



THIS REPORT
HAS BEEN
PRODUCED WITH
RESEARCH FROM:

VERDANTIX

REPORT

UK

Conservation

Climate change

Sustainability

Green game-changers

Insights for mainstreaming business innovation



TRANSFORMING BUSINESS FOR THE FUTURE

WWF is at the heart of global efforts to address the world's most important environmental challenges. We work with communities, businesses and governments to help people and nature thrive. Together, we're safeguarding the natural world, tackling climate change and enabling people to use only their fair share of natural resources.

The international Rio+20 and climate conferences illustrate how the world's political leaders are struggling to reach multilateral agreements that deliver economic and ecological alignment. And yet, while the world is still in the grip of a financial crisis, many business leaders are stepping out in front with multinational plans that support a greener and fairer economy.

2015 will be a critical year: it's when plans should be put in place for the United Nations Sustainable Development Goals and the elusive global climate deal. WWF sees the business community as playing a crucial role in building the stepping stones that will ensure the required level of ambition is achieved in 2015. This will increase the likelihood of governments catching up and providing the long-awaited certainty and policy support that will enable businesses to perform within global natural limits.

In the meantime, the more enlightened businesses are seeking long-term future-proofing by aiming to decouple business growth from increasing damage, produce all-round zero negative impacts, or even generate restorative/net-positive social and environmental impacts. Others are going even further, to innovate into entirely new resilient ways of working. WWF remains optimistic that many global solutions will come out of the creative parts of the private sector. We continue to work with those companies that have the foresight to transform business for the future.



Verdantix is an independent analyst firm. We provide independent data, analysis and advice to help our clients resolve their energy, environment and sustainability challenges. Through our global primary research and deep domain expertise we provide our clients with strategic advice, revenue generating services, best practice frameworks, industry connections and competitive advantage.

For more information, please see www.verdantix.com.

This report was produced by WWF-UK and researched by Verdantix.

CONTENTS

DISRUPT OR BE DISRUPTED	04
INTRODUCTION	06
DEMATERIALIZATION	10
Substituting ownership with car-sharing at scale	13
Providing performance-based lighting as a service	15
Exploring non-ownership models of leasing and collaborative consumption	18
OPEN LOOP	20
Transitioning to ‘urban mining’, clean technology materials and recycling	23
Remanufacturing of two million components a year	26
RENEWABLES AND LOW CARBON	28
Creating a value chain for sustainable food and cooking fuels	31
Reshaping the business case for renewable energy	34
Providing solar power to the bottom of the pyramid	36
RESTORATIVE	38
Avoiding end-user emissions through climate protection products	41
Achieving net positive water balance	44
LEARNING FROM GREEN GAME-CHANGING BUSINESS MODELS	46
LOOKING AHEAD	50

DISRUPT OR BE DISRUPTED

This is the rallying cry of many who often point to those failing businesses – including Blockbuster, Kodak, HMV, JJB Sports, Borders group, Lehman Brothers and Woolworths – that have fallen well short of adapting to all kinds of global

developments. The broad spectrum of trends – from the digital media revolution to growing natural resource scarcity – presents new threats to those businesses that fail to adapt and new opportunities to those that move with the times.

There's an explosion of entrepreneurial activity enabled by digital technologies, and an increasing sense among businesses of global challenges and the rise of the more conscious consumer. This activity is lighting the way to all kinds of new nature-friendly business models.

In our previous *Green Game-Changers* report we looked at some great examples of entrepreneurs who were responding with new business approaches while contributing to a greener economy. We assembled the examples according to the themes of dematerialisation, open loops, low-carbon energy and restorative/net-positive moves. In this report, we focus on the same themes and look at the larger corporations that draw from entrepreneurial activity and are taking innovation forward at a grand scale.

The innovators interviewed in this report advise on the wide-ranging insights around what is driving disruption across some of the world's leading companies, and the sector-wide implications that follow. They also provide insights for scaling up new and different practices throughout large organisations. These include internal cultures of staff collaborating across business units, close working with customers and the co-development of solutions, open innovation with peers, building trust within supplier relations, and realising opportunities that work across whole value chains.

We're seeing some exciting fundamental shifts within business and I hope you enjoy this collection of expert insights into mainstreaming green innovation. We're always interested to hear more stories and insights, so do keep in touch via wwf.org.uk/innovation, dlovegrove@wwf.org.uk, twitter: @1Dax1 or +44 (0)1483 412 395.

Dax Lovegrove
head of business and industry, WWF-UK.



“The more enlightened businesses are seeking long-term future-proofing by aiming to decouple business growth from increasing damage, produce all-round zero negative impacts, or even generate restorative/net-positive social and environmental impacts. Others are going even further, to innovate into entirely new resilient ways of working”

Dax Lovegrove,
head of business
and industry,
WWF-UK



© IStockPhoto.com

This report looks at the larger corporations that draw from entrepreneurial activity and are taking innovation forward at a grand scale.

INTRODUCTION

The purpose of this report is to highlight actions that large firms have taken to transform their business models towards sustainability.

This review follows on from last year's *Green Game-Changers* report, which looked at small-scale sustainability innovators. The potential of these smaller players inspired this year's review of the progress that large firms have made to adopt and scale up innovations. Within this remit we have honed in on those that have gone beyond product and process optimisation and have innovated their business models towards sustainability.

Strategic innovation of business models is a well-discussed business concept. Here we identify sustainable business models at three scales of adoption: core business transformation, innovative business units, and new scalable models (see figure 1). Such innovations are redefining customer value and how this value is delivered – going further than individual sustainability innovations at the product or process level.

This report provides not just stories but insights into how firms are innovating their business models and using sustainability to alter existing markets or create new ones.

Methodology

This review is based on a market scan coupled with primary research including:

- A desktop research review of strategic innovations.
- The application of screening criteria (see figure 2).
- In-depth interviews with the 10 firms identified for case studies.

The 10 case studies have been organised by the type of innovation: dematerialisation, open loop, renewable and low carbon, and restorative. Within these categories we also identify the scale of adoption of each case study (see figure 3).

Figure 1: Business model innovation



Figure 2. Innovation screening criteria

KEY QUESTION	CRITERIA	DEFINITION
IS IT SUSTAINABLE?	Does it achieve one of the four key environmental benefits?	Dematerialisation – business products, services or processes that dramatically cut the use of natural resources
		Open loop – where one company’s waste is turned into another’s resource
		Renewable energy and low carbon – innovations are supportive of a move towards WWF’s call for 100% renewable energy future by 2050
		Restorative – innovations relate to net positive environmental impacts, e.g. the restoration of forests, wetlands, biodiversity and watersheds
IS IT A GAME-CHANGING STRATEGIC INNOVATION?	Does the innovation use sustainability to alter the business model, alter existing markets or to create new ones?	Core business – strategic innovations that have transformed the core business of a firm, redefining the value provided to customers
		Business unit – a unit with an innovative business model that’s distinct from the core business
		Scalable solution – innovative models that may be scaled up across the business
	Has the innovation been adopted by a large corporate with plans to scale it up?	The innovation should have been adopted by a large corporate (with annual revenues of more than US\$1bn) that has succeeded in scaling it up, or has plans to do so
Can it be replicated?	The innovation should be roughly replicable by other corporates, allowing whole industries to move towards more sustainable business models	

