption. The first offering to be trialled with British Gas will be an automated heating control system, which makes it easy for consumers to adjust their home heating for minimum energy costs, without compromising comfort. The system is easy to set up and allows the consumer to alter their heating at any time from the Web or any mobile phone. For example, householders can turn on their heating before they get home, or control it when away on holiday.

This agreement follows the announcement in June of AlertMe securing £8 million in Series B funding by investors Good Energies, Index Ventures, SET Venture Partners and VantagePoint Venture Partners The financing enables AlertMe.com to extend its product development program, continue to ramp up its distribution strategy and to expand headcount.

Market and Competition

In addition to diversifying their fuel mix, companies have begun to move from supplying energy as a product to providing “energy services” – offering a suite of services including energy demand management. This trend has developed as a response to the increasing recognition that UK households need help in achieving energy efficiency. In addition, issues related to installation of microgeneration such as connection, metering, notification to network operators are also identified as barriers to the greater uptake of microgeneration. As a consequence, energy suppliers are providing services that respond to varied customer needs, allowing the client to reduce costs and time and transfer risk.

Key actions and strategies

Offering products with green credentials

Contrary to other products, green tariffs have been marketed to appeal to consumers who are more aware of and willing to act on their concerns over climate change. These tariffs are often priced at a premium to conventional power supply and therefore target only those who are willing and able to pay the premium.

Most energy companies provide green tariffs alternatives. For example British Gas offers green tariffs, at a premium to its conventional supply. Typically, signing up for green tariffs means that the premium paid by the customer is used by the supplier to buy the same amount of energy from renewable sources. British Gas offers two different green tariffs. Future Energy for electricity and Zero Carbon for dual fuel option. For a surcharge of £24 a year for Future Energy, and £84 a year, Zero Carbon customers will contribute to increase the share of renewables from 8% to 12%, and help contribute to a green fund which helps schools to reduce their carbon emissions.

Broadening business to facilitate entry

Driven by existing and upcoming regulation and incentives to encourage the uptake of microgeneration and other energy saving technologies in households, energy suppliers have typically developed relationship with technology suppliers to provide and install the relevant technology as subcontractors. On the other hand, other suppliers such as British Gas chose to broaden its in-house offering into services such as insulation and solar PV installation. Contrary to outsourcing such services, providing its own services offering is said to allow the company to maintain control over its key customer 'touch points'. In other words, an insulation installer can easily gain entry and identify opportunities for other service offerings by British Gas. This would be achieved with more difficulty with subcontractors. Having a wide range of expertise and offering is also argued to increase consumer trust in energy suppliers to provide informed and impartial advice on the best options for each particular customer. It has been suggested that the conversion rate from 'visit' to 'installation' is 50% with British Gas that uses its in-house installer, higher than for visits from microgeneration companies that are outsourced by energy suppliers.

Marketing strategies

As cost saving is becoming an important driver in consumers' decision making, it has become the main marketing route for companies to both comply with government measures and promote their energy efficiency products and services. It has been suggested in interviews conducted as part of this research that in order to ensure faster and wider uptake, it is important not to rely on changing consumer behaviour towards a more eco-friendly lifestyle, but rather, understand the main consumer pains and find innovative w environmentally friendly solutions. For example, market research from British Gas has revealed that inaccurate billing was one of the main concerns expressed by customers. As a response, British Gas introduced the EnergySmart monitors, a handheld device that shows consumers how much they are consuming, with recorded data to up to 30days. It has been argued that although introduced to tackle the problem of inaccurate metering, the device has increased the household's visibility over its energy consumption and contributed to up to £150 saving a year in energy bills.

Energy services

Energy service offering has also been seen as a strategy to gain consumer trust as well as access to market other offerings. As a result, energy services are also used by brands to enhance their reputation and position themselves as environmental leaders. British Gas introduced energy savers report service, which allows households to gain visibility of the property's energy efficiency performance and identify areas of improvement and cut costs. As one fifth of its customers have signed the report British gas also introduced the Energy Planner. The new feature allows households to build a personalised plan of action and track the performance over time. More control over a household's energy efficiency gives opportunities to energy suppliers to further promote their green credentials by offering insulation and energy efficient technologies

Awareness raising through children and community

British Gas' Generation Green initiative allowed the company to engage with families and schools in green activities. Participants earn 'green leaves' through activities such as changing light bulbs, installing microgeneration technology or more creative activities such as having recycled Halloween costumes. The Green leaves are then redeemed against rewards such as botanical kits, wind turbines etc. This initiative not only raised awareness both among children and families with insightful information on the various energy saving measures, it also contributed to developing the market for green products such as those included in the rewards.

