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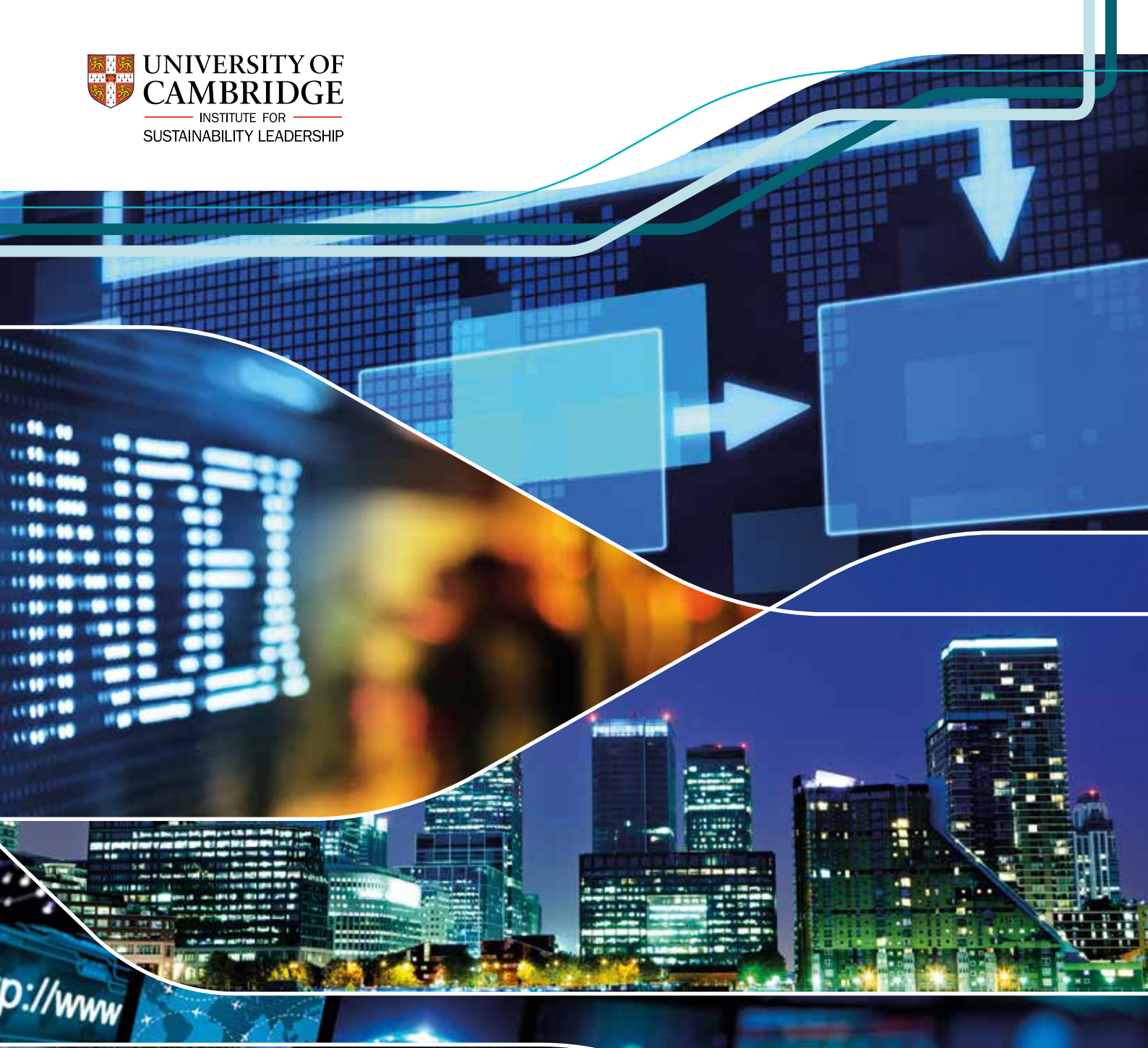
INSTITUTE FOR SUSTAINABILITY LEADERSHIP



Business compendium

How the private sector is building Europe's climate ambition

Produced for the Green Growth Platform

About the Green Growth Platform

The Green Growth Platform (GGP) was established in 2013 at the request of a group of like-minded European energy, climate and environment Ministers. It has grown in strength and now consists of Green Growth Groups at Ministerial, Business Leader and European Parliamentary level. The secretariat of the GGP is provided by the University of Cambridge Institute for Sustainability Leadership (CISL). The Prince of Wales's Corporate Leaders Group, which is also convened by CISL, acts as a strategic advisory body to the GGP.

The GGP provides an informed business and expert-led debate with useful insights into the challenges of a low carbon and resource efficient economy. The GGP brings together ministers from 16 European governments, 18 members of the EU parliament and some 40 major businesses to discuss and debate the economic opportunities and challenges involved in the transformation to a low-carbon economy.

The University of Cambridge Institute for Sustainability Leadership

For 800 years, the University of Cambridge has fostered leadership, ideas and innovations that have benefited and transformed societies. The University now has a critical role to play to help the world respond to a singular challenge: how to provide for as many as nine billion people by 2050 within a finite envelope of land, water and natural resources, whilst adapting to a warmer, less predictable climate.

CISL brings together business, government and academia to find solutions to these critical sustainability challenges. By bringing together multidisciplinary researchers with influential business and policy practitioners across the globe, it fosters an exchange of ideas across traditional boundaries to generate new, solutions-oriented thinking.

Rewiring the Economy

Rewiring the Economy is CISL's ten year plan to lay the foundations for a sustainable economy. The plan is built on ten interdependent tasks, delivered by business, government and finance leaders over the next decade to create an economy that encourages sustainable business practices and delivers positive outcomes for people and societies.

Publication details

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Foreword

Vidar Helgesen
Norwegian Minister of
Climate and Environment

Breaking the Climate Stalemate

With the historic climate agreement reached in Paris last December we have increased the global ambition on climate change. All countries will cooperate to combat the threat of climate change, to reduce emissions and to strengthen climate resilience. I believe the Paris Agreement sent a clear signal of a common will of action. It sets out to keep temperature rise well under two degrees Celsius, pursuing efforts to limit it to 1.5 degrees. And not least, it sets out to achieve climate neutrality in the second half of the century.

The private sector was important in reaching the Paris Agreement. It is the private sector that leads the way in showing us what is possible technologically. Without the strong involvement from many in the private sector, the path to Paris would have been much steeper.

Europe is showing leadership in climate policy. The EU has proved that decoupling of carbon emissions and economic growth is possible. The transition to a low-carbon economy will be demanding, but first and foremost it will offer opportunities.

I am delighted to introduce this Compendium. The case studies presented inspire me. The leading positions, as taken by companies across disciplines and sectors make me optimistic. Through partnership between the private and public sectors we are breaking the climate stalemate. Together we can, and will, find the smart and green solutions that secure economic growth, jobs and emission reductions.

All countries will cooperate to combat the threat of climate change, to reduce emissions and to strengthen climate resilience.

Norwegian Ministry
of Climate and Environment

Contents

Introduction

In 2013, working with the Green Growth Group of European environment and climate change ministers, the University of Cambridge Institute for Sustainability Leadership (CISL) established a respected and dynamic Green Growth Platform (GGP).

The platform has become a notable and influential hub for discussion about the future of Europe, creating numerous opportunities for dialogue between ministers, business leaders and policy makers and demonstrating through its activities the existence of a strong case for jobs, growth and competitiveness in a low-carbon Europe.

The Platform has brought together analysis and macro-economic evidence from some of the leading organisations and institutions in the world to show that a resilient, low-carbon future can be a positive and prosperous one. But alongside such analysis, there is a growing wealth of practical experience showing that low carbon industrial practices can be good for business and society at large.

This compendium of examples compiles some of that experience and shows the bold ambitions and impressive achievements that European businesses have made so far in tackling harmful climate change, and building a new climate-proof economy.

The report features leaders from a wide range of sectors and geographies across the EU. Some of the themes – such as the importance of energy efficiency and renewable energy – are predictable. It may be more surprising how strongly action on climate change is linked to innovation, and how often action turns out to be good business sense.

Many of these businesses are clear that a predictable EU policy environment is required to give them the scope for business. Targets and regulation are not seen as the dirty words they are sometimes caricatured as, but are seen by business as an important part of the landscape that can help their planning and underpin their innovation.

Companies featured in the report demonstrate that going down the low carbon route makes absolute business sense. Low carbon ambition has the potential to create competitive advantage, save money, create jobs and make businesses resilient and prepared for changing climatic and business environments.

Action and examples such as these will be vital to continue providing political momentum and additional policy insights as we move into 2016, a year of key significance at both EU and international level.

The Norwegian government has provided the funding for us to communicate these examples, which are intended to be useful to the governments, businesses and parliamentarians in the Green Growth Platform, as well as policy makers, business and investors across the EU.

Companies featured in the report demonstrate that going down the low carbon route makes absolute business sense.

Part 1

Retail and consumer goods

Part 1: Retail and consumer goods

Barilla
The Italian Food Company. Since 1877.

Company profile

Business:	The Barilla Group is a world leader in the market for pasta and ready-made pasta sauces in continental Europe for bakery products in Italy and for crispbreads in Scandinavia.
International Presence:	Barilla owns 43 production sites (13 in Italy and 30 outside Italy) and exports to more than 100 countries.
Turnover:	€3.3 billion (2014)
Employees:	8,136
Website:	www.barillagroup.com

Barilla
The Italian Food Company. Since 1877.

Company's sustainability vision

"Only One Way of Doing Business: Good for You, Good for the Planet, Good for the Communities."

Business case for low carbon

Barilla's Good for You, Good for the Planet strategy is based on a serious commitment for the future, realised through three dimensions, all linked to each other:

Good for you

- Barilla's commitment to providing a good, safe, quality and nutritionally-balanced products offer in line with the Mediterranean Model

Good for the planet

- Sustainable production and supply chains that respect the rights of the Earth and everyone involved from field to fork

Good for the communities

- Continuous collaboration to encourage the inclusion of diversity, access to food, and the promotion of responsible choices through educational paths

The Barilla Center for Food and Nutrition has developed the concept of a double pyramid, which shows how the foods recommended to be consumed most frequently (such as vegetables, grains, pulses and fruits) are also those exerting less environmental impact, whereas the foods that should be consumed less frequently (such as meat) are those characterised by a higher environmental impact.

A diet based on the principles of the Mediterranean diet, as suggested by the double pyramid, generates a lower environmental impact compared to diets that are heavily based on daily meat consumption.

Benefits, savings & profits

The company has consistently invested in low carbon investments and activities, especially in terms of energy saving and renewable energy initiatives.