Figure 3. Summary of case studies

INNOVATION	CORPORATE ADOPTER	REGION	INDUSTRY	TYPE OF INNOVATION	SCALE OF ADOPTION	PAGE
Substituting ownership with car-sharing at scale	Hertz	Canada, France, Germany, Spain, UK, US	Automotive	Dematerialisation	Business unit	13
Providing performance-based lighting as a service	Philips	Netherlands	Electronics	Dematerialisation	Scalable solution	15
Exploring non-ownership models of leasing and collaborative consumption	B&Q (Kingfisher)	UK	Retail	Dematerialisation	Scalable solution	18
Transitioning to urban mining, clean technology materials and recycling	Umicore	Belgium	Chemicals	Open loop	Core business	23
Remanufacturing of two million components a year	Caterpillar	Global	Industrial engineering	Open loop	Business unit	26
Creating a value chain for sustainable food and cooking fuels	Novozymes, Cleanstar	Mozambique	Biofuels	Renewables and low carbon	Business unit	31
Reshaping the business case for renewable energy	DONG Energy, Novo Nordisk	Denmark	Utilities	Renewables and low carbon	Scalable solution	34
Providing solar power to the bottom of the pyramid	SunEdison (MEMC)	India	Utilities	Renewables and low carbon	Business unit	36
Avoiding end-user emissions through climate protection products	BASF	Global	Chemicals	Restorative	Scalable solution	41
Achieving net positive water balance	PepsiCo	India	Food and drink	Restorative	Scalable solution	44

Figure 4. Case study map: type of innovation and scale of adoption

	DEMATERIALIZATION	OPEN LOOP	RENEWABLE ENERGY AND LOW CARBON	RESTORATIVE
Core business		Umicore		
Business unit	Hertz	Caterpillar	Novozymes SunEdison	
Scalable solution	B&Q Philips		DONG Energy	BASF PepsiCo

DEMATERIALIZATION

“Businesses like ZipCar and Zilok are causing people to ask: do they need to own a car anymore? Do they need to own specialist power tools? People are not wedded to owning stuff anymore”

Matthew Sexton, director of corporate social responsibility, B&Q





DEMATERIALIZATION

The finite nature of resources, coupled with escalating global demand, is placing increasing pressure on global firms to reduce their reliance on natural resources.

Dematerialisation is the process by which businesses decrease their dependency on continual resource supply by embracing models based on sharing, collaboration and services. This category of strategic innovations is characterised by large firms moving away from traditional ownership models. At the macro level such business models reduce demand for individual products without reducing the utility provided to end users. This reduces the strain on natural resources.

Business models that pursue dematerialisation have reached varying levels of scale. B&Q is just starting out on the road towards innovating its business model: the firm has identified the need and is exploring the practicalities of scalable solutions using different business models. Philips is in the process of scaling up its Pay Per Lux leasing solution, while Hertz has rolled out its Hertz On Demand car-sharing business unit to six countries. Core business transformation of a large firm towards dematerialisation has yet to be achieved.

As resource scarcity looms, businesses that can shift their strategies away from 'make it, use it, chuck it' models, towards collaborative consumption and service-based models, will insulate their businesses from supply fluctuations and price inflation while creating a viable business case for sustainability.

SUBSTITUTING OWNERSHIP WITH CAR-SHARING AT SCALE

ADOPTER	Hertz On Demand, Hertz Corporation
DESCRIPTION	<p>Hertz On Demand provides customers 24/7 access to cars by the hour or day, which offers the freedom of car ownership, without the expense or commitment of actual car ownership. Hertz On Demand's business model is based on convenience, innovation and sustainability through provision of local and flexible hourly rentals and fuel efficient and alternative fuel vehicles. Unlike some competitors, Hertz On Demand also enables one-way rental. The programme launched in 2008 in London, New York and Paris and has since expanded in six countries: Canada, France, Germany, Spain, UK and US. Hertz On Demand plans to scale its rental locations in new cities, as well as grow its operations in current cities.</p>
WHAT ARE THE ENVIRONMENTAL SUSTAINABILITY BENEFITS?	<p>According to academic research by the Transportation Sustainability Research Center at the University of California Berkeley, shared-car utilisation coupled with increased use of public transport leads to 4-13 fewer cars on the road for every car-sharing vehicle. The benefits to communities and the environment include reduced traffic congestion, reduced parking space demand, decreased oil and gas consumption, fewer driving emissions and increased non-vehicle travel between car trips, such as walking, cycling and public transport. The Hertz On Demand fleet also contains alternative fuel and low-emissions vehicles, including hybrids, CNG, clean diesel and EVs, such as the Nissan Leaf, Chevy Volt and Smart EV.</p>
WHAT ARE THE DRIVERS FOR THIS INNOVATION?	<p>Customer demand for flexible, hourly car rental is the primary driver for Hertz's expansion into car sharing. The decentralised model is a convenient and economical option for many urban consumers compared to car ownership.</p> <p>Disruptive models such as ZipCar have made strategic innovation in the transportation industry a must-do.</p>



HOW WAS THIS IMPLEMENTED?

Hertz On Demand's fleet is equipped with technology created by Eileo technology, a French firm that Hertz acquired in 2009. The system allows consumers to book online or on their mobile devices. Vehicles are available globally, primarily in cities and on university campuses. Hertz On Demand has also partnered with retailers such as B&Q (UK) and Ikea (Spain), to provide customers with convenient access.

Not all customers instantly or intuitively grasp the benefits of renting cars using technology in this way. To help promote the economic, environmental and convenience benefits of car sharing, Hertz uses Facebook and mobile apps to engage and educate consumers.

WHAT LESSONS ARE THERE FOR OTHER FIRMS?

Firms in the automotive industry should be prepared to strategically innovate as new mobility trends, such as car and ride sharing, and new models, such as ZipCar and WhipCar, emerge and scale up.

Hertz differentiates from its competitors through one-way rentals, efficient and clean tech vehicles, and by removing membership fees. Hertz On Demand is an example of large corporates' ability to adopt new innovative models, and to improve, scale, and make them more sustainable. Hertz credits its horizontal organisational structure and open communication culture as enablers of its adoption of new business models.

Hertz On Demand also stresses the importance of communication with consumers about new technologies and sustainability solutions. Use of customer feedback and their preferred communications channels, such as social media and mobile devices, are critical to understanding their needs and improving customer satisfaction.