British gas' Green street experiment and Scottish and Southern Energy (SSE) (see box below) have both contributed to the uptake of new technologies while increased the overall reputation of the brand.

Strategic acquisition

Energy suppliers are also making strategic acquisitions, signaling their intent to develop energy demand management exposure. For example, in 2008, SSE invested £1million in Onzo Limited ("Onzo"), in return for a 24.5% share of the business. Onzo is a data systems development business, with specific intellectual property relating to the development of display devices that support smart metering systems. The devices provide real-time information about energy consumption and have the potential to provide data down to the individual appliance level. SSE has also placed initial orders worth over £7 million with Onzo for the company's energy display products and specialist data services. As part of this order, SSE has secured exclusive rights to Onzo's products and services covering the UK and Ireland.

British Gas on the other hand, has invested not only in renewable energy to diversify its fuel mix, but also in acquiring new businesses that offer insulation and solar PV equipment supply and installation.

British Gas – Green Streets experiment

British Gas carried out a Green Streets experiment, a year long energy efficiency challenge over 2008/09 to reduce energy consumption. The Green Streets experiment was monitored and analysed by the Institute for Public Policy Research (IPPR), which also released a report on the recommendations to encourage similar energy savings for families across the UK.

British Gas gave households on eight streets in eight UK cities a budget of £30,000 per street to spend on energy efficiency measures. Residents were given information from British Gas energy experts on energy saving measures, including simple behavioural changes such as turning off lights when not in a room and not leaving the television on standby. These small changes have led to significant drops in energy use. The findings show that if every household in the country followed suit they could cut an average of £200 a year from their energy bills. The street that reduced its CO2 emissions and energy use the most received a £50,000 prize to spend on further energy efficiency projects for a community building of their choice.

Other findings from the experiment include:

- Green Streets families started the experiment in 2007 with carbon emissions of 6.14 tonnes of CO2 per household, slightly above the UK average of 6 tonnes per household for 2006; by the end of the experiment, they had cut this figure by an average of 23%.
- The average energy saving across all Green Streets households was just over 25%.
- All streets saw a significant reduction in their average energy use during the course of the project. The street average ranged from under 15% in London to almost 35% in Leeds, although most streets were in the range 22-27%.
- Applied across the UK, these carbon savings could translate to an annual reduction of 35 million tonnes of CO2 - roughly equivalent to the output of three to four coal-fired power stations.
- Gas demand across Green Streets households fell by almost 26% on average; if all UK households were to see a similar fall, total demand for gas in the UK could be cut by over 8 per cent, roughly a third of the UK's current gas imports. Gas savings were seen as the primary driver of all energy savings.
- Householders cited face-to-face energy advice; the use of handheld electrasave meters and smart-meters; and the "street vs. street" competition as key drivers of behaviour change. In particular the provision of face to face advice was seen as a huge driver of behaviour change amongst residents.
- Green Streets families benefited from an average of £3,750 of free insulation and energy saving appliances and measures, an investment which could pay for itself in some cases in just three years.

Source: IPPR

SSE (Scottish and Southern Energy) – Glasgow as sustainable city

SSE is investing over GBP100m in the city over the next five years to help deliver Glasgow's Energy Master plan, which aimed at identifying how the city can contribute to tackling climate change by delivering major carbon emission reductions.

As a result of this research, SSE has produced a low carbon technology city plan identifying the most suitable locations for low carbon technology solutions. The company also revealed the launch of an energy tariff for 2010 which will reward and financially incentivise Glaswegians who reduce their own home's energy usage, and help them take action in their management of household energy use by offering them help and advice on how to reduce consumption.

Source: Energy Business Review, January 2010

Impact on supply chain

Energy supplier' investments in renewable technology have to a certain extent supported the development of the renewables market. On the other hand, the market for microgeneration technologies is still at an early stage of maturity. However, because uptake is stimulated by government incentives, energy companies are increasingly interested in the market, with some companies gaining exclusivity over specific supplies. For example, to ensure leadership over the installation of fuel cell boilers, British Gas has co-developed and secured exclusivity in the installation of CERES' grid-connected combined heat and power (CHP) product (Focus, 2009). CERES is a market leader in the development of fuel cell technology of small scale CHP products for the residential sector and in energy security applications.