In 2009, the Barilla Centre for Food and Nutrition Foundation (BCFN) was created. This think tank aims to investigate a multidisciplinary approach to the most burning issues related to nutrition, food and sustainability through the contribution of international researchers and scholars.

Since 2010 Barilla has implemented Barilla Sustainable Farming (BSF) programme. It consists of the active promotion of an integrated approach to sustainable cultivation of durum wheat through the promotion of crop rotation and the use of a decision support system in over 1,000 farms, resulting in a reduction of greenhouse gas (GHG) emissions and production costs for farmers.

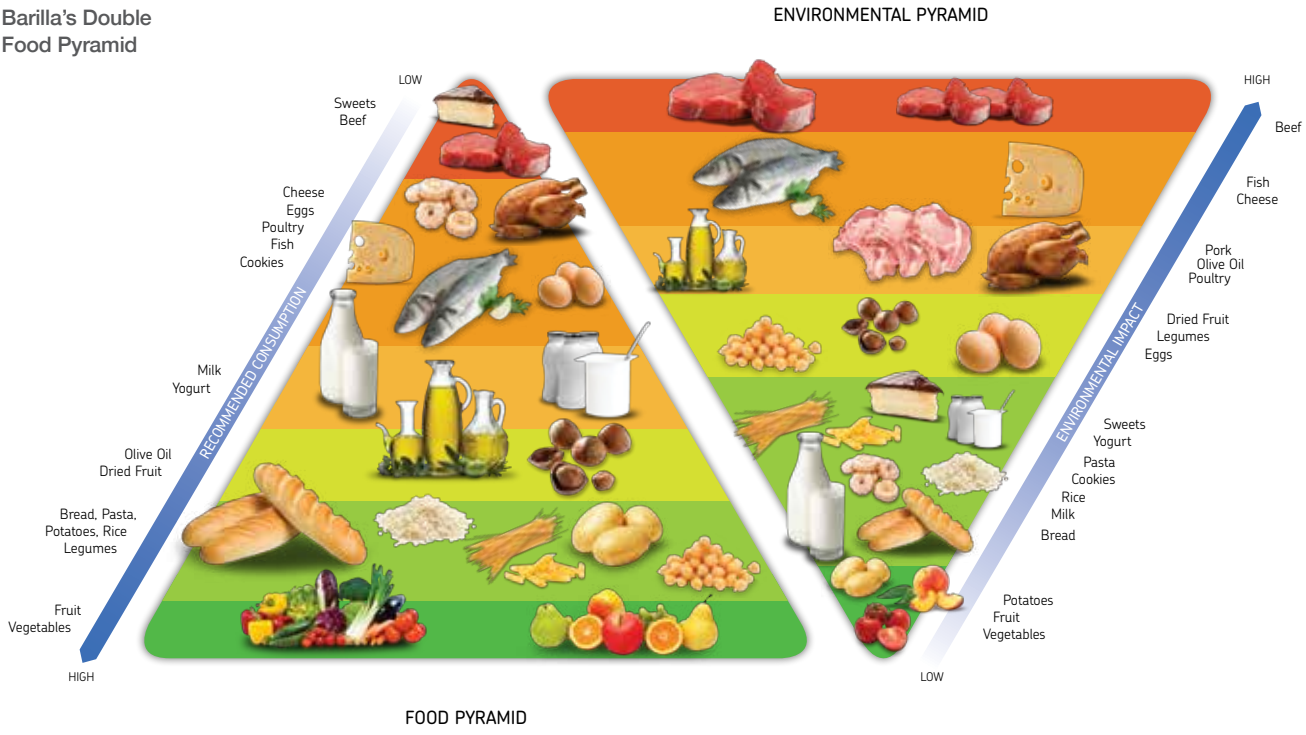
Company climate goals

Barilla's 2020 goals:

- 100% of Barilla products are in the lowest section of the environmental pyramid (93% in 2014)
- Reduce CO_2 emissions and water consumption in the production process by 30% per tonne of finished product compared to 2010 levels (20% in 2014)
- 100% of strategic raw materials purchased responsibly (6% in 2014)
- Develop sustainable cultivation projects for all strategic supply chain

Part 1: Retail and consumer goods *continued*

Barilla's Double Food Pyramid



The company's progress so far

Barilla has implemented the Sustainable Durum Wheat Project to identify sustainable agricultural systems with high levels of safety and quality. Various types of crop rotation and agro-economic practices were compared to identify the most efficient and sustainable cultivation method. This resulted in the development of the Barilla Handbook for Sustainable Cultivation of Durum Wheat and Garnoduro.net, a tool supporting farmers on how to optimise their cultivation practices. The project has shown that a 30% reduction of GHG can be achieved while increasing yields by 20%. In 2013 this project received the European Corporate Social Responsibility Award sponsored by the EU Commission.

In 2014, a 20% reduction of CO_2 emissions per tonne of finished product compared to 2010 was achieved and they invested €1.8 million in environmental impact reduction.

The project has shown that a 30% reduction of GHG can be achieved while increasing yields by 20%.

Barilla
The Italian Food Company. Since 1877.

Low carbon investment examples

A. Energy Projects

The main carbon reductions in Barilla plants have been obtained thanks to cogeneration plants, energy saving projects, and energy produced from renewable sources. Co-and tri-generation plants have been installed at all their Italian pasta plants. The Parma and Foggia cogeneration plants produce electricity and thermal energy; and the Caserta pasta plant uses a tri-generation plant producing electricity, heat, and refrigerated water.

To reduce energy consumption, cooling plants were constructed in a more efficient way and LED lightning has been adopted. Barilla is purchasing certified renewable energy for parts of its electricity demand in several of its plants.

B. Raw materials low carbon projects:

Barilla have implemented several projects regarding the raw materials they use:

- **Cereals:** Implemented projects for more sustainable agriculture in all countries from which Barilla purchases
- **Tomatoes:** Cooperation with local producers to improve environmental impact and farmers' income
- **Vegetable oils:** 100% Responsible Palm Oil (RSPO) sourced, which ensures zero deforestation and full traceability to the mill in the countries of origin
- **Packaging:** 100% of the virgin fibre cardboard used in packaging is certified according to FSC (Forest Stewardship Council), PEFC (Programme for the Endorsement of Forest) and SFI (Sustainable Forestry Initiative) standards

Outcomes and lessons learned

Sustainable agriculture has effectively demonstrated that economic, environmental and social sustainability can be pursued and achieved simultaneously benefitting the environment, farmers and the business.

The Barilla Sustainable Farming project has demonstrated the importance of adopting an integrated approach in order to implement sustainable cropping systems. Environmentally sound practices are also economically advantageous as they increase the efficiency of agricultural input, usage, and yields. Technical assistance to farmers reduces production costs and related environmental impacts.

Barilla is developing agreements with other operators in the Italian agro-food system to support farmers in developing multi-year sustainable crop rotation systems.

Innovation and improving production systems is key, but the most important challenge is to produce crops sustainably. It is fundamental for Barilla to act as a promoter of change in dietary behaviour in order to make a transition to a low-carbon society.

Effects of energy and climate policies on long term planning

Agriculture is responsible for more than 30% of the global GHG emissions, and food consumption accounts for 20–30% of the total ecological impact of households in Europe. It is essential, therefore, to raise public awareness concerning the environmental and nutritional impacts of their food choices, in order to achieve the twin goals of health and sustainability together.

As a food-producing company, Barilla feels that more investments could be made specifically to promote sustainable agriculture and sustainable diets. Current food consumption patterns in industrialised countries have an impact on human health and the environment.

Part 1: Retail and consumer goods

Kingfisher

Company profile

Business:	Kingfisher Plc is Europe's leading home improvement retailer.
International Presence:	Kingfisher Plc operates nearly 1,200 stores in 10 countries in Europe including UK, France, Turkey, Romania, Spain, Portugal, Germany and also Russia. The main retail brands are B&Q, Castorama, Brico Dépôt and Screwfix. Kingfisher Plc also operates the Koçtaş brand, a 50% joint venture in Turkey with the Koç Group.
Turnover:	£11 billion
Employees:	79,000
Website:	www.kingfisher.com

Company's sustainability vision

We create good homes by making home improvement accessible for everyone and we believe everybody should be able to have a home they feel good about.

Kingfisher's aspiration

Every Kingfisher store and customer's home is zero carbon or generates more energy than it consumes.

Business case for low carbon

Kingfisher promotes energy-efficient products and smart home devices to its customers. The smart home industry is growing and can deliver significant energy savings for customers through intelligent lighting and heating.

The COP21 agreement made Kingfisher aware that accelerated decarbonisation across its markets is required and they need to continue to see the low-carbon economy as an opportunity for the company in terms of saving energy and carbon for both the business and their customers.

Kingfisher's current investment of £50 million in renewable energy is part of a plan to reduce energy consumption from the national grid by 10% in the next two years.

Benefits, savings & profits

In their business, Kingfisher is integrating energy-efficient design principles into new stores and refurbishments, looking to improve energy performance with each new opening.

- A major focus is on cutting energy used for lighting, typically around 60% of store energy use, through the roll-out of LED technology
- The target is to roll-out LED to all new and existing stores by 2020
- To date LEDs were installed in 15% of the estate, which is delivering £3 million in savings per annum
- Kingfisher has cut energy intensity by 17% and reduced its total carbon emissions by 2% since 2010/11

Kingfisher works with NGOs, other businesses and governments to promote solutions that will speed up the transition to a low-carbon economy, including being active participants in the Prince of Wales's Corporate Leaders Group.

Company climate goals

- Save 38TWh of energy for customers by 2020
- Reduce energy intensity of Kingfisher's property by 45% by 2020
- Becoming carbon positive, so that every Kingfisher store and customer's home will be either zero carbon or generate more energy than it consumes. This will be achieved when a customer can visit any of Kingfisher's stores and be able to purchase all the products and services they need from Kingfisher to create a zero carbon or carbon positive home

The company's progress so far

Kingfisher is making good progress towards its 2020 targets. So far it has achieved the following:

- 45% reduced energy intensity
- 25% absolute CO_2 reduction
- 50% reduced carbon intensity
- 100% LED lighting throughout the property estate
- Half of group sales coming from eco products and services
- All energy using products meet best practice standards
- 38TWh of customer energy saved every year

Part 1: Retail and consumer goods *continued*

Low carbon investment examples

A. Consumer Installation Scheme

Kingfisher's energy saving products includes insulation, draught-proofing and low-energy lighting and appliances. Kingfisher also offers consumers advice and project planning tools to help with their energy efficiency projects. Kingfisher's companies are also launching installation services that make it easier for customers who want to save energy, without taking on the project themselves. Their customers are now saving 8.6TWh of energy every year through the energy-saving products they've purchased from their stores since 2011/12. This is enough to power three quarters of the homes in Paris for a year. This is equivalent to saving their customers over £600 million a year, based on the average UK household energy bill.