"We've improved our operations and technology significantly by using customer feedback. Where should we place cars? What customer service options are needed? The voice of the customer has been very powerful"

"We've created a culture of collaboration across the organisation. Hertz is able to support innovation even if it's disruptive, with a horizontal organisational structure where everyone contributes and works towards the same goal"

Jordan Reber, vice president, Hertz On Demand, Hertz

PROVIDING PERFORMANCE-BASED LIGHTING AS A SERVICE

ADOPTER	Philips Lighting
DESCRIPTION	Philips' B2B Pay Per Lux business model sells lighting as a service, distinct from the firm's traditional product approach. Philips recycles existing equipment and installs efficient lighting which it retains ownership of. The firm then pays customer energy bills and recycling costs at the end of the equipment's life. After a trial with RAU Architects in the Netherlands in 2010, Philips Lighting's Turnkey Projects & Services global business unit launched the Pay Per Lux service in the same year.
WHAT ARE THE ENVIRONMENTAL SUSTAINABILITY BENEFITS?	The key environmental benefits of Pay Per Lux are reduced ecological footprint due to closed material loops and energy efficient lighting solutions, including LED lighting. This example of dematerialisation is a shift away from a traditional ownership model to a performance-based service model. This gives Philips further incentive to innovate to create more efficient lighting solutions, and enables customers to upgrade to efficient lighting systems without upfront capital cost and to adopt new technology faster. Philips can also recycle or reuse equipment as it retains ownership, paying for disposal through assumed increases in material value.
WHAT ARE THE DRIVERS FOR THIS INNOVATION?	<p>In 2010, a small firm – RAU Architects – approached Philips. They wanted an office lighting solution in line with their aim for a cradle-to-cradle, closed loop office space.</p> <p>Philips Lighting sought a business model that addressed three innovation challenges for sustainable development: high standard of living; high energy efficiency; and low material footprint. This resulted in a business case for customers to adopt energy-efficient lighting, such as LED lighting, without the hurdle of large upfront costs.</p> <p>The Pay Per Lux concept was developed by pursuing this joint goal of efficient, closed loop light.</p>

HOW WAS THIS IMPLEMENTED?

Philips credits the success of the trial project to a close working relationship between Philips and RAU, and the transparency and ambition of the two firms around what they wanted to achieve and how they could get there.

When devising the service model, Philips Lighting faced obstacles around insurance, legal ownership and accounting processes. To overcome these challenges, Philips devised and presented a clear business case to stakeholders as early as possible, highlighting the business benefits and scalability of the concept.

Philips aims to scale up Pay Per Lux further in the future, as part of its Turnkey Projects & Services unit.

WHAT LESSONS ARE THERE FOR OTHER FIRMS?

The Philips case study highlights the important lesson that sustainable innovation does not end with sustainable products. To ensure a viable market for these products the value proposition needs to be reassessed and business models innovated accordingly.

In the B2B marketplace, collaboration between suppliers and customers can be pivotal in developing new business models that fulfil sustainability goals. By collaborating, firms can understand what drives their customers, and ensure that this is incorporated into the business model to achieve game-changing longevity and scalability.



“Sustainable technology solutions create additional value but the challenge is that this value is not necessarily customer value but value for future generations, social or environmental value. It’s challenging to find new ways to include these additional benefits into your business model”

Robert Metzke, senior director, EcoVision Program, Philips



© COURTESY OF PHILIPS

RAU Architects only pays Philips for the performance of the LED lighting it uses, while Philips retains ownership of the fixtures.

EXPLORING NON-OWNERSHIP MODELS OF LEASING AND COLLABORATIVE CONSUMPTION

ADOPTER	B&Q (Kingfisher)
DESCRIPTION	<p>Ian Cheshire, CEO of B&Q parent firm Kingfisher, announced in 2011 that the firm would explore new business models, including leasing its products. By the end of 2012, the firm had not rolled out a leasing model, but it is focusing on the cultural and system change required to make the transition.</p> <p>Simultaneously, the firm is exploring models of collaborative consumption using social networking sites. The firm's StreetClub initiative allows communities to form local community groups, while fellow Kingfisher brand Castorama has rolled out Les Troc'heures – a skills sharing website. The company is testing the water with these models to determine if there are opportunities to profit from them and is also looking at the feasibility of online tool banks. These initiatives sit within the context of Kingfisher's Net Positive Plan, released October 2012, which features innovation as a significant strand.</p>
WHAT ARE THE ENVIRONMENTAL SUSTAINABILITY BENEFITS?	At a macro level, dematerialisation through leasing and sharing reduces the resources needed to provide the same end value to consumers.
WHAT ARE THE DRIVERS FOR THIS INNOVATION?	<p>Emerging social trends are driving this innovation. B&Q cites the examples of peer to peer tool-sharing website Zilok and car-sharing site ZipCar as indicators that consumers are no longer concerned with necessarily owning products. Longer-term relationships with consumers are another benefit of these models.</p> <p>The move towards leasing is also being driven by a desire to insulate the business from rising resource costs, by retaining ownership.</p>



HOW WAS THIS IMPLEMENTED?

B&Q is still on the path to implementing a business model change. It is working to overcome initial challenges. Collaborative consumption models are still in the trial phase, but at relatively low cost the firm is experimenting with how it can monetise these initiatives.

The firm identifies two key barriers to a leasing model: culture and systems. To shift company culture, B&Q became a founder member of the Ellen MacArthur Foundation. As part of this, the firm implemented a 'Youth Board' last year – challenging nine young people to shadow the board and devise ways the firm could strategically innovate towards a more sustainable business.

B&Q is yet to overcome the system challenges required to adopt a leasing model – primarily IT and finance processes. The firm has learned from pilot initiatives into rental equipment – a more short-term approach to leasing – that have had mixed results. Based on this experience it has decided not to subcontract out these services but to keep them in house, to ensure customers receive a high level of service.

WHAT LESSONS ARE THERE FOR OTHER FIRMS?

Key to B&Q's exploration of new models has been the firm's watchful eye on the innovative and disruptive businesses that are emerging, particularly around collaborative consumption, and the social trends fuelling these.

Other retailers can learn from B&Q's steps to challenge itself through membership of the Ellen MacArthur Foundation and its efforts to create a culture of strategic innovation and not to get left behind.



“The drivers for leasing are numerous. Emerging social trends mean people are less keen on owning things now. In addition, leasing can be financially attractive for B&Q. If you keep materials in the loop then in 10 years’ time they are costed on resource costs 10 years ago and we insulate against increasing prices”

Matthew Sexton, director of corporate social responsibility, B&Q

OPEN LOOP

“With resource scarcity becoming more of a pressing concern, the more you can offer recycling services to customers and society in general, the more competitive you can become”

Tim Weekes, director of group communications, Umicore





OPEN LOOP

‘One man’s waste is another man’s treasure’. Open loop innovation is the old adage in practice as companies transform the waste of another firm into new products.

Recent years have seen a plethora of open loop innovations at the product level, with firms including Dell, Fujitsu and Puma repurposing waste into new products. But at the corporate level, how are firms innovating their business models to adopt open loop strategies?

Our case studies in this section showcase established, successful business models in this space, in contrast to some of the smaller-scale adoptions elsewhere in the report. Former mining company Umicore has successfully transformed its core business away from dirty, resource-inefficient mining and refining activities to an open loop business characterised by its commitment to sustainability megatrends. Caterpillar has created and successfully scaled up a business unit devoted to remanufacturing and repurposing machinery otherwise considered to be at the end of its life.

These successful transformations highlight the opportunities for large firms to scale up open loop innovation at the product level and to refocus corporate strategies on the bottom line benefits that waste can provide.