Barriers/market failure

Cost/Price premium

For products and services that require higher financial commitment such as the green tariffs, cost is a major impediment to higher uptake. Gas and electricity is a significant part of the household budget, research by uSwitch in at the beginning of 2010 reveal that consumers are beginning to ration their energy usage due to high cost and cold weather. As a consequence, mass-market consumers are unlikely to be willing to pay for green energy at a premium. Similarly, the adoption of microgeneration is hindered by the high upfront cost. Although government incentives such as grants and feed-in tariffs have in part contributed to this problem, microgeneration remain prohibitive to many households especially as they do not have access to low interest rate loans.

Related to this issue, green tariffs may be affected by a market failure identified as the problem of 'free-riding' whereby individuals pay conventional tariffs while benefiting from the development in renewable energy. Research suggests that individuals may prefer to contribute to green technology as a collective rather than bearing the costs on bills individually. This overcomes the unease about free riding, which may put off some customers from signing up to the green tariffs (Menges and Traub, 2009).

Technology

Maturity of technology also play a role in limiting the uptake of green products and services offered by energy suppliers. For example, consumers express unease and lack of trust in the reliability of renewable technologies. In addition, the immaturity of technology may also lead to the lack of economies of scale to drive the upfront prices down in order to make the uptake more realistic to mainstream consumers.

Consumer interest & trust

Statistics from price comparison companies show that around 2% of uSwitch users are interested in the 'green' energy' sections. Although this data may be skewed as uSwitch users are initially customers looking to save money and therefore might not represent the wider market, it can be suggested that the 'green' credentials of renewable energy is not yet reaching the mainstream market.

This is exacerbated by the general lack of trust expressed by customers regarding the additionally of green tariffs. In other words, because consumers cannot see what they have paid for i.e. greener energy, there are often doubts about how much of their money has really gone into investment in renewable, and whether they have really made a difference in terms of supporting the renewable market.

In addition, anecdotal evidence from our interviews suggest that a large proportion of UK consumers often perceive security of supply as one of the most important factors in choosing their energy supply. However, some express reservations regarding the security of supply from green tariffs, without being fully aware that the energy mix does not affect the actual supply.

Government intervention

Market incentives and market mechanisms are highlighted by desk research and interviews as the best way to stimulated proactive and competitive action among energy companies and encourage consumer behaviour change.

Appendix B: Case Studies:

12. Green financial services

Key findings

Company and product	Financial services Henderson, (pending: Lloyds, F and C, Barclay's , Repay) Based on interviews and literature review
Competitive landscape	▪ The Financial services market is highly competitive. ▪ Green and low carbon consumer products are in early stages of maturity ▪ Brands are seeking to compete on environmental and social credentials
Product differentiation/Key strategies	▪ Provision of green products and services ▪ Support risk management and brand position
Impacts on carbon reduction	▪ Impact potential is very high (scale compared to industrial revolution)
Enabler	▪ Competition ▪ Growth in green technology sector
Customer key drivers	▪ Awareness for retail and SRI products ▪ Opportunity in investing in growing sector for clean technology funds
Customer key barriers	▪ Lack of diversification and flexibility of the product, which may affect returns
Supply Chain Impact	▪ Green mortgages may stimulate energy efficiency improvement in building material and appliances
Impact of uptake on market	▪ Consideration of environmental factors in investment decision ▪ Funding for environmentally friendly projects and development ▪ Job creation and increased employee satisfaction
Success Factors	▪ Ensuring ease of use and tangible and comprehensible benefits
Role of government in encouraging success	▪ Providing competitive and stable framework for growth ▪ Providing fiscal incentives ▪ Providing guidelines for benchmarking

Introduction

Climate change and energy are areas increasingly leveraged by financial services companies to attract positive media coverage and improve brand image (Covalence, 2008).
This case study looks at the availability and uptake of environment-related financial services and products. There are a range of green products in both the retail and corporate and investment banking industries, associated to different drivers, enablers and drivers.