B. Consumer behaviour

Kingfisher has developed a portfolio of products across their stores. B&Q offers smart controls that enable people to come home to a house that's already lit up, already cooled down or already washing the laundry while eliminating wasted energy use ensuring systems are switched off when they are not needed.

One of Kingfisher's other business units, Screwfix, is also promoting connected products, including intelligent thermostats that learn people's behaviours as to when they do and do not need the heating on. Eco Prime, an initiative from Brico Dépôt France makes it easier for customers to plan home energy efficiency projects and access subsidies.

C. Efficient homes

The Efficient homes with Castorama scheme allows customers at Castorama's Hénin-Beaumont store to get help from specially trained sales advisors when planning a home energy efficiency project.

Effects of energy and climate policies on long term planning

The COP21 agreement signals shifts towards cleaner smarter energy. Kingfisher looks forward to additional EU and national government policies that drive greater certainty for businesses investing in low-carbon technologies and greater consumer demand for low carbon goods and services.

Kingfisher continues to drive cleaner technologies and energy efficiencies across the business. It also looks to build on the current energy solutions offered to customers.

Kingfisher's current investment of £50 million in renewable energy is part of a plan to reduce energy consumption from the national grid by 10% in the next two years.

Part 1: Retail and consumer goods

Company profile

Business:	Tesco is one of the world's largest retailers, active in food, non-food and retailing services.
International Presence:	Tesco serves millions of customers a week in their stores and online in 11 countries. Tesco has operations in the UK, Rep of Ireland, Czech Republic, Poland, Hungary, Slovakia, Thailand, Malaysia and Turkey.
Turnover:	£69 billion (c. €89 billion) (2015)
Employees:	480,000+
Website:	www.tescoplc.com

Company's sustainability vision

"Wherever we work, we want to help make life a little easier for our customers, colleagues and communities."

Business case for low carbon

In 2007, Tesco recognised that climate change is the biggest environmental threat the world faces and would have a profound impact on their operations and supply chains.

Climate change is already having a material impact on the ecosystems upon which their supply chain depends, which in return has financial implications on Tesco's value chain. To minimise this threat, Tesco set themselves the ambition of becoming a zero-carbon business by 2050. They also set 2020 commitments to halve emissions in their stores and distribution centres, cut transport emissions by 25%, and supply chain emissions by 30%.

The Paris Climate Agreement at the COP21, highlighted the need for business to act on climate especially as consumers and citizens are now expecting a bolder response from businesses and policy makers.

Addressing climate change also includes adapting to climatic changes. Creating a resilient food system will be critical for Tesco's business in the medium to long-term.

Tesco can benefit immediately from savings from investing in energy efficiency. In the medium to long-term, mitigation and adaptation offer the hope that the worst impacts of climate change can be managed in their supply chain and operations.

Benefits, savings & profits

In order to meet Tesco's 2050 zero-carbon aspiration, their approach is three-pronged:

- Invest in efficiency improvements: energy efficiency, refrigeration leakage reduction, transport efficiency
- Invest in renewables: electricity, fuel and natural refrigeration
- Engage with policy makers to create the regulatory environment to stimulate the move to a low-carbon economy

Since 2006, Tesco has invested over £700 million and has achieved reductions of more than 39% in their property emissions and 24% in transport emissions. By the end of 2010/11, the average carbon footprint of new stores and distribution centres across the group was already 28.8% lower than those built in 2006-07. These investments are already saving the company £150 million a year in avoided energy bills.

Company climate goals

Tesco has an ambition to become a zero-carbon business by 2050 and have set medium-term 2020 targets to help them achieve this:

- Reduce by 50%, the CO_2 emissions per square foot of their stores and distribution centres against a 2006/7 baseline
- Reduce by 25%, the CO_2 emissions per case of goods delivered against a 2011/12 baseline
- Reduce by 30%, the CO_2 emissions in the products in their supply chain against a 2008 baseline

They have also pledged to help achieve zero net deforestation by 2020, starting with the four global drivers for deforestation: palm oil, cattle products, soy and timber. For each commodity Tesco is mapping their supply chains to understand their exposure, and putting in place sustainable procurement policies.

Since 2006, Tesco has invested over £700 million and has achieved reductions of more than 39% in their property emissions and 24% in transport emissions.

The company's progress so far

Tesco's progress towards their targets so far includes:

- 39% reduction in CO_2 emissions per square foot of their stores and distribution centres between 2006 and 2015
- 40.9% lower carbon footprint of stores and distribution centres across the group at the end of 2014/15 compared to 2006/07
- 14.5% reduction in CO_2 emissions from distribution across the group against a 2011/12 baseline
- 100% certified sustainable palm oil in supply. Over 95% of this is through a combination of fully segregated and mass balance supply chains

Low carbon investment examples

A. Low-carbon stores

Tesco has been opening environmental stores in the UK since 2006, and in 2009, Tesco built its first store to use a new, low-carbon blueprint in Cheetham Hill with a carbon footprint that is 73% lower than that of an equivalent store built in 2006.

This environmental design is now standard and, planning permitting, all new-build stores will be based on this model and where possible, some elements will be incorporated into existing stores. Tesco has built low-carbon stores in every country in which it operates retail outlets.

- Its store in Rajec, Slovakia is the only one of its kind to be built from sheep's wool, wood and pressed straw
- Tesco Hungary opened a new environmental store that cuts the standard energy needs in half using alternative technologies
- Tesco Poland's sixth energy efficient store uses a ground heat exchange to cut energy use by 10%
- Solar installations are also present in the Czech Republic, Hungary, Korea, Thailand and Turkey

B. The world's first zero-carbon stores

Building on the low-carbon model, Tesco opened the world's first zero-carbon supermarket at Ramsey, in Cambridgeshire, UK, in November 2009. The store generates more energy than it uses; it produces its own energy using renewable fuel and exports any excess back to the national grid. It had 10–15% higher building costs than a conventional store, however, its environmental design and technologies cut energy use by 45%.

Tesco has since opened three more zero-carbon stores in the UK and one in the Czech Republic. The stores are all operating at a zero-carbon level, and some are generating excess energy.

The four zero-carbon stores in the UK generated nearly 7% more renewable energy than they required. This led to carbon savings of over 233,000kg CO_2.

C. Working with suppliers

Tesco is working with suppliers to identify the emissions hotspots in its supply chains. Tesco has invited over 1,200 of its suppliers to join them. To help share best practice across sectors Tesco launched its online Knowledge Hub in autumn 2010. Its next step is to pilot the development of carbon reduction strategies in three product categories, working with buyers and suppliers.

Outcomes and lessons learned

Some carbon reduction projects can pay for themselves over a reasonably short timeframe. Many of Tesco's energy efficiency projects have a less than four year payback. It was important to recommend energy efficiency investment options that are in line with Tesco's business realities and capital availability.

Setting clear and ambitious emissions reduction targets has fostered innovation at every level. For example, Tesco is tackling the problem of emissions on several fronts: reducing leakages, replacing HFCs with refrigerants that have lower global warming potential or natural refrigerants, and experimenting with new condenser systems and 'forced free air cooling systems'.

Some problems cannot be solved by one company alone. Suppliers need to be encouraged to set their own emissions reduction targets leading to more low carbon goods. Also, Government policies that foster renewable energy are critical for Tesco to achieve their carbon targets.

Part 1: Retail and consumer goods *continued*

Effects of energy and climate policies on long term planning

The Paris Climate Agreement represented a settled policy consensus on the need to fight climate change.

Tesco welcomes this agreement as a major step towards reducing the risks of climate change on business. The long-term objectives and synchronised national targets of the agreement provide clear signals and certainty that will attract business investment and innovation to address emissions from energy, transport, refrigeration and agriculture.

The EU's long-term emissions reduction targets are supportive to long-term business planning. However, some analysts indicate that the EU's targets may not yet be sufficiently ambitious to meet the Paris Agreement.

The Paris Agreement includes a 'ratchet' mechanism by which targets are collectively reviewed and updated, which provides a planning horizon for businesses as the EU increases its carbon reduction efforts.

The UK's approach, enshrining a low-carbon economy in law, and having clear and highly ambitious rolling targets is a helpful approach that other governments can learn from.

The existence of sectoral emissions reduction targets for transportation, building and energy in many countries provide substance to the overall emissions targets. However, few countries within the EU or outside have yet to set sector-specific targets for agriculture, retail or manufacturing industries.

The EU and member states need to support further innovation, roll-out, and maturity of renewable energy and low-carbon technology by providing the certainty, signals, and incentives to attract long-term investment. This is critical to Tesco's ambition to become a zero-carbon business as a significant proportion of their direct emissions are from the grid.

Part 1: Retail and consumer goods

Unilever

Company profile

Business:	Unilever is a Fast Moving Consumer Good (FMCG) company spanning 14 categories of product including home, personal care and food products.
International Presence:	Global business with manufacturing operations in over 60 countries touching the lives of over two billion people every day.
Turnover:	€53.3 billion worldwide, €13.6 billion in Europe (2015)
Employees:	172,000 worldwide, 22,000 people in Europe
Website:	www.unilever.com

Company's sustainability vision

"Unilever's purpose is to make sustainable living commonplace."

Business case for low carbon

Stabilising the global climate is the greatest challenge of the 21st century. As its consequences are already felt around the world and as cost of inaction now exceeds the cost of action, tackling climate change makes good economic sense.

As signalled at the Paris COP21 a turning point has been reached for accelerating climate action on a global scale. Unilever believes that businesses should not and will no longer stand on the side-lines, therefore a transformational change is needed for how business is conducted. A report by the Carbon Disclosure Project (CDP) indicates that businesses which actively take into account the issue of climate enjoy 18% higher returns on investment than those that do not. Engaging on this path, therefore, became critical to the success of Unilever. Key benefits include improving the security of supply of Unilever's raw materials due to changes in rainfall patterns and avoiding disruption from extreme weather events.

At Unilever they are already taking significant actions across their value chain. Five years ago they launched their Sustainable Living Plan to build a business fit for the future. Since then the world has changed enormously, becoming ever more volatile and complex, and presenting huge challenges to our society and planet. Unilever has grown and with it proved how sustainability can drive growth, innovation, and develop closer relationships with consumers.