TRANSITIONING TO 'URBAN MINING', CLEAN TECHNOLOGY MATERIALS AND RECYCLING

ADOPTER	Umicore
DESCRIPTION	<p>Belgium-based Umicore was traditionally a commodity mining and refining company. In the mid 1990s the firm redirected its strategy away from mining towards materials technology, with a focus on materials, recycling, and creating and closing material loops.</p> <p>Since completing this transition in 2007, Umicore has established four business divisions: recycling, energy materials, catalysis, and performance materials. The firm reclaims and recycles over 20 different metals both from production scrap and end of life materials such as electronic scrap and used rechargeable batteries. It invests approximately 7% of its annual revenues in cleantech research and development.</p>
WHAT ARE THE ENVIRONMENTAL SUSTAINABILITY BENEFITS?	<p>Recycling end of life materials offers significant resource and CO₂ savings compared to mining from primary sources. According to Umicore, extracting 1kg of gold from a mine below ground requires the removal of 200 tonnes of rock, compared to processing just 3-4 tonnes of scrap to reclaim the same amount of gold from used electronics through an 'urban mining' approach.</p>
WHAT ARE THE DRIVERS FOR THIS INNOVATION?	<p>As part of its transformation, Umicore invested in voluntary remediation initiatives to clean up the environmental legacy of its mining and refining activities. The resulting boost to stakeholder relationships was a trigger for the firm to rethink its strategy towards sustainability and closing the materials loop.</p> <p>Today, Umicore's business strategy is designed around four 'megatrends': resource scarcity, renewable energy, cleaner air, and electrified modes of transport.</p>



HOW WAS THIS IMPLEMENTED?

Umicore achieved this radical shift in its business model primarily through divestments of mining and refining activities and acquisitions of cleantech and catalysis businesses, coupled with consistently high spend on research and development in recycling and materials for clean technologies. Umicore credits the success of this redefined strategy to consistency of leadership and a clear vision from the outset.

Today, Umicore embeds sustainability in the business, with dispersed responsibility and no central sustainability department. The firm produces a combined annual report, detailing economic performance alongside social and environmental.

WHAT LESSONS ARE THERE FOR OTHER FIRMS?

Mining and refining firms can learn from the close customer relationships that Umicore has achieved thanks to its open loop strategy. Close, long-term relationships with customers allow the firm to reclaim production scrap arising from customer use of Umicore materials – for example, germanium used for fibre optic cables – and recycle it into new materials. This is both cost effective and environmentally sound.

Umicore demonstrates the commercial viability of a business model that focuses on open loop, ‘urban mining’ and of adding value to metals. By mapping its business plan to four megatrends in sustainability, the firm has a long-term vision for sustainable growth.



“We made the conscious decision to address our environmental legacy. The credit we received from our stakeholders gave us an appetite to be even more entrepreneurial in developing our cleantech activities and business”

Guy Ethier, senior vice president, environment, health & safety, Umicore



© COURTESY OF UMICORE

Umicore produces gold and silver granules from its world leading precious metals recycling process.

REMANUFACTURING OF TWO MILLION COMPONENTS A YEAR

ADOPTER	Caterpillar
DESCRIPTION	<p>Caterpillar, global manufacturer of construction equipment, established its Cat Reman business unit in 1972. The unit remanufactures worn out Cat equipment such as engines and pumps, back to their original performance and life expectancy levels. In addition, Cat Reman provides remanufacturing services to other original equipment manufacturers (OEMs). In November 2011, Cat Reman announced an agreement with Vestas, a wind turbine manufacturer, to remanufacture the firm's wind turbine components.</p> <p>Cat Reman has over 4,000 employees globally. Its revenues increased by 205% between 2001 and 2011.</p>
WHAT ARE THE ENVIRONMENTAL SUSTAINABILITY BENEFITS?	<p>Cat Reman keeps materials in an open loop where they would otherwise have been taken to landfill by users at the end of Caterpillar's value chain. This is an open loop model, as remanufactured products are sold on again via Cat dealers rather than returned in a closed loop back to the same user.</p> <p>In 2011, the business took back approximately 70,000 tonnes of materials from over 2.2 million 'cores' (the worn out components that are the raw material for remanufacturing).</p>
WHAT ARE THE DRIVERS FOR THIS INNOVATION?	<p>Customer demand for remanufactured equipment was the primary driver for this new business in the early 1970s. Increasing revenues drive the growth of the business today, by supporting customers' desire to minimize owning and operating costs.</p>
HOW WAS THIS IMPLEMENTED?	<p>Caterpillar created a new business unit for remanufacturing services. To ensure the sustainability of this model, the firm charges customers a deposit when they buy remanufactured equipment – this deposit is then returned when the core is returned for remanufacture.</p> <p>This deposit system and a perception of remanufactured equipment as 'used' equipment have led the firm to experience hurdles when expanding into new, emerging markets. Cat Reman has actively worked in China for over six years but is only just getting traction in the market, having faced complex red tape around selling of remanufactured products. To overcome this, the firm has opened up dialogues with governments and encouraged market led lobbying.</p>



WHAT LESSONS ARE THERE FOR OTHER FIRMS?

The business case for remanufacturing is strong as it makes economic sense for both customers and manufacturers. The deposit system ensures the sustainability of this model and allows the firm consistently to recoup worn materials for reuse. By doing this, Caterpillar retains some of the value of the materials it sells and insulates itself against rising resource costs.

Caterpillar first identified the opportunity for this business model by engaging with customers and listening to their requirements. The firm has acquired such expertise that it is now in a position to provide remanufacturing services to other OEMs – another distinct business model. By making use of their core competencies and listening to the market, firms can provide new sustainable services for new and existing customers.

To promote a circular, open loop economy, the next step for business models such as Cat Reman, would be to broaden the scope of materials accepted for remanufacture and accept worn out equipment originally manufactured by other firms.



“A big hurdle we’ve had is that marketplaces like China and India view remanufactured goods as ‘used’ products – they technically define remanufactured as ‘used’. This makes the import process complex. We’re working with governments, dealers and end customers to resolve this”

Richard Snodgrass, manager, Cat Reman

RENEWABLES AND LOW CARBON

“The difference in business model is that we are selling electricity directly to household consumers. Elsewhere, SunEdison plants are feeding into the grid. In this case we are the grid”

Manik Jolly, director of rural solar solutions, SunEdison





RENEWABLES AND LOW CARBON

Renewable energy and low-carbon technologies are crucial to achieving a sustainable economy. But it's not necessarily easy to identify a business model that provides a viable and sustainable business case for this technology. Across the world such models rely on fluctuating government policies.

A theme in this section is the creation by traditionally business-to-business companies of new business units based on bottom of the pyramid models in rural areas. The examples show how Novozymes and SunEdison seek to access high-growth opportunities and to provide clean solutions to entirely new customers.

The importance of collaboration is also evident. One firm may have the technology solution, but it may need to collaborate with external partners or customers to create a viable business case. That's the case for all the business models outlined here.

Innovative strategies that focus on renewables and low carbon are scaling up across the world as companies look outside the box to rethink how to achieve shared goals.