Market context

The recent years have witnessed a shift in banks' strategies and actions towards sustainability as an increasing number of financial institutions have started to direct their

resources and lending power to promote sustainable consumer practices and decision-making. The liability of lenders, borrowers' ability to meet financial obligations, ecological deficits, and business opportunities are some of the main factors currently driving the integration of sustainability into banking. Similarly, companies have to be increasingly mindful of the reputational risk associated with mismanagement of their environmental and social performance. Companies with strong brands are consequently the most vulnerable to a reputational risk.

Banks are increasingly aware of their role as a financer of climate change mitigation and adaptation effort. HSBC in 2008 announced a $90 million global environmental efficiency programme. The money will be spent over five years to reduce the bank's impact on the environment through a series of initiatives, including the introduction of renewable energy technology, and water and waste reduction programmes.

A Co-operative bank report on ethical consumerism show that monies in ethical finance have increased almost threefold, from £5.2 billion in 1999 to £14.4 billion in 2008. This growth is led by ethical banking, but also comprises ethical investment, credit unions and ethical shareholding (Co-op, 2009).

Although green investment funds have attracted companies and stakeholders with a need to mitigate reputational risk, retail FS products such as green credit cards remains niche products which appeal to customers with a strong awareness of environmental issues.

Drivers for Business

Market and competitive driver

Desk Research and the interview conducted as part of this case study suggest that the introduction of environmental financial products and services are initiated from either "corporate push" generally from the board level or "demand-pull". In the first case, the bank's board recognises the opportunities and/or risks of an environmental issue, and then responds by defining one or more "green" products or services. In the second case, the bank recognises an unmet demand among current or prospective customers, and responds with targeted products .

For example, in the area of emissions trading, the Board of BNP Paribas took an executive decision to enter the climate change market long before clients expressed the need for a specific service. Conversely, the Italian Banca Intesa waited to establish an emissions trading desk until a considerable number of corporate clients put forth a request for the service, which over time became highly profitable. A further observation is that environmental action by US banks tends to start at the policy level (top-down), whereas for many progressive European banks environmental action begins at the product level (bottom-up) (UNEP-FI, 2007). In addition, regional differences exist in terms of nature of government intervention. It has been suggested that policies in the US are mainly of a negative screening nature, excluding investment in portfolio on ethical or environmental grounds such as involvement in alcohol, tobacco, gambling, armament etc. On the other hand European policies are focused on incentivising positive green investment.

Drivers for financial services in practice are similar to that of other green products. UBS Warburg in their report on Sustainable Investment (Aug 2001) stated that they believe that changing public sentiment, new laws and the launch of ethical benchmark indices, will encourage product innovation and growth. Similarly, interview with Henderson reveal that green technology fund, and to a lesser extend, SRIs are identified as a major area of growth as a result of the acknowledgement of rising customer support for these products.

Environmental regulation

Government regulation and incentives can significantly constrain unsustainable practices and encourage demand for greener products and services. For example, UK Government has plans to prompt mortgage providers to facilitate loan applicants to improve the energy

efficiency of their properties. These include financial incentives such as competitive interest rates, cash back, removal of fees, or high loan to value. In exchange, the loan recipient must commit to a home that has an energy performance above minimum standard (UNEP-FI, 2007). This measure complements the June 2007 launch of the Government's Energy Performance Certificates (EPCs). The regulation aims at encouraging more development and increase of energy efficiency in homes. Quickly responding to the public request, HBOS and Abbey, the UK's largest mortgage lenders, and other key lenders (e.g. Halifax) and building societies have committed to bringing either green mortgage or energy efficient financial products online.

In the UK, a new amendment to the Pensions Act 1995 was enacted in 2000 that requires the trustees of occupational pension schemes to disclose their policy on socially responsible investment (SRI) in their Statement of Investment Principles (SIP) Arguably, the regulation has brought a new level of scrutiny by civil society to the investment decisions of pension funds, and SRI is increasingly embraced by all shareholders. For example, some of the SRI specialists are introducing voting policies specifically on SRI issues, such as a commitment to vote against the annual report of a company which fails to produce an environmental report

Improved license to operate

Interview reveals that in addition to recognising products such as SRI funds as an area of future growth, companies such as Henderson regard the relevant skills as supporting the company's effort in responsible investment as a whole, contributing therefore to improved CSR and risk mitigation.
In general the skill sets help mitigate for the high cost of litigation as responsible investment avoids or underweights industries that have higher legal risk.