Benefits, savings & profits

Unilever has made cumulative cost avoidance of over €400 million through eco-efficiency measures in their factories. Innovation in products has also provided savings. On Dove Body Wash, for example, their newly developed packaging technology bottles uses 15% less plastic, saving them €50 million.

By playing an active role in a number of business coalitions, such as We Mean Business, the B Team and the World Business Council for Sustainable Development, Unilever is seen as one of the most progressive businesses in this space and has been recognised year-on-year as the world leader in sustainability in the Annual GlobeScan Sustainability Survey of corporate leaders.

By proactively cutting their greenhouse gas (GHG) footprint they also reduce their exposure to environmental regulation and taxes.

Company climate goals

Unilever's most recent and biggest commitment is to become 'carbon positive' in their operations by 2030. To do this, they will:

- Source 100% of their total energy across their operations from renewable sources by 2030
- Source all electricity purchased from the grid from renewable sources by 2020
- Eliminate coal from their energy mix by 2020
- And in order to achieve their target of 'carbon positive' by 2030, they intend to directly support the generation of more renewable energy than they consume and make the surplus available to the markets and communities in which they operate

The company's progress so far

Unilever progress can be measured in four different areas:

Reducing their carbon footprint:

- CO_2 from energy in manufacturing has been reduced by 40% per tonne of production since 2008, the equivalent of one million tonnes of CO_2 per annum
- In absolute terms they have reduced CO_2 from energy in manufacturing by 65% since 1995

Making manufacturing and distribution more eco-efficient:

- They have made cumulative cost avoidance of over €400 million through eco-efficiency measures in their factories
- At the UK Marmite factory, for example, they convert waste into methane via an anaerobic digester that provides 30% of the factory's thermal energy needs; waste mayonnaise from Purfleet in the UK is turned into biofuel; Ben & Jerry's uses ice cream waste to create biogas

Eliminating deforestation:

- Together with others in the industry, Unilever has committed to achieving zero net deforestation associated with four commodities: palm oil, soy, paper and board, and beef no later than 2020
- 55% of Unilever's agricultural raw materials were sustainably sourced by the end of 2014, exceeding their interim milestone of 50% by 2015
- As the largest user of palm oil, 20% of their palm oil comes from physically certified sources, up from 9% last year

Helping consumers use less water, less energy and recycle more:

- Their compressed deodorants last as long, and perform as well while using only half the gas and 25% less packaging
- Their concentrated laundry liquid now comes in eco packs that can be used to refill existing bottles. They use up to 70% less plastic and reduce GHG impacts by 50-85% per consumer use

In 2015 they partnered with peer companies, experts and key stakeholders to identify how they can work together to eliminate waste on an unprecedented scale across the globe.

Low carbon investment examples

Unilever's goal is to become 'carbon positive' in their operations by 2030.

Being 'carbon positive' means that in partnership with others, they will directly support the production of more zero-carbon renewable energy than they need for their own operations. Unilever wants to demonstrate that ambitious climate action is both possible and profitable.

The first step will be to phase out their use of coal by the end of this decade. While this only makes up 4% of their total energy consumption, they recognise the importance of early action to phase out the most polluting fuels. Over the same time period all the electricity they buy from the grid will be from high quality certified renewable sources, something they have already achieved in North America and Europe. Also by 2020, they will power more than 50% of their total energy consumption (heat and power combined) from renewables. Unilever Japan has recently announced it is the first Unilever business to switch to 100% renewable power for all its domestic operations.

By 2030 all energy use will be from renewable energy sources both a mix of purchased and self-generated renewables. As they become a 'net positive' generator, they intend to directly support the generation of more renewable energy than they consume and make the surplus available to the markets and communities.

Unilever have developed these targets with the support of independent global non-profit Forum for the Future and will continue to work collaboratively with partners, suppliers and others to achieve their goal. They are currently working on a roadmap for making this a reality.

Outcomes and Lessons Learned

Partnerships are key. Unilever recognise that the target of 2030 is ambitious. In the next 15 years, external forces will undoubtedly make this a very challenging target to realise. Unilever believes that ambitious climate action is both possible and profitable, and that with others on board, an accelerated decarbonisation of the economy is possible.

One challenge in particular is in developing countries where there is a lack of appropriate infrastructure and availability of renewables. In these situations, Unilever will look to stimulate investment and thus the growth of a renewable energy industry through partnering with renewable energy providers.

Sometimes it can be difficult to compare corporate commitments on renewable energy because of the differences in geographic scopes and types of businesses, (for example industrial companies versus professional services firms.) For a global business with manufacturing operations in over 60 countries, Unilever believes their new targets are consistent with a science based trajectory for the world to reach net zero GHG emissions by 2050.

Unilever hopes their ambitious move forward will both encourage others to do the same and give confidence to leaders that business supports and is planning for an accelerated decarbonisation of the world economy.

Effects of energy and climate policies on long term planning

Unilever has taken action to become 'carbon positive' in their operations by 2030 because it makes business sense. Industry is moving forward, but legislation will be an enabler to speed up the transition of the front runners and create an environment of support for companies that are struggling. Climate policy has a key role to play in stimulating low carbon investment by creating the long-term vision.

Part 1: Retail and consumer goods

Coca-Cola Enterprises

Company profile

Business:	Coca-Cola Enterprises (CCE) is the world's third largest independent bottler of Coca-Cola products.
International Presence:	CCE manufactures and distributes soft drinks across eight countries in North West Europe.
Turnover:	$8.3 billion (2014)
Employees:	11,650 employees (2014)
Website:	www.cokecce.com/sustainability/climate-change

Coca-Cola Enterprises

Company's sustainability vision

"To grow a low-carbon, zero-waste business, and inspire and lead change for a more sustainable tomorrow."

Business case for low carbon

CCE believes that climate change is one of the most serious and complex challenges facing the world. Urgent action must be taken to tackle climate change, which is also one of the most significant risks for CCE's business.

Gradual rises in global temperatures, due to increased greenhouse gases (GHG) in the atmosphere, are linked to changing weather patterns and extreme weather conditions around the world, both of which could have adverse impacts on their manufacturing operations and distribution network. Climate change may also impact water, CCE's primary ingredient, exacerbating water scarcity and causing a further deterioration of water quality in affected regions.

In addition, climate change could lead to decreased agricultural productivity in certain regions of the world and possibly limit the availability or increase the cost of raw materials used in CCE's products.

CCE believes that de-carbonisation and the transition towards a low-carbon economy can be a driver of green growth and deliver significant long-term economic benefits. These include:

- Improved energy security
- New jobs in the low-carbon sector
- Reduced air pollution
- Protection of biodiversity and ecosystems

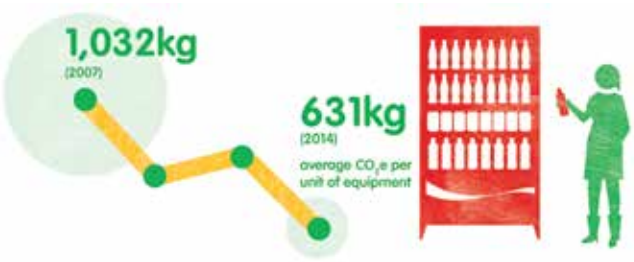
Transition to a low-carbon economy will also deliver long-term business benefits for CCE, including:

- Efficient and effective low-carbon manufacturing operations
- Sustainable packaging, utilising recycled and renewable materials
- Sustainably sourced ingredients
- Enhanced collaboration with supply chain partners
- Increased levels of employee satisfaction and employee engagement

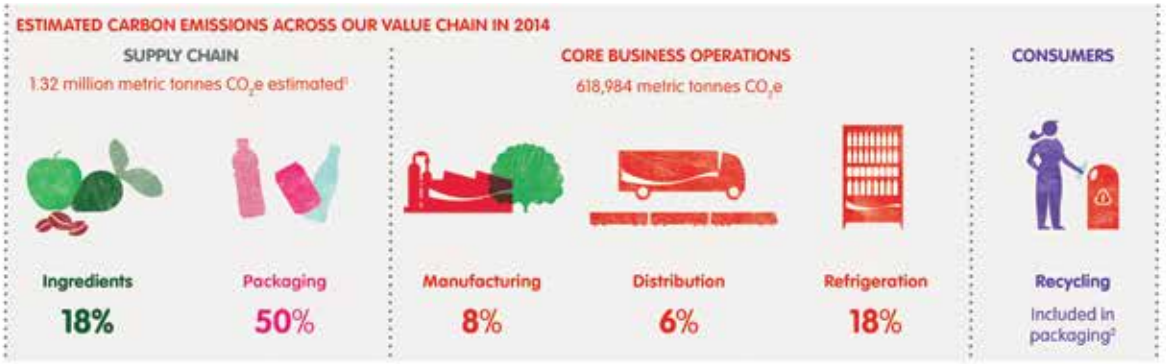
Benefits, savings & profits

Investments in low-carbon technology have helped to deliver significant business benefits for CCE. These include:

- A reduction in the carbon impact of their cold drinks equipment by more than 188,000 tonnes of CO_2 since 2007
- A carbon footprint reduction of 19,300 tonnes of CO_2 in 2014 as a result of projects to reduce the weight of packaging and use recycled and renewable materials
- An annual carbon footprint reduction of over 1400 tonnes of CO_2 as a result of the introduction of a Combined Heat and Power (CHP) plant at their Wakefield factory in the UK
- A carbon footprint reduction of 760 tonnes of CO_2 in 2014 as a result of the installation of energy-efficient LED and intelligent lighting systems in manufacturing sites in the UK and France
- The removal of more than 2.54 million road kilometres and 2,257 tonnes of CO_2 in 2014 as a result of transportation backhaul arrangements in place with major customers
- Accreditation as a Low Energy Company (LEC), achieved via the Energy Managers Association (EMA)
- In 2015, for the first time, CCE was listed in the Dow Jones Sustainability Index (DJSI). CCE has also been recognised as one of the leading performers in carbon management by The Carbon Trust and ranked 13th in the Corporate Knights' 2016 Global 100 Index of the Most Sustainable Companies in the World



Part 1: Retail and consumer goods *continued*



Company climate goals

CCE's climate goals and carbon reduction targets include a value chain carbon reduction commitment to "reduce the carbon footprint of the drink in your hand by one third by 2020". This is supported by additional commitments to:

- Reduce the absolute carbon footprint of their core business operations by 50% by 2020
- Manufacture every litre of product with 50% less emissions by 2020
- Ensure that 100% of the electricity used is from renewable sources by 2020
- Deliver a case of product with 30% less carbon emissions by 2020
- Reduce the carbon emissions from their cold drinks equipment by an average of 50% by 2020

The company's progress so far

CCE focuses on reducing both the carbon footprint of its business operations and that of its entire value chain. Since 2007, CCE has reduced its carbon footprint of "the drink in your hand" by 19% and has reduced the carbon footprint of its core business operations by 29%.