CREATING A VALUE CHAIN FOR SUSTAINABLE FOOD AND COOKING FUELS

ADOPTER	Novozymes and CleanStar
DESCRIPTION	<p>Biotech firm Novozymes partnered with CleanStar Ventures to launch a joint venture – CleanStar Mozambique – in 2011. The venture comprises agricultural cultivation, processing and distribution operations.</p> <p>The cultivation arm works with subsistence farmers in central Mozambique to boost production of cassava, legumes and cereals using simple sustainable farming methods such as crop rotation and agroforestry. Cassava is a staple food crop, particularly resilient to variations in rainfall, but rapid degradation of the fresh tuber limits the market demand for it.</p> <p>CleanStar’s processing division commits to purchasing the farmers’ surplus production. It processes the cassava into an ethanol cooking fuel, and the legumes and cereal into packaged foods at its integrated food and energy processing facility.</p> <p>The firm sells this cooking fuel, along with affordable cookstoves, to customers in the Mozambique capital, Maputo, using its own network of shops and door-to-door micro-resellers.</p>
WHAT ARE THE ENVIRONMENTAL SUSTAINABILITY BENEFITS?	<p>Downstream, CleanStar Mozambique’s cooking fuel is a cleaner, healthier alternative to the charcoal that is used daily by 75% of urban households as a cooking fuel. Reducing demand for charcoal helps avoid deforestation and reduce greenhouse gas emissions.</p> <p>Upstream, by working with farmers to improve yields by using more sustainable farming techniques, CleanStar Mozambique is ensuring better natural resource management and a more resilient income stream for subsistence farmers, without compromising the food crops they depend on.</p>
WHAT ARE THE DRIVERS FOR THIS INNOVATION?	<p>Novozymes was driven to launch this joint venture by its appetite to create business models that use its technology solutions and provide value to customers in high-growth frontier markets. This followed the recognition by the firm that it did not have existing models to access such markets with its technologies.</p> <p>In addition, both partners were driven by the need to overcome the ‘fuels v food’ debate and to create a sustainable fuel value chain that boosts food production and enhances nutrition security.</p>

HOW WAS THIS IMPLEMENTED?

As founding partners in the venture, Novozymes and CleanStar both provided expertise as well as the initial capital. Novozymes' enzyme technology is used to create ethanol from cassava, and CleanStar's on-the-ground venture development experience is a crucial enabler. The integrated commercial model has proven an attractive investment, securing US\$20m over three rounds of fundraising with a projected internal rate of return of 15%.

WHAT LESSONS ARE THERE FOR OTHER FIRMS?

From the outset, Novozymes and CleanStar considered scalability and replicability to be crucial to creating game-changing business models. They intend to duplicate and scale the model in new African markets.

This venture highlights the opportunity even for business-to-business firms – as Novozymes traditionally is – to leverage strategic partnerships to innovate their businesses towards consumer-facing models. CleanStar Mozambique allows Novozymes to provide a new type of value to a completely new set of customers.

The venture also highlights the role that the emerging “impact investing” sector can play in co-financing businesses that deliver social and environmental benefits.



“This business innovation is game-changing because it enables a growing percentage of the \$10bn spent annually on charcoal cooking fuel in sub-Saharan African cities to be channelled into a restorative solution that can be scaled by the private sector”

Sagun Saxena, director, CleanStar Mozambique



© COURTESY OF CLEANSTAR MOZAMBIQUE

The sustainable cooking fuel team in Maputo engaging the local community.

RESHAPING THE BUSINESS CASE FOR RENEWABLE ENERGY

ADOPTER	DONG Energy and Novo Nordisk
DESCRIPTION	<p>Danish utility DONG Energy and pharmaceutical firm Novo Nordisk established DONG's first climate partnership in May 2007. The partnership involves DONG providing its existing energy customer Novo Nordisk with energy consulting services. Novo Nordisk then convert the energy savings into the purchase of renewable energy certificates from DONG Energy, to invest in its renewable wind farm project Horns Rev 2. DONG Energy has since established 130 climate partnerships in Denmark and is looking to take the model into new countries, including the UK.</p>
WHAT ARE THE ENVIRONMENTAL SUSTAINABILITY BENEFITS?	<p>DONG Energy's climate partnerships provide benefits on both sides of the energy value chain: energy savings on the demand side are mirrored by investment in renewable energy on the supply side.</p> <p>On the energy reduction side, Novo Nordisk's total global energy consumption fell 21% between 2007 and 2011, while its sales grew 59% over the same period. On average DONG's climate partners reduce energy consumption by 10-15% and in some cases up to 30%.</p> <p>On the supply side, DONG's Horns Rev 2 wind farm, enabled by climate partnership investment, has a production capacity of 209 megawatts, equivalent to the annual electricity consumption of 200,000 homes.</p>
WHAT ARE THE DRIVERS FOR THIS INNOVATION?	<p>Novo Nordisk began to explore the business case for renewable energy in 2006, having joined WWF's Climate Savers programme and pledged to reduce its absolute emissions by 10% by 2014, on a baseline of 2004. When the agreement was made in 2006 this equated to a 65% relative reduction thanks to its growing business. The commitment proved a surprise driver as the initial unviable business case for expensive renewable energy forced the sustainability team to look at innovative ways to finance the purchase of renewables.</p> <p>For DONG Energy, this partnership was driven by a desire to invest in renewable energy, for which it needed guarantees that customers would pay a premium. This was coupled with regulation in Denmark specifying that utilities must assist their customers to reduce energy consumption.</p>



HOW WAS THIS IMPLEMENTED?

Novo Nordisk approached its energy supplier DONG Energy to discuss how to make renewable energy a viable option. DONG uses its expertise in energy-efficiency consulting to identify improvements for Novo Nordisk. Energy screenings are conducted on-site in collaboration between DONG Energy and Novo Nordisk staff. When the agreement was made in 2007, Novo Nordisk made a long-term commitment to earmark the financial savings to the purchase of renewable energy certificates from Horns Rev 2 wind farm until 2020.

WHAT LESSONS ARE THERE FOR OTHER FIRMS?

In this case an ambitious absolute emission reduction target made Novo Nordisk look beyond optimisation, exploring new business models with its energy supplier. Utilities can learn from DONG Energy's collaborative partnerships with business customers. For DONG this has not only enabled it to invest in renewable energy and benefit from the resulting premium paid, but it has also strengthened long-term customer relationships. Both firms credit the success of this initial partnership to a close, long-term working relationship that sought a business model that would work for them both.



"We now get the energy reductions we want, we have access to more green electricity than we use and we currently save approximately 40 million Danish kroner annually in operational energy costs. We've more than proven that this was a really clever way to set a target and to have effective external partnerships"

Anne Gadegaard, programme director corporate sustainability,
Novo Nordisk

PROVIDING SOLAR POWER TO THE BOTTOM OF THE PYRAMID

ADOPTER	SunEdison (MEMC)
DESCRIPTION	<p>Solar energy firm SunEdison launched Eradication of Darkness, its electrification programme in rural India, in May 2012. The programme builds on a successful pilot in Meerwada village in India and will provide solar energy to 29 communities before being scaled up further next year.</p> <p>Off-grid villages with no electricity will be provided with a solar energy plant, creating a micro-grid that will supply local houses directly.</p> <p>Operational costs will be paid by revenues collected from houses supplied with the energy. To cover capital costs, the Indian government has awarded the programme a 90% subsidy and the firm is seeking partnerships with other organisations that would benefit from the rural areas having access to electricity.</p>
WHAT ARE THE ENVIRONMENTAL SUSTAINABILITY BENEFITS?	<p>This solution will provide clean energy to communities that have never had access to electricity. This will replace use of kerosene, and it avoids the alternative of micro-grid diesel-based power.</p>
WHAT ARE THE DRIVERS FOR THIS INNOVATION?	<p>SunEdison was driven to explore this business model by the staggering number of people in India with no access to electricity. Three billion worldwide have no electricity and 400,000 of these people are in India. For a solar energy firm this represents an opportunity to use its technology to provide sustainable value and to access a large and previously untapped market opportunity.</p>



HOW WAS THIS IMPLEMENTED?