Improved social and ethical banking is also identified as a sign of management competence, as positive relationships were found between social ratings and Business Week's ratings of board quality (UBS Warburg, 2001).

Other drivers

There are a series of other benefits associated with the development and introduction of green financial services and products. Athough these benefits have been mostly anecdotal, they are identified as possible drivers underlying the increased offering of such products. These include increased return (UBS Warburg, 2001), improved market share and customer acquisition and loyalty.

Key Actions and strategies

Retail banking

Leading retail banks are increasing consumer access to green products and services. For example, from 2007 onward, all existing and new HSBC account holders have the option of choosing an eco-friendly method of banking.
Those who opt to take on this package will not receive paper monthly statements, cheque books, paying-in books, letters or paper direct mail relating to their current account.
The green banking option also provides a number of discounts, including £70 off with Ecotricity the green energy supplier.

Home mortgage

In general, green mortgages reward customers who purchase new energy efficient homes and/or invest in retrofits, energy efficient appliances or green power with lower interest rates. .
Banks are also expanding the benefits offered as part of the financial product to include environmentally friendly options, such as home energy audits or off-sets. For example, Co-operative Financial Service (CFS) is known as a pioneer in offering all mortgage customers a free home energy rating, while paying Climate Care to offset 1/5 of the a household's CO2 every year the customer holds the mortgage.

Green credit card

"Green" credit cards offered by most large credit card companies typically offer NGO donations equal to approximately half a percentage point on every purchase, balance transfer or cash advance made by the card owner. Annual Percentage Rates (APR) for affinity cards normally range between 15-22%, and many of these include annual user fees. Increasingly, banks are also offering to link credit card usage to offset programs. For example CFS introduced scheme to donate £1.25 per £100 spent by personal (Co-op debit and credit cards) and business customers (Co-op Business Visa) to the bank's "Customers Who Care" Campaign.

The BarclayBreathe Card includes discounts and low borrowing rates to users when buying "green" products and services. In addition, 50% of card profits will go to fund emissions reduction projects, worldwide (Barclays).

At the same time, Barclay's has been tackling the physical angle of its offering by introducing the UK's first carbon neutral debit card. In order to do so, Barclay's card manufacturer, Axalto has worked closely with the Carbon Neutral Company to offset the carbon emissions associated to the manufacturing of the cards.

Sales

From a sales angle, Banks have introduced initiatives that involved tying environmental donations to traditional sale transactions. For example, In January 2007, HSBC committed to contribute £2 (per transaction) to various environmental NGOs every time customers opted for a selection of traditional bank products.

Banks are also linking consumer action with climate change and providing solutions, such as off-sets. For example. Barclays' launched a Currency and Carbon initiative to encourage consumers to offset CO2 emissions associated with air travel. In order to do so, Barclays established a co-branded website with Climate Care with funds being used to invest in energy efficiency, forest restoration and/or renewable energy projects in developing countries. This initiatives aims at raising awareness of offsetting practices through statement inserts, travel services brochures and educational material on all travel money wallets accompanying travel currency.

Green insurance

As climate change is increasingly being identified as a potential risk, the need to assess and quantify this risk is becoming ever more important for insurers. In addition to offering climate change related risk coverage, insurers are introducing innovative 'green' products that go beyond traditional coverage.

For example, some insurers have offered separate policies for green home owners. These policies may included discount on premium and coverage that replaces and rebuilds after a loss with more eco-friendly materials.

Other

Other examples of retail banking's green products include technology leasing, where banks provide environmentally friendly technology-related loans at preferential rates to commercial customers. More precisely banks offer these products to companies wanting to invest in environmentally-friendly equipments, such as low-emission fleet, smart technology, or renewable energy. These products are often supported by the government. The Dutch government for example deduct the costs associated with the investments by deducing it from the banks' taxable profit. The government has also introduced an environmental investment allowance scheme.

Another example is Microfinance, where banks provide micro-loans to individuals and SMEs to finance small projects such as solar installations. These micro-loans typically removes certain barriers for SMEs and individuals considered not credit-worth by traditional financial

institutions. Major banks such as Credit Suisse, Société Generale and Santander have introduced services to refinance local lenders. Barclays on the other hand is focusing on providing green micro-loan services in developing countries.