CCE has made significant progress against its other climate and carbon reduction targets, including:

- 24% reduction in the CO_2 g/litre of product produced (versus 2007)
- 26% reduction in CO_2 per case delivered (versus 2007)
- 35% reduction in the absolute carbon footprint of their cold drinks equipment (versus 2007)
- 39% reduction in the average CO_2 per unit of cold drinks equipment (versus 2007)

Outcomes and lessons learned

CCE's Sustainability Plan, Deliver for Today, Inspire for Tomorrow, sets challenging and measureable targets which represent a significant stretch for their business. To make a step change in sustainability, and to deliver against their targets, CCE has looked beyond their operations and taken responsibility for the whole life-cycle of their products.

CCE wants to work towards a low-carbon, zero-waste future where sustainable resources are used as a part of circular economy to ensure that every ecosystem in which CCE depends is healthy and capable of sustaining itself.

Collaboration and innovation throughout CCE's value chain will be essential in delivering sustainable growth and critical to their ability to deliver against their targets.

CCE aims to extend research, pilot new technologies and to embed sustainability into their procurement processes and supplier relationships. CCE aims to work with its suppliers to encourage them to improve their own sustainability. CCE's Supplier Relationship Management (SRM) process enables them to collaborate with suppliers, and provides a management framework under which each supplier is evaluated.

Coca-Cola Enterprises

Low carbon investment examples

A. Reducing the carbon footprint of CCE's manufacturing operations

CCE has set rigorous targets for reducing emissions across its value chain. CCE's manufacturing plants account for 8% of its total value chain carbon footprint. In 2014 CCE invested $59 million in new energy-efficient production lines and equipment and $10 million to reduce carbon emissions at its plants. This includes initiatives to:

- Manage the energy usage and adopting best practices and behaviours. Metering and inline monitoring and targeting systems to provide live data on energy consumption and to identify opportunities for improvement
- Invest in new and improved energy-efficient equipment and technologies such as optimised bottle blowers and installing energy-efficient LED and intelligent lighting systems

B. Reducing the carbon footprint of our packaging

Packaging is essential to safeguard the quality of their drinks and ensure their safe delivery to customers and consumers. Packaging is the largest source of carbon emissions in the CCE value chain, accounting for 50% of the total. To reduce emissions from packaging CCE has undertaken initiatives to:

- Constantly redesign packs to use less material. They continue to lead the industry in lighter packaging and aim to use 25% less material across all their packaging formats by 2020
- Include recycled materials in all of their packaging formats, including: aluminium, steel, glass and polyethylene terephthalate (PET). It takes 95% less energy to produce recycled aluminium than virgin aluminium, therefore, increasing the recycled content of cans represents the best opportunity to reduce their carbon footprint
- Ensure that 40% of the PET used is recycled PET and/or PET from renewable materials. This includes the use of PlantBottle™ packaging which is PlantPET derived from sugar cane and molasses, instead of fossil fuel based material
- Ensure that 100% of their cans and bottles are fully recyclable

C. Reducing the carbon footprint of cold drinks equipment

CCE's customers operate more than 545,000 items of cooling equipment. Their cold drinks equipment fleet is the third largest source of carbon emissions in their value chain, accounting for 18% of the total. In the past five years, CCE have invested more than $47 million in reducing these emissions. This includes initiatives to:

- Purchase new and more efficient equipment. CCE only purchases equipment that is at least 40% more energy-efficient than equipment purchased in 2000
- Fit existing equipment with energy-efficient technology during refurbishment and in customers' premises and working with suppliers and other partners to innovate and develop new cooling technologies that can then be adopted by the wider cold drinks industry

Effects of energy and climate policies on long term planning

CCE is already considering the impact of energy and climate policies on its long-terms business plans. This includes consideration of:

- The materials used for primary and secondary packaging in the future – including a focus on recycled and renewable materials
- The technology and refrigerant gases used in cold drinks equipment in the future
- The source of energy used in its manufacturing operations, with a focus on ensuring that by 100% of the electricity used by CCE by 2020, will be from renewable sources

Part 1: Retail and consumer goods

Company profile

Business:	Home furnishing retailer.
International Presence:	331 Stores in 28 countries and operations.
Turnover:	€3.5 billion (2015)
Employees:	155,000
Website:	www.ikea.com

Company's sustainability vision

"To create a better everyday life for the many people."

Business case for low carbon

As a global business, IKEA has a clear responsibility, and a great opportunity, to have a positive impact on people and the planet. IKEA has identified climate change as one of the biggest challenges and IKEA have decided to take a leadership position on this matter. Climate change has clear impacts for IKEA's business, severe storms and floods directly impact operations, moreover changes in land impact the sourcing and manufacturing part of their businesses.

IKEA believes that bold targets are needed in order to achieve a transformational change. Hence IKEA decided to produce as much renewable energy as they consume in their operations by 2020. IKEA is investing in solar and wind technologies but is also looking at energy efficiency as the simplest way to reduce CO_2 emissions and their dependence on fossil fuels.

Benefits, savings & profits

IKEA's goal is to become energy independent and to produce as much renewable energy as they consume by 2020. This will protect IKEA from fluctuating energy prices.

Improving energy-efficiency in buildings and operations has reduced running costs and carbon emissions. Energy efficiency measures have saved IKEA more than €133 million since 2010.

Changes to their transport network, to minimise the shipments needed and reduce transport distances, has also provided energy savings. Smart and efficient transport is an essential component of the IKEA business idea and is prioritised at every stage.

IKEA is also committed to enabling more customers to live more sustainably. Design improvements in their product range enable its customers to: save or generate energy, conserve and re-use water, reduce waste, and live healthier lives. One way IKEA measures its impact is by tracking the sales of products that they categorise as enabling a more sustainable life at home. The range continues to grow, keeping IKEA on track to achieve their goal of a fourfold increase in the sales of products for a more sustainable life at home by 2020, compared with 2013. In 2015, these sales more than doubled compared to 2013, to €1.3 billion.

Company climate goals

- By 2015, produce renewable energy equivalent to at least 70% of IKEA's energy consumption and by 2020, at Group level, produce as much renewable energy as consumed in IKEA's own operations
- Become 20% more energy efficient in their operations by 2015 and 30% by 2020
- By 2016, reduce carbon emissions from the transport of goods by 20% compared to 2011, and by 30% compared to 2012 by 2020
- By 2015, reduce carbon emissions from their operations by 50%

The company's progress so far

Since 2009 IKEA has invested €1.5 billion into renewable energy, and in 2015 a further €600 million was invested in to IKEA's own wind and solar power generation equipment. IKEA is committed to own and operate 327 wind turbines, and have already installed almost 700,000 solar panels on its buildings.

In 2015, IKEA's relative carbon emissions were 30% less than the 2010 baseline but still a long way from their 50% goal partly due to delays in energy efficiency improvements to retail units. As the company has opened new IKEA facilities many of these more energy intensive operations are in markets with limited access to renewable energy.

By 2015 IKEA had already reached their 2016 CO_2 reduction target for transport, reducing CO_2 per cubic metre of products transported by 27% compared with 2011. In 2015, IKEA switched its entire lighting range to

Part 1: Retail and consumer goods *continued*

energy-efficient LEDs. In one year, they sold 64 million LED bulbs. If each bulb replaced an incandescent bulb, it would be equivalent to energy needed to power more than half a million households for a year.

IKEA is calling for bold action from policy makers, individually and through the We Mean Business, a coalition of business organisations pushing for action on climate change which IKEA helped to found. IKEA is also a member of RE100, a collaborative initiative of leading influential businesses committed to 100% renewable power. Their commitments on tackling climate change, achievements and efforts to contribute to a low-carbon future have been acknowledged by international organisations and governments.

Low carbon investment examples

A. On-Site Improvement and Management

Every new IKEA site or building is assessed for its suitability for solar panels. The biomass and solar energy produced by IKEA is mostly used in their buildings. Most wind energy produced by IKEA is sold to the grid, but increasingly used internally. In some markets IKEA purchase renewable electricity to supply stores and other buildings, as well as producing its own. Improving on-site energy efficiency reduces running costs and carbon emissions. IKEA has carried out energy audits in all IKEA facilities in the EU.

B. Product Innovation

In 2012 IKEA switched its entire lighting range to LED. Thanks to its close cooperation with its supply chain, IKEA LED bulbs are now available in a range of shapes, sizes, and tones at affordable prices. Production automatisation enabled IKEA to reduce the recommended price of their most popular bulb by 80% compared to 2012. IKEA is also developing a new range of showers and taps with water and energy saving features. And even the carbon footprint of IKEA's new veggieballs is 30 times less than that of their traditional meatball.

C. Transport and accessibility

IKEA are making their stores, products and services accessible without customers needing to rely on private cars, and in this way reducing their carbon footprint. For example, in some markets, like Denmark, they have worked with municipalities and bus companies to better align timetables with store opening hours. Bus and train timetables are displayed in store and they also provide free shuttle buses between stores and city centres in several markets.

Outcomes and lessons learned

Substantial progress in reducing carbon emissions is both possible and desirable to IKEA's stakeholders and in particular its customers and employees. There is the need for IKEA's business plans to be updated as market forces, policies and legislation change across investment hotspots. Unpredicted policy changes harm long-term planning and lead to missed investment opportunities.

The energy and carbon markets are volatile, and financial returns of low carbon initiatives have had mixed results for IKEA. They have also observed that the sharing of knowledge and expertise across the EU and other markets is difficult. However, developments in technology support manufacturers who want to offer more sustainable products at affordable prices.

Effects of energy and climate policies on long term planning

Policies on energy efficiency and renewables have an impact on IKEA's decision to invest in a given country or region. IKEA advocate for frameworks that are clear and long term and which will facilitate those investments. On the road to COP21 IKEA advocated for an international agreement that would give a sign to investors that clean technologies should be further deployed and mainstreamed. As an international company IKEA needs to look at trends and legislative frameworks in different countries.

IKEA's goal setting is independent of specific policies in a given country. However the implementation of measures and investments to achieve its goals is directly impacted by national and local legislation. The measures taken to achieve the 2030 targets in the EU will most certainly have an impact on IKEA's business decisions.

The IKEA Group would like to see more ambitious, legally binding targets for the EU and its Member States.

It is important to think about what consumers could contribute and find ways to make it easier for them to invest in low carbon technologies in their homes.