Before embarking on its pilot model in Meerwada, SunEdison conducted two months of in-depth on the ground research to determine community needs and the feasibility of the project. Internally, SunEdison built a team of experts with previous experience both in micro-grid and in rural project management. The firm has also paid close attention to the scalability of the model, with the intention that this should be reliable and scalable.

WHAT LESSONS ARE THERE FOR OTHER FIRMS?

SunEdison has redefined its customer by taking electricity directly to rural off-grid communities. While the firm has not ironed out its model yet, it is experimenting with the goal of making this a scalable, sustainable business model.

Before making this step, firms should conduct rigorous due diligence to understand how a new market might take shape and to anticipate challenges. By understanding potential customer needs, firms can innovate business models to provide the most value.

SunEdison has watched other small-scale rural electrification programmes carefully and witnessed their mistakes, such as relying too heavily on grants and not researching and anticipating potential load. Large firms looking to innovate business models should watch developments by other firms closely.



“The model and scale at which we are trying to move away from dependence on subsidies and grants, makes us pioneers in this field. We are determined to find the commercial and sustainable model for rural electrification”

Manik Jolly, director of rural solar solutions, SunEdison

RESTORATIVE

“Industry should not only be a user of water but also focus on recharge and conservation of water. Industry must have a restorative impact”

Vivek Bharati, executive director, agriculture and corporate affairs,
PepsiCo India Region





RESTORATIVE

There are pockets of restorative innovation across the world. These include reforestation, restoration of wetlands, coral reef restoration and other net positive environmental impacts such as a business saving more emissions or water than it produces.

In order for a business to achieve net positive impact it needs to look at its end-to-end value chain. Upstream in their supply chains, companies are extracting resources including water and materials, and traditionally this environmental cost has been externalised. Firms with active sustainable supply chain programmes are not only working to neutralise these impacts but also to positively benefit them.

PepsiCo has achieved net positive water balance at the country level in India. Downstream, firms have the opportunity to supply products that actively lower end-user emissions. BASF's portfolio saves more customer emissions than the firm's entire value chain footprint. These examples are scalable solutions with the potential to disrupt. But they have not yet been adopted at significant enough scale to change the core business model.

An inherent challenge to restorative strategies is the quantification and communication of these achievements. Firms need to collaborate with other industry players to standardise methodologies and provide transparent reporting and verification.

Business models with restorative aims are beginning to take shape, but they have a long way to go to achieve core business transformation.

AVOIDING END-USER EMISSIONS THROUGH CLIMATE PROTECTION PRODUCTS

ADOPTER	BASF
DESCRIPTION	<p>Global chemicals firm BASF's climate protection product portfolio includes innovative products which contribute to a reduction in greenhouse gas emissions at the usage stage. The portfolio includes efficient insulation materials, lightweight automotive plastics and resins for more efficient wind turbines. BASF published the emissions avoided by the use of its climate protection product portfolio for the first time in 2008.</p> <p>The firm spent one third of its 2011 research and development budget of €1,605m on climate protection products.</p>
WHAT ARE THE ENVIRONMENTAL SUSTAINABILITY BENEFITS?	<p>By using BASF climate protection products sold in 2011, end users saved 330 million tonnes of greenhouse gas emissions. Savings include more efficient heating of homes and more fuel efficient vehicles, and are achieved by using BASF products compared to non-use of these products.</p> <p>In the same year, BASF's complete value chain emissions totalled 152 million tonnes. This includes scope, 1, 2 and 3 emissions, including end use of products, supply chain and disposal emissions, in line with the Greenhouse Gas Protocol Value Chain (Scope 3) Standard.</p> <p>The net result is a positive environmental impact created by the business, where the emission avoidance benefits of its climate protection products outweigh the firm's value chain emissions. BASF remains committed to reducing its value chain emissions and has global targets in place to do so.</p>
WHAT ARE THE DRIVERS FOR THIS INNOVATION?	<p>In addition to the €6.7bn revenue that BASF generated from its climate protection products in 2011, another driver is the ability to identify how BASF chemical products can achieve end-user emission reductions. This raises the profile of BASF's brand with end-users as well as direct customers.</p>



HOW WAS THIS IMPLEMENTED?

BASF has been conducting life cycle analysis of its products for over 15 years using its Eco Efficiency methodology. This expertise has enabled eco design of BASF climate protection products and research and development investment.

BASF's calculations highlight that cement additives and insulating materials contribute the most to its customers' avoided emissions. The former reduce the need for cement clinker, which is highly energy intensive to produce, while efficient insulation reduces building energy consumption. These examples highlight the need to delve into the value chain, assess product use and the opportunities to innovate.

An ongoing challenge is the lack of standardised methodology to calculate avoided emissions. To overcome this, BASF provides transparent information online and works with other chemical firms under the umbrella of the World Business Council for Sustainable Development and International Council of Chemical Associations to develop a methodology. BASF's own calculation methodology was reviewed by sustainability researchers Oeko-Institut in 2008.

Communication of the results presents BASF with another challenge, as product sustainability benefits are often not realised by direct customers but by end-users. BASF has created exhibits to engage indirect customers, such as the BASF House at Nottingham University which demonstrates how BASF materials save emissions in the home.

WHAT LESSONS ARE THERE FOR OTHER FIRMS?

BASF demonstrates the business case for products that avoid emissions down the value chain and of conducting product life cycle analysis to identify where the benefits are.

BASF also credits the success of its climate protection programme to the leadership of its climate protection officer, who reports directly to the board.



"For BASF it's not about educating direct customers but educating the customers of the customers of the customers... It's really about taking these issues along the complete value chain"

Cordula Mock-Knoblauch, climate protection coordinator, BASF



© COURTESY OF BASF

A craftsman glues an insulating panel on to the facade of the East Hotel in Dubai. The building is optimally insulated thanks to BASF's multi-layer SENERGY insulation system. This reduces the energy used to cool the building by 50 percent.