Corporate and investment banking

In wholesale banking, products tend to involve more sophisticated money management instruments, which are increasingly designed to incorporate green features. In general these include various ways of financing renewable technology or other environmental projects such as project implemented through the Clean Development Mechanism. In addition, financial institutions might provide series of environmental indices such as biofuels commodity basket, total returns solar energy index etc.

Socially Responsible Investment (SRI)funds have seen a growing interest in the UK in the past decade, partly stimulated by the government's requirement to disclose SRI information. The growth of SRI in the UK is however part of a worldwide trend. One example of this is the growing number of social investment forums, such as UK Social Investment Forum (UKSIF), around the world. UKSIF, the UK's membership network for socially responsible investment, was established 10 years ago.

To respond to the growing interest in SRI across Europe and the need therefore for pan-European information and networking, five social investment forums in Europe have got together to create European Sustainable and Responsible Investment Forum (Eurosif). Funding for Eurosif's initial work programme is being provided by the European Commission and it will be launched in early November.

Marketing

Marketing strategies may differ for corporate and retail banking.

For retail banking in particular, the higher exposure to consumers requires some features of success which companies take into account in the launching of their green products. These are flexibility, user friendliness, virtual access, bundled package options and low risk (UNEP-FI, 2007).

Commercial products such as SRIs are often marketed with a focus on 'best in class' climate change features, such as investment in forestry projects. It aims at targeting a niche market of environmentally conscious customers.

Green technology funds on the other hand are identified as part of an area of high growth. Green technology funds such as Henderson's up-coming Global Innovation Funds does not often appeal to the CSR need of its customers, but are marketed together as a profitable financial product together with other mainstream offerings.

Green products in the financial services sector is currently driven by corporate push designed to mitigate risk and enhance brand image. More stakeholder research is required to understand which customer segments are most likely to consider eco-products complementary to their lifestyles, interests and financial goals.

Consumer uptake

To date, it can be argued that due to the wide range of available green products, consumer uptake differs from one offering to another. Retail banking offerings such as green credit cards and green mortgages as well as SRI funds from commercial banking are commonly still regarded as niche products. On the other hand, investment in clean technology such as Henderson's Global Innovation Fund are said be more easily incorporated into mainstream offerings as clean tech is regarded as an area of high growth and able to satisfy the various criteria of conventional funds.

Overall, green products are regarded as an area which will be mainstreamed in the long terms as companies and consumers are increasingly perceiving green investment as high return investment. One interview compared green financial products to Information Technology. It has been suggested that IT, such as on-line banking service twenty years ago was considered as a 'value-adding' investment, whereas it has become a common infrastructure feature now.

Barriers/Market failure

Lack of product information & Lack of trust

Research reveals that majority of consumers are aware and would like to select according to the green credentials of financial products but are not able to name or describe any ethical financial product or service (EIRIS).

According to the EIRIS survey, (2009) 46% of respondents felt that there is not enough information available on how ethical financial products make a genuine difference.
35% do not trust the claims of financial providers

Over a quarter were concerned that there was no external verification of claims made.

Fear over poor financial performance is not a significant barrier. Only 15% of respondents do not purchase these products as they do not believe in the financial performance of these products.

Lack of government commitment

It has been argued that the government is in general supportive of green financial offerings. Existing government support is however focused on responsible green investment as a whole, benefiting mainly green businesses, such as microgeneration technology manufacturers. As a result, although financial institutions can indirectly benefit from the growth of the green industry, they do not have direct incentive to invest in green financial products.

Tax treatment for individual savings accounts (ISAs) in relation to green investment and more guidance on the definition of 'green' financial products are identified as possible areas of government intervention.

Sub-optimal product specifications of SRIs

A general perception is that SRI funds are less flexible and often lack product diversification across the different stocks and sectors needed to mitigate market risk. In other words, SRI funds are limited by the self-imposed restrictions and screening, which reduces the availability of options for diversification and risk mitigation (UBS Warburg, 2001). In addition, SRI are perceived to have active risk exposure, and therefore does not generate

Lack of guidance and methodology

Interviewee also suggested that the mainstreaming of green financial products needs more research into the best methodology to integrate these products into mainstream offerings. The lack guidance on how to classify and benchmark different products are also barriers to uptake.

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