Part 1: Retail and consumer goods

Interface®

Company profile

Business:	Interface is a world leader in the creation of modular flooring that combines beauty with functionality and sustainability to help organisations bring their design vision to life.
International Presence:	Interface is present on six continents, with 40 global showrooms and manufacturing sites in The Netherlands, the UK, Australia, China, Thailand, and the USA.
Turnover:	$1 billion (2014)
Employees:	3,500
Website:	www.interface.com

Company's sustainability vision

Mission Zero: an open commitment to eliminate any negative impact it has on the environment by the year 2020, and ultimately to become restorative.

Business case for low carbon

Interface embarked on Mission Zero 20 years before the European Commission's 2030 Climate & Energy Framework was signed. It was the result of the company founder's belief in the need for manufacturers to play a greater role in eliminating the world's negative environmental impact, but also in the potential business benefits of sustainable production. These include increased profits from reduced energy consumption, and more jobs throughout the supply chain. Interface has started looking beyond its 2020 sustainability mission and is developing ideas to become regenerative.

Benefits, savings & profits

Mission 2020 has a proved a profitable strategy for Interface with the following benefits being observed:

- Cost reductions: energy efficiency, material reductions and waste savings
- Reputation: Differentiating by doing some extraordinary things ahead of schedule and expectations
- Attracting and retaining employees: Empowering engineers, giving them an umbrella to act on and a stronger voice and a sense of pride for the rest of the organisation
- Product innovation: Sustainability innovations such as Microtuft products already account for 13% of total sales
- Sale competitive advantage from always being ahead in terms of innovation
- Protecting profitable markets such as Scandinavia where regulation and voluntary standards are very stringent on chemicals
- Expanding to adjacent markets and developing services

Interface is an internationally recognised pioneer of sustainable manufacturing and business practices, having won a number of awards for its achievements. This includes the highest distinction "Red Dot: Best of the Best" for Microsfera, the carpet tile with the lowest ever carbon footprint.

Interface's commitment to reducing materials, waste and energy consumption in Europe has had significant benefits for the business's operating costs. Cost savings are fed into research and development, as well as renewed investment in people and the expansion of Interface's global operations.

Finally, with the rise of green building standards, Interface products have an advantage by scoring higher than competitors on points such recycled content and CO_2 footprint.

Company climate goals

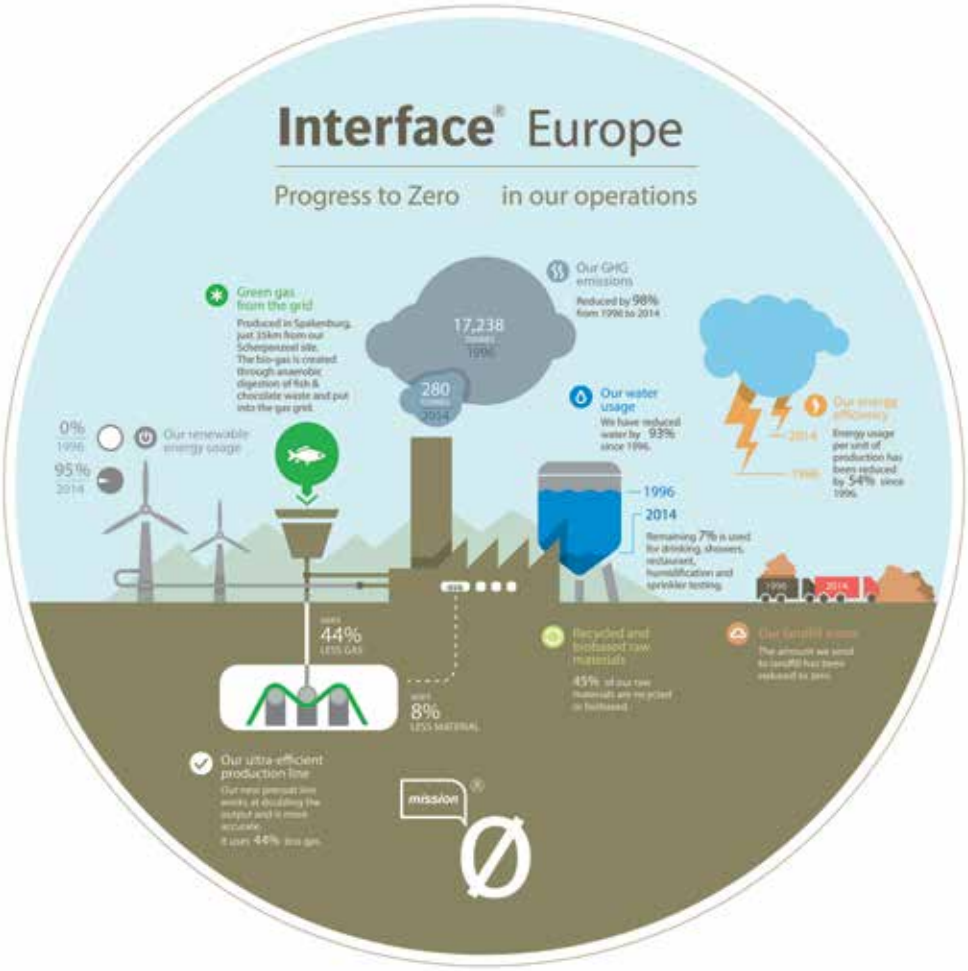
Mission Zero's 2020 goals by 2020:

- Zero carbon in own operations
- Zero waste to landfill
- Zero water in own manufacturing processes
- Zero non-virgin petrochemical raw materials
- Dramatically de-carbonising its products and supply chain

In addition to its own sustainability goals, Interface's Mission Zero pledge includes commitments to inspire partners up and down the supply chain to reduce their environmental footprint and achieve a truly circular economy.

With this success, Interface is now considering its sustainability goals beyond 2020 and defining how it will continue its mission as a regenerative company.

Interface®



The company's progress so far

Interface posts regular updates on its "Progress to Zero". These include:

- In 2014 the company's Scherpenzeel plant reached a number of sustainability milestones, including operating with 100% renewable gas and electricity. Using virtually no water in its manufacturing processes, and achieving zero waste to landfill
- Interface Europe has reduced its greenhouse gas emissions (GHG) by 98% and water use by 93%. This has led to ongoing net annual savings of more than €7.6 million in energy and raw materials savings
- Half of their raw materials are recycled or bio-based
- As of 2014 Interface has reduced its GHG emissions from its global manufacturing facilities by 73% compared to 1996
- In Europe, the embodied carbon footprint per m^2 has been reduced by 27% since 2008

Low carbon investment examples

A. Biogas at the Scherpenzeel facility, The Netherlands

The Dutch Government is promoting biogas in industry. The target is that green gas should account for at least 8% of gas use in The Netherlands by 2020, rising to 20% by 2030. Interface has already overachieved this goal as its Scherpenzeel facility which uses 100% biogas from anaerobic digestion of fish and chocolate waste, which is then fed into the national gas grid. In 2015, Interface invested €4.5 million in a flexible new installation at its Scherpenzeel factory to produce biobased compounds.

Part 1: Retail and consumer goods *continued*

As part of the investment it also created a dedicated research and development team focused on compound development.

Scherpenzeel uses 100%renewable energy, which has helped to eliminate the plant's reliance on natural gas.

B. Low carbon product design

Interface developed carpet tiles with the smallest ever carbon footprint in history. Microsfera carpet tiles release just 3kg CO_2 per m^2 during their production, including the processing of all the raw materials whereas a typical carpet tile release 12kg CO_2 per m^2.

Interface's Microtuft™ products made with 100% recycled nylon held the previous record for lowest carbon contribution of 5kg CO_2 per m^2 in comparison an 80/20 wool/nylon broadloom carpet releases 63kg CO_2 per m^2.

C. Product innovation

Interface pioneered the world's first recycled poly-vinyl butyral (PVB) precoat for use in the manufacturing of modular flooring. Interface has also co-innovated with partners to obtain PVB from car windscreens and turn it into an environmentally-sound replacement for the synthetic SBR latex precoat used predominantly in the industry. This innovation led to a PVB precoat with an 80% smaller carbon footprint than the industry standard.

This innovation has increased Interface's use of recycled or bio-based materials to 66%.

Outcomes and lessons learned

Interface's most important observation is that the carbon embedded in products is much higher than carbon in own operations but rarely is this the focus of companies. Using recycled materials is probably the best way to cut carbon and there are a number of energy efficiency technologies on the market that pay back in less than two years.

Renewable electricity is almost at parity with 'brown' electricity already and biogas command an acceptable premium in countries such as the Netherlands.

Effects of energy and climate policies on long term planning

Government and policy makers play a vital role in encouraging energy efficiency across the European economy, however, much more must be done. In Europe, the introduction of A-F ratings for energy using products or the end of pipe legislation in vehicles coupled with progressive tax thresholds and incentives are examples of how legislation can make a difference.

Embedded carbon is not only not regulated but not even measured at the European level. 1kg of cement and 1m^2 of carpet would have very different embedded footprints but there is no incentive for industry to measure it, let alone improve it.

Interface believes it is time for governments to design new policies to support the uptake of energy efficiency.