ACHIEVING NET POSITIVE WATER BALANCE

ADOPTER	PepsiCo
DESCRIPTION	PepsiCo India has had 'Positive Water Balance' status since 2009. According to PepsiCo, its Indian operations consumed 5.8 billion litres in its manufacturing facilities in 2010 and replenished 10.1 billion litres of water in the same year, as verified by Deloitte, thus replenishing 4.3 billion litres of surplus water.
WHAT ARE THE ENVIRONMENTAL SUSTAINABILITY BENEFITS?	PepsiCo India effectively offsets the water that it consumes in its manufacturing operations by replenishing, reusing and conserving water in its agro supply chain, manufacturing operations and through creating rainwater harvesting structures in communities around its plants. However, the agricultural stage of the fizzy drinks supply chain uses substantially more water than the manufacturing stage and this is not included in the positive calculations.
WHAT ARE THE DRIVERS FOR THIS INNOVATION?	The primary driver for PepsiCo India's water recharging initiatives is the urge to address a pressing country need given the critical nature of water stress in India. Globally, PepsiCo prioritises water sustainability due to its fundamental importance to the PepsiCo business.
HOW WAS THIS IMPLEMENTED?	<p>The first hurdle PepsiCo sought to overcome was to map its water impact and to develop knowledge of water in both the supply chain and in its manufacturing operations. Assessing opportunities in agriculture was crucial since the sector accounts for 80% of all water consumed in India. PepsiCo India has capabilities in growing paddy and potatoes and has become water positive at the country level in India through water conservation in paddy and potato cultivation. Agricultural interventions include the 'direct seeding of rice' initiative, drip irrigation for potato cultivation, and community water recharging programmes such as check dams and recharge ponds. Recharge initiatives within its factories, such as rainwater harvesting, have also contributed to the positive balance.</p> <p>Budget for this has come from two sources: the established manufacturing process budget and the CSR budgeting process for water recharge initiatives in communities and agriculture.</p> <p>Working with external partners and suppliers was crucial for success. To get farmers on board with its direct seeding of rice programme, PepsiCo conducted demonstrations and training to communicate the positive impacts. The firm also worked with external partners including the International Rice Research Institute.</p>

WHAT LESSONS ARE THERE FOR OTHER FIRMS?

PepsiCo's water positive status highlights the importance of exploring opportunities both inside and outside its manufacturing operations including neighbouring communities to assess the positive impacts a business can have. PepsiCo has a lot of knowledge on agricultural practices and leveraged this to identify opportunities to save and replenish water.

The next step for PepsiCo is to achieve positive water balance at some of its individual plant level sites in India. This challenge highlights the local nature of water stewardship. It is crucial that any firm looking to develop a water replenishment strategy considers water locally and at the watershed level wherever possible. Replenishing water more than the equivalent to that used across PepsiCo's agricultural supply chain would be an ambitious next step.

In addition, firms seeking to communicate positive environmental balances should ensure that assertions are quantified and backed up by third-party verification to ensure credibility.

"We need a sustainable business model with an inbuilt mechanism for environmental impact mitigation. Water is a critical stress factor for India so we need to be particularly responsible"

Vivek Bharati, executive director, agriculture and corporate affairs, PepsiCo India Region



LEARNING FROM GREEN GAME-CHANGING BUSINESS MODELS

This report highlights the innovative changes that some large businesses are making to their business models to achieve sustainability. Driving this movement are the smaller, disruptive business models that are emerging – using sustainability to create new markets and alter existing

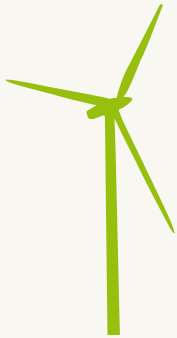
ones. There are common themes throughout the case studies that exemplify key learnings for other firms that have not yet started to think about redefining their business proposition towards sustainability.

Key recommendations for firms starting out on the road to sustainable business models:



HERTZ WAS ABLE TO BUILD ON THE ZIPCAR IDEA AND SOUGHT TO IMPROVE ON IT WITH ONE-WAY RENTALS AND MORE EFFICIENT VEHICLES.

- **Monitor emerging models.** Firms in all markets should consider how companies in their industry are delivering value and monitor shifts and new players in the market. When senior management at Kingfisher were presented with disruptive businesses such as the peer-to-peer tool sharing site Zilok, they were shocked by the traction that these models have achieved in the market already. As ZipCar continued to expand across the US and globally, Hertz innovated away from its core product and launched its own car-sharing business division. Hertz was able to build on the ZipCar idea and sought to improve on it with one-way rentals and more efficient vehicles. Small, disruptive business models are emerging: staying on top of this threat allows large corporate firms to act before they get left behind.
- **Don't stop at sustainable product innovation.** Sustainable products require business models that ensure a viable business case that captures all the value provided. Philips, for example, identified that the high capital cost of energy-efficient lighting required a new business model in order to be feasible for its customers. Accordingly, it developed a new model in collaboration with a sustainability-minded customer, which it can now roll out to others. In the same way, DONG Energy could not make the business case for investment in renewable energy sources work without having customers committed to paying the premium. As a result, the firm created a new service model for its customers by leveraging existing expertise in energy saving to fund renewable energy premiums. Sustainable products create



**BY COLLABORATING
EXTERNALLY, FIRMS
ARE CHALLENGED TO
BE MORE AMBITIOUS**

sustainable value that may not be captured in existing business models, requiring firms to be prepared to go further than just product sustainability and to innovate how they deliver value.

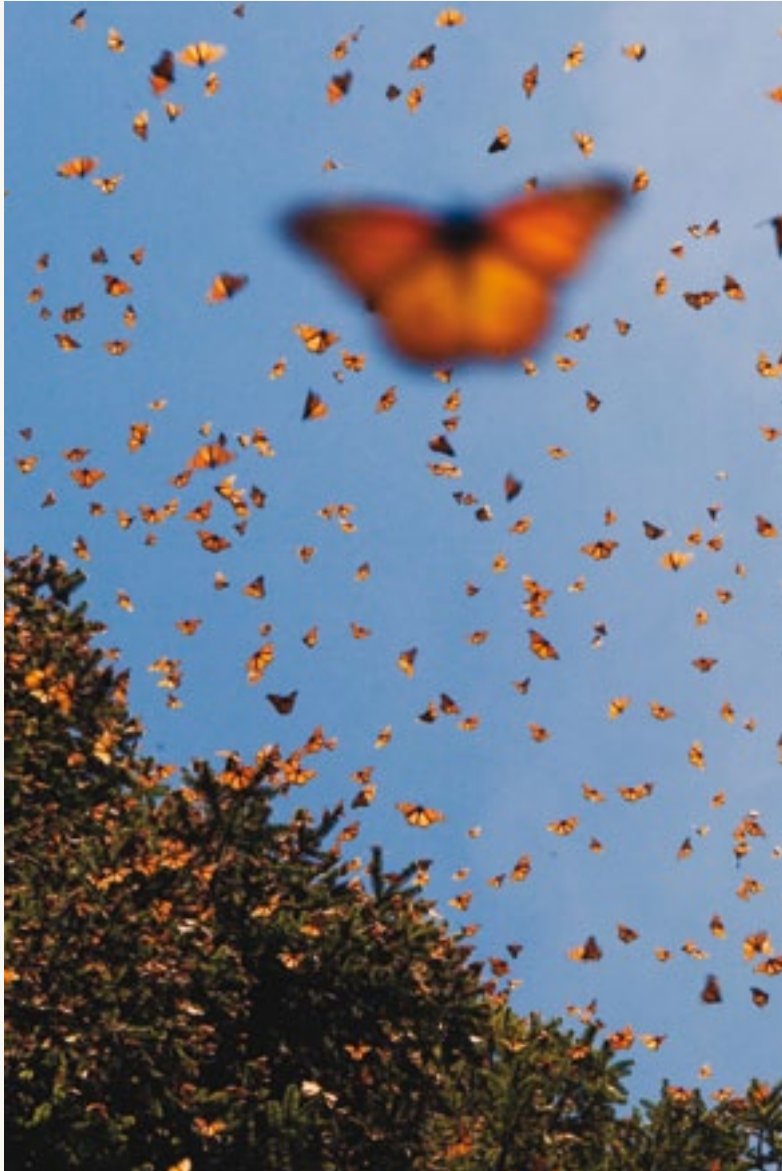
- **Get buy-in from the top.** Internal leadership support is crucial for sustainable business model innovations to achieve scale. At Umicore, the business's transformation is credited to a consistent vision from the top of the firm. Similarly at SunEdison it was leadership vision that identified an entirely new market for the firm. B&Q's CSR director Matthew Sexton views culture change as the biggest hurdle in adopting a more sustainable business model. But by getting leadership on board, the firm has made big steps towards positive culture change. When faced with a challenge from its CFO as to the financial viability of renewable energy, Novo Nordisk was forced to rethink its strategy to create a more viable business case to convince the board and to achieve its ambitious emissions reduction target.
- **Reassess the value chain.** Truly sustainable business models look outside a firm's four walls to the impacts that the company has in the value chain, both upstream and downstream. Both PepsiCo and BASF have had early successes in creating restorative models – by looking for restorative opportunities downstream in the case of BASF, and upstream by PepsiCo. In addition, Novozymes' CleanStar Mozambique venture redefined the firm's usual customer base and created an entirely new value chain. By taking a wide lens view of its business, its impacts and the potential opportunities, a firm can identify the scope for business models with positive sustainable impacts.
- **Collaborate externally.** The case studies in this report highlight that developing new business propositions and shifting towards sustainable models cannot be done without engaging with the market and collaborating with external partners. These may be customers, suppliers, NGOs or industry bodies. Novo Nordisk collaborated with WWF to set itself a challenging emissions target, forcing the firm to look outside its usual way of doing things and to collaborate again with its utility, DONG Energy. Philips worked closely with customer RAU Architects to identify a viable business model for sustainable lighting. And Umicore develops new ways of reusing materials by identifying customer needs. By collaborating externally, firms are challenged to be more ambitious, to think outside the box and to develop new ways of delivering value.