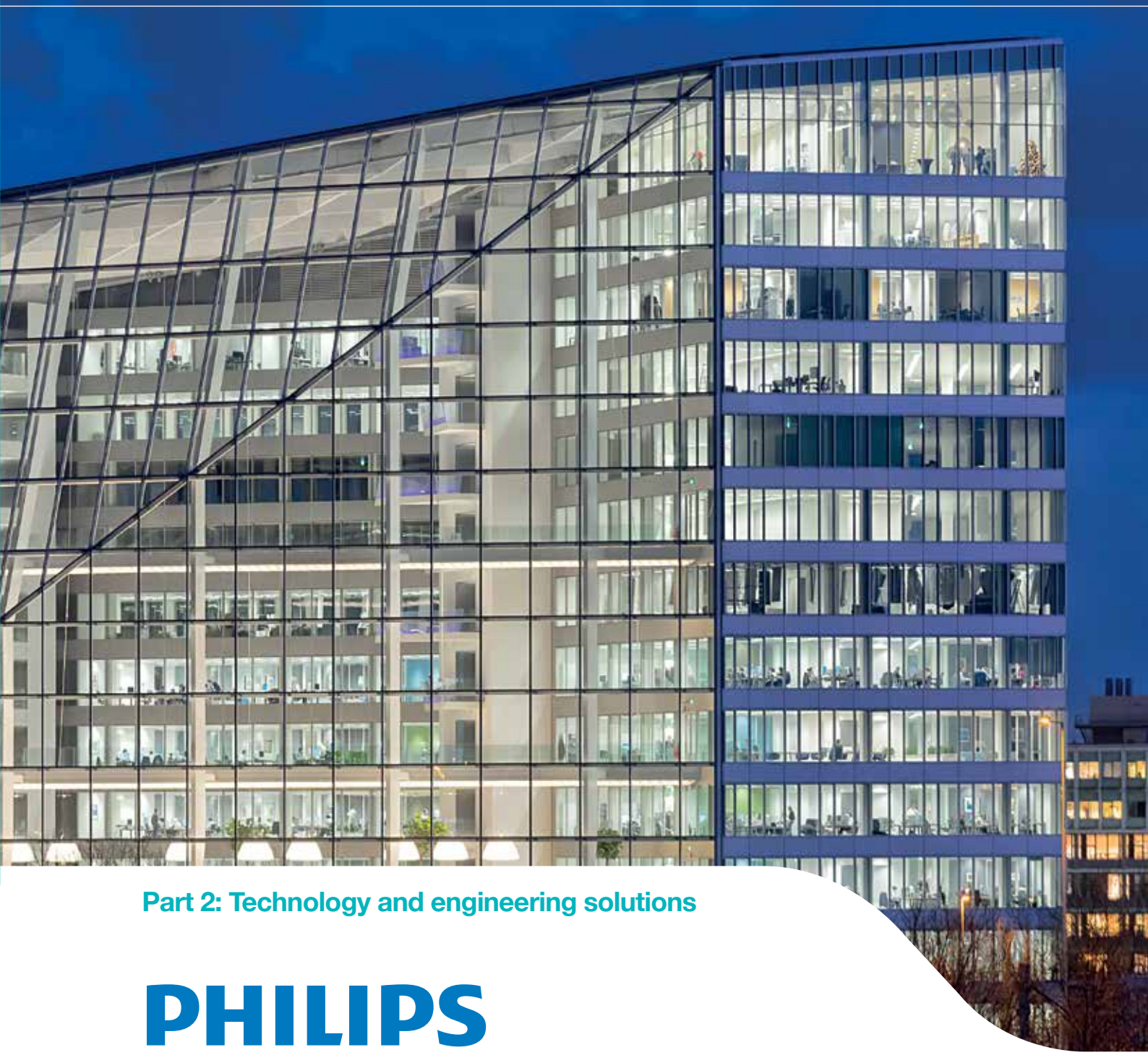
This could include far more aggressive building renovations targets focused on insulation and other technologies and more aggressive targets on energy-using products. Product standards are key, as seen in the car industry, and minimum standards and tax incentives for low energy buildings and transport could be developed.

The manufacturing sector in Europe is responsible for more than 17% of the EU's total carbon emissions.

At Interface Europe energy consumption has been reduced by more than 50% through investing in a range of technologies such as high efficiency boilers and hot air recirculation. Policies to support the uptake of these technologies, should also be recommended by Government's to boost energy efficiency across the whole manufacturing sector, especially on those sectors where electricity and gas costs are not a large part of their product.

Part 2

Technology and engineering solutions



Part 2: Technology and engineering solutions

PHILIPS

Company profile

Business:	Philips provide healthcare, consumer lifestyle and lighting solutions for individuals, communities and business customers.
International Presence:	Philips is a global company with sales and services in more than 100 countries worldwide.
Turnover:	€24.2 billion sales in 2015
Employees:	104,000
Website:	www.philips.com

PHILIPS

Company's sustainability vision

"We develop sustainable innovations that consider both people's needs and the ecological capacity of the planet. Our innovations improve people's health, well-being and quality of life, while reducing the ecological impact of our products, solutions and operations. Our ultimate goal is a healthier and more sustainable world."

Business case for low carbon

The lighting industry accounts for 19% of global electricity consumption. Global trends like population growth, urbanisation and the rise of the middle class will lead to an increase of 35% in the number of light points by 2030. Improvements in LED and connected lighting could contribute to delivering higher than previously foreseen carbon emission reductions. A global transition to LED lighting would result in an energy saving of 53% by 2030 when compared to a business as usual scenario.

Philips is leading the global switch to LED lighting and connected lighting that will bring multiple economic, social and environmental benefits. The versatility of LED lighting contributes to making cities more inviting for tourism, increasing citizen's sense of safety outdoors and improving productivity in the workplace. In addition, LED technology, when combined with the latest solar and battery developments, can provide practical light for one third of the world's population who currently live without electricity.

LED lighting applies EcoDesign principles in several ways such as energy saving, waste reduction, recyclability, the use of materials and resources. They use less energy than most other types of lamps with up to 80% energy savings. They last longer which means less frequent replacement and, therefore, reduce waste. They are also mercury-free, and can be housed in special luminaires designed for easier disassembly and recycling.

Benefits, savings & profits

Philips sustainable innovations help benefit: their customers, society at large, the environment, the company's reputation, and sales and profits. Philips aims to be carbon neutral by 2020 for all its operations, logistics and business travel.

LED sales now represent 48% of total Philips Lighting sales, compared to 37% in Q4 2014. Through energy-efficient LED, Philips can greatly contribute to a more sustainable planet.

Improving global energy productivity by 1.5% to 3% per year would provide the following benefits:

- €2.3 billion reduction in annual fuel bill by 2030
- Reduction of household energy bills by one third
- More than 6 million jobs (already by 2020)

Company climate goals

Philips will play their part in reducing greenhouse gas (GHG) emissions.

- Philips has pledged to cut their operational carbon footprint to zero by 2020
- Philips has also targeted to be carbon neutral by 2020 for all its operations logistics and business travel

Philips intends to reach their goals through a multi-pronged attack on the way they use energy, driving down energy consumption in their operations by reducing energy use, logistics and business travel.

Part 2: Technology and engineering solutions *continued*

The company's progress so far

Philips has measured the following progress so far:

- From 2007 until 2015, Philips reduced its operational carbon footprint by 40%
- Increased their use of renewable energy from 8% to 55% in just six years (2008-2014). They are also members of the RE100 program, which is a collaborative initiative of influential businesses committed to 100% renewable electricity
- Undertaken more than 260 connected street lighting projects around the world since 2011
- One billion lives improved (baseline 1.7 billion in 2012) 1.9 billion in 2014
- 14,000 tonnes of recycled materials used in products
- 536 tonnes of recycled plastics used in Q3 2015
- €563 million Invested in green innovation R&D in 2014
- In 2014 52% of total sales were Philips Green products
- In the 2015 Dow Jones Sustainability Index (DJSI), Philips became the leader in the "Industrial Conglomerates" category. Philips achieved top scores for its best in class performance on climate strategy, product stewardship, and supply chain management
- Philips has again been recognised as a world leader for corporate action on climate change at the Carbon Disclosure Project (CDP) Climate Leadership Awards 2015 and for the third year in a row they achieved a perfect score in the CDP Climate Change Survey

Philips Green products, which demonstrate improved environmental performance are often supported by a recognised eco-performance label. Philips categorises its products as green when they are outperforming existing products, competitor products, or surpass minimum legislative requirements by at least 10% in one or more of the six Philips Green Focal Areas.

Low carbon investments

A. The Edge, Deloitte's HQ in Amsterdam

Deloitte's HQ is an office of the future with greater comfort, productivity and building efficiency. Workers are able to personalise lighting and temperature via a smartphone app. Connected LED lighting powered over Ethernet provides anonymous occupancy and climate data for more efficient facility management.

B. Schiphol Airport Amsterdam

The Schiphol Group, Cofely and Philips have entered into a collaboration for new lighting in the terminal buildings at Amsterdam airport. Schiphol pays for the light it uses, while Philips remains the owner of all fixtures and installations, therefore, offering light as a service. By using energy-efficient LED lamps, a 50% reduction in electricity consumption will be achieved over conventional lighting systems. The lighting fixtures were specially developed for the airport to last 75% longer and this will reduce maintenance costs. By applying circular economy principles, a new standard in the transition towards sustainable lighting was created.

C. Street-lighting in Madrid

Madrid upgraded its infrastructure with the largest street lighting project in the world. The local government of Madrid aim to convert 100% of its street lighting to energy-efficient lighting. The Philips lighting technology used will enable energy savings of 44% and in doing so create a safer, more sustainable, and energy-efficient city.

D. Los Angeles City Touch

Los Angeles will become the first city in the world to control its street lighting through an advanced Philips management system that uses mobile and cloud-based technologies. Through Philips's CityTouch connected lighting management system, lighting, energy use, and the status of each light can be remotely controlled. Mobile chip technology enables street lights to identify themselves and network instantly. This smart plug and play approach reduces the cost of programming and commissioning time is reduced from days to minutes. The entire system can be controlled and managed remotely through any web browser.

E. Supplier Sustainability

Philips requires its suppliers to share their commitment to sustainability and have designed programs to engage and support them on a shared journey towards continuous improvement. By 2015, 72% of Philips suppliers shall adhere to their sustainability requirements.

PHILIPS

Outcomes and lessons learned

All energy efficiency sectors combined have the potential to help 'cross the gap' from the current three to four degree Celsius in global warming projections, to below two degree Celsius.

Switching to LED lighting will result in more than 40% energy savings in cities and smart connected LED lighting will result in 70% energy savings as well as increasing people's well-being and safety.

Effects of energy and climate policies on long term planning

Philips recognise the need for the EU to strengthen energy efficiency policy. The EU should focus on energy efficiency in cities as 75% of EU citizens live in urban areas. Investing in energy efficiency strengthens energy security, tackles impact of rising energy prices, reduces CO_2 emissions and improves Europe's competitiveness.

Currently the energy efficiency chapter of the EU 2030 energy and climate framework is weak but Philips also see opportunities. Implementation should include energy efficiency in buildings, appliances and cities. The EU also needs to better enforce Energy Performance of Buildings (EPBD) and the Energy Efficiency Directive (EED).

Philips recommend that energy efficiency should be promoted in public procurement funding and financing to achieve climate objectives. Public authorities at all levels should lead by example purchasing energy efficient products and services based on circular economy principles (eg light as a service). Investment decisions should be based on the total lifecycle cost, not only on the lowest initial cost. Innovative financial and fiscal incentives, and new business models, including Energy Performance, should be supported. Funding will be necessary for the large scale deployment of connected street-lighting and current EU Structural Funds may offer opportunities but more is needed to achieve scale in projects.