**THIS WOULD INVOLVE
SUSTAINABLE,
STRATEGIC CHANGE
AROUND WHAT
VALUE IS DELIVERED,
HOW VALUE IS
DELIVERED AND TO
WHOM VALUE IS
DELIVERED.**

Scalability remains a crucial tenet of business model innovation. While many of the business models profiled here demonstrate geographic pockets of scalable solutions or have been ramped up to comprise a separate business unit, there are distinctly fewer examples of businesses that strategically innovate their core business model towards sustainability. This would involve sustainable, strategic change around what value is delivered, how value is delivered and to whom value is delivered. A scaled up example of core business innovation is Umicore's transition from traditional to 'above ground or urban mining' and its strategy defined by global megatrends in sustainability.

As small-scale green innovators with novel business models are gaining traction and market share across the world, large firms need to reconsider business models to ensure they don't get left behind. This will involve more radical business model innovation, and businesses can learn from the case studies here of firms that have started out on this journey to business transformation.



© NATUREPL.COM / INGO ARNDT / WWF

Learning from green game-changing business models can transform the way we do business.

LOOKING AHEAD

Expert innovators at 10 very different large businesses have given us their perspectives on changes being driven across their organisations. These generate fascinating company, sector and economic-wide implications.

The emergence of businesses exploring more dematerialised and less resource-dependent propositions intersects with the way customers are questioning whether in future they'll need to own expensive goods. Can the same level of convenience that's currently gained through ownership be reached through leasing and sharing? Price, convenience and social media are evidently driving new collaborative consumption models that could change the face of retail.

Resource scarcity and natural limits are driving efforts to reuse materials, salvage used products and remanufacture goods to such an extent that we've seen one mining company transform into an above-the-ground or 'urban mining', open loop business. This contrasts with the Glencore and Xstrata models that bet on (and influence) increasing food and coal prices. Umicore's social licence to operate is clearly the more resilient one.

The energy sector has not changed a great deal over the last 40 years, but it is set to change dramatically over the next 40. In developed economies, closer working between energy users and suppliers is unlocking cost savings for reinvestment into renewable energy supplies. And in developing economies, off-grid renewables are tackling fuel poverty in rural communities. These opportunities open up new commercial avenues for the more forward-looking utilities.

Restorative and/or net-positive ambitions are increasingly becoming part of leading-edge business sustainability plans such as those of Kingfisher, O2 and IKEA. And evidence of net-positive results are arriving from the likes of BASF and PepsiCo. The shift from doing less harm to creating overall societal benefits will bring future-proofing for any business.

Global financial and non-financial challenges are driving businesses to innovate out of trouble and into new resilient ways of working. Is your company one that will disrupt, or be disrupted?

Dax Lovegrove, head of business and industry, WWF-UK.

Innovation in numbers

100%
RECYCLED

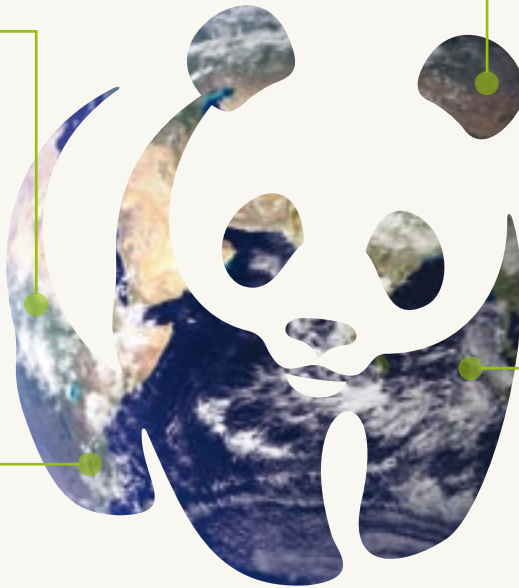


\$500

3D printers cost as little as \$500 and up to \$1.5m, can be placed anywhere and will eliminate the need for shipping and warehousing in most industries.**

40%

Global power generation from hydropower, solar, wind and other renewable sources is projected to increase by more than 40% over the next 5 years.*



\$158M

UK cleantech R&D investment will grow from £82m in 2011 to £158m in 2015.***

58%

58% of sustainability leaders globally expect their firm's sustainability budget to increase next year.****



Why we are here

To stop the degradation of the planet's natural environment and to build a future in which humans live in harmony with nature.

wwf.org.uk

WWF-UK, 2012, registered charity number 1081247 and registered in Scotland number SC039593. A company limited by guarantee number 4016725 © 1986 Panda symbol and © 'WWF' Registered Trademark of WWF-World Wide Fund for Nature (formerly World Wildlife Fund). WWF-UK, Panda House, Weyside Park, Godalming, Surrey GU7 1XR, T: +44 (0)1483 426444, E: business@wwf.org.uk

* International Energy Agency (IEA), Medium-Term Renewable Energy Market Report, July 2012

** How 3D printing will change manufacturing, www.investmentu.com, 23 July 2012

*** Verdantix, UK Sustainable Business Spending 2010-2015

**** Verdantix, Global Sustainability Leaders Survey 2012