Part 2: Technology and engineering solutions

United Technologies

Company profile

Business:	UTC provides high-technology systems and services to the building and aerospace industries. Businesses include Otis, Pratt & Whitney, UTC Aerospace Systems and UTC Climate, Controls & Security.
International Presence:	UTC is a global company. Its sales in Europe represent 27% of total sales, with more than 62,000 employees in 32 European countries.
Turnover:	$56 billion net sales (2015)
Employees:	197,200 (2015)
Website:	www.utc.com, www.naturalleader.com

United Technologies

Company's sustainability vision

"Sustainability at UTC means we can do good for the planet while we do good for our employees, communities, customers and shareowners."

Business case for low carbon

UTC believes a low-carbon future is needed for the health of the natural environment and for the health of the economy to mitigate the risks associated with a changing climate.

To achieve a lower carbon future, UTC plans to:

- Extend the legacy it established in 1988 of minimising its environmental footprint to reduce greenhouse gas (GHG) emissions by 80% before 2050
- Advance the environmental sustainability and energy efficiency of technologies in its aerospace, food refrigeration, building products, and in systems to support sustainable urbanization across the world
- Require its preferred suppliers to annually reduce their operational environmental impacts, including GHG emissions
- Engage the global community to promote policies and initiatives that achieve energy efficiency and lower GHG emissions to ensure a sustainable future

Benefits, savings & profits

For nearly three decades, UTC has taken a comprehensive approach to incorporating sustainability into its products, operations and culture.

Since 1997, United Technologies has tripled its revenues while:

- Reducing greenhouse gases 34%
- Realised a 55% absolute reduction in the water it uses
- Achieved similar reductions in the waste it generates and air chemical emissions released to the environment

Beyond these benefits, UTC is committed to connecting the global dialogue on critical environmental issues facing the planet. As rapid global urbanisation continues it is equally important to build sustainable cities, ensure food security for billions of new city dwellers, and connect growing urban centres with sustainable aviation. UTC's approach to these issues is based on three key pillars: collaboration, research and education.

UTC is the only company in the world to be a founding member of Green Building Councils on five continents.

In 2014, its Carrier business convened its inaugural World Cold Chain Summit to Reduce Food Waste, which brought together experts to develop strategies for decreasing the estimated one-third of the world's food that goes to waste each year. UTC actively seeks opportunities to add valuable data through sponsored research that can help drive better decisions, while remaining committed to advancing energy efficiency in their products in support of a sustainable future.

Company climate goals

UTC new 2020 goals:

- Reduce greenhouse emissions by 15% by 2020 (versus 2015 baseline)
- Reduce water consumption by 25% by 2020 (versus 2015 baseline)
- Implement 100% of global water best practices
- Reduce Hazardous waste generation by 10% (versus 2015 baseline)
- Recycle 90% of total waste
- Eliminate use of chlorinated and brominated solvents

Part 2: Technology and engineering solutions *continued*

In 2016, UTC signed the American Business Act on Climate Pledge, joining the White House and more than 150 companies across the United States in pledging to lower carbon emissions. As part of its climate pledge, UTC is recommitting itself to reducing carbon emissions by 80%before 2050.

The company's progress so far

Every five years, UTC reviews its progress. All current goals include interim annual targets and are measured in absolute terms—they are not adjusted for organic business growth.

UTC's environmental results 2006-2015:

- 32% reduction in GHG emissions
- 65% reduction in non-GHG air emissions
- 43% reduction in industrial process waste
- 37% reduction in global water consumption

UTC recently released their 2020 Sustainability Goals in mid-February 2016 and UTC is on track for an 80% reduction in greenhouse gas emissions by 2050. Over 20 years, UTC has cut water use in half and lowered GHG emissions by a third while growing sales more than 200%.

UTC's Carrier CO_2NSERVATION Meter is used to estimate the aggregate amount of avoided GHG emissions from the installation of high-efficiency Carrier air conditioning, heating and refrigeration products since 2000, and from NORESCO, the energy services business of UTC Building & Industrial Systems, since 2008.

Globally, buildings account for 40% of all energy consumption. Heating, ventilation and air conditioning (HVAC) systems account for 40% of that usage. In this area where there is a lot of savings opportunity, the Carrier CO_2NSERVATION meter helps illustrate the impact of choosing the high-efficiency technologies and solutions in which Carrier invests.

In 2015, the Carrier CO_2NSERVATION Meter saved over 185 million metric tonnes of GHG emissions, which is equivalent to the removal of approximately 39 million cars off the road for one year.

Low carbon investment examples

A. Pratt & Whitney's PurePower® Geared Turbofan™ (GTF) engine

At the Global Sustainable Aviation Summit in Geneva the Air Transport Action Group (ATAG) cited the GTF engine as an Aviation Climate Solution, a collection of 100 examples of collaboration within the aviation industry that cut CO_2 emissions and help reduce impact on climate change. The engine's technology reduces:

- Commercial aircraft fuel burn and CO_2 emissions by more than 16%
- Aircraft noise by more than 75%
- Emissions by more than 50%

This is equivalent to CO_2 savings made by planting nearly 1 million trees or removing 3 million cars off the road every year.

B. Carrier's NaturaLINE™

The NaturaLINE™ unit is the world's first natural refrigerant technology for container refrigeration. For container shipping, CO_2 is the only refrigerant that meets all of the following criteria:

- Global warming potential (GWP) of 1
- Zero ozone depletion potential
- Excellent heat transfer/heat reclaim properties
- Non-flammable

NaturaLINE reduces carbon emissions by 28% compared to previous units.

C. Otis Gen2® Switch elevator

The Gen2 Switch elevator is the first battery-powered Gen2 system. The battery technology allows the unit to operate with less power than a microwave or a hairdryer. The system's single phase technology can be coupled with alternative energy sources, like solar panels, and can lower energy use by up to 80% over conventional elevators.

Otis's solar-powered Gen2 Switch elevators installed by Otis France at Les Bourderies housing project in Rezé won the Sustainable Development award from the Fédération des Ascenseurs.

United Technologies

Outcomes and lessons learned

Since 1997, UTC has identified thousands of cost effective energy-savings opportunities that have reduced their absolute use of energy and GHG emissions by more than 30%. They have also realised a more than 55% absolute reduction in the water they use, and similar reductions in the waste they generate and air chemical emissions released to the environment.

The value provided by sustainability is not just limited to UTC, they expect their key suppliers to employ sustainable practices to improve profitability and business resilience. The environmental footprint of UTC's supply base is significantly larger than their own so by the end of 2019, UTC's ACE Gold level suppliers will be required to have adopted 11 sustainability practices and also demonstrate year on year improvements in their use of energy, water and material resources.

Effects of energy and climate policies on long term planning

In response to recent climate policy and agreement UTC looks forward to building on its new 2020 Sustainability goals and its Natural Leader campaign. It aims to put its climate position into action by working with countries to help meet new GHG reductions commitments from COP21. Because buildings consume 40% of global energy, energy efficient technologies for elevator, heating and cooling systems will become even more important. UTC's climate position is also put into action by demonstrating how green aviation starts with green technology development and break-through green product introductions from green factories.

There is also the need to connect the global dialogue to reduce hunger and food waste. If emerging economies adopted cold chain technologies to the level of developed countries, the carbon footprint of food waste due to a lack of refrigeration could be reduced by more than 50%.

Part 2: Technology and engineering solutions

3M

Company profile

Business:	3M are a diversified science-based technology company with a global presence in the following business groups: consumer, electronics and energy, health care, industrial, safety, and transportation.
International Presence:	3M has operations in more than 70 countries and serves customers in nearly 200 countries.
Turnover:	$31.8 billion (2014)
Employees:	90,743 (2014)
Website:	www.3m.com

Company's sustainability vision

"We are committed to improving our business, our planet, and every life."

Business case for low carbon

Access to a dependable energy supply directly affects all businesses and communities. From air emissions to fossil fuels, 3M takes a proactive and collaborative approach to addressing energy demand and climate change in both its operations and for its customers. 3M is focused on seeking solutions that promote energy conservation, clean energy infrastructure, and reductions in atmospheric greenhouse gases (GHG). 3M already has many products and technologies that reduce the impact of energy use, promote energy efficiency, and reduce greenhouse gases. Their goal is to continue developing and implementing global concepts for the greatest long-term impact.

3M has a history of proactive leadership in addressing both the challenges and opportunities presented by climate change and energy conservation. They operate under the philosophy that early action is paramount to being a leader in sustainability. There is a strong executive-level commitment as well as an extensive public policy engagement on both climate change and energy conservation.

Benefits, savings & profits

Since 2002 3M has reduced its GHG emissions by 57% (2013) while at the same time the company's sales and production grew. 3M's reductions resulted in a cumulative reduction of nearly 100 million metric tonnes of GHG emissions compared with the base year. This is equivalent to removing nearly two million cars from the road.

3M continues to focus on appropriately managing its GHG emissions and aims to achieve further reductions in the years to come. While 3M has made significant GHG emission reductions across its global operations, they realise that they can make far greater contributions by helping their customers' reduce their GHG emissions through the use of their products.

Company climate goals

- Improve energy-efficiency indexed to net sales by 30% by 2025. Building on 3M's 50% improvement in energy efficiency between 2000 and 2014 a 30% energy efficiency improvement will keep its global energy use nearly flat over the next 10 years, even as the company grows
- Increase renewable energy to 25% of total electricity use by 2025. Nearly 800,000MWh of renewable energy (mainly wind and solar) will be added globally
- Ensure GHG emissions at least 50% below 2002 baseline, while growing 3M's business, by 2025
- Help 3M's customers reduce their GHGs by 250 million tonnes of CO_2 emissions through use of 3M products by 2025

The company's progress so far

From 2000 to 2014, 3M reduced energy usage by over 50% indexed to net sales. Having exceeded its energy-reduction goal ahead of schedule, 3M set an internal target to improve energy use per unit of product by an additional 3% annually (2010–2015). Achieving these goals would help prevent an additional 1.3 million metric tonnes of related CO_2 emissions.

3M continues to evaluate, invest in and incorporate on-site renewable energy sources within their operations where feasible while continuing to expand and collaborate with external partners. They estimate that approximately 1% of their energy used today is from renewable sources generated on-site in their own operations.

Part 2: Technology and engineering solutions *continued*

Other energy highlights include:

- Implementation of over 400 energy efficiency projects globally in 2014
- Formed partnership to develop novel solutions for transportation, IT and electronics
- Leveraged grants to advance: CO_2 recycling, fuel systems, battery, and solar technologies
- Achieved ISO 50001 certification at 11 sites, and nine more sites are currently pursuing certification

Low carbon investment examples

A. Employee Solar Energy Scheme

3M provided employees with resources to bring more sustainable solar energy into their homes. By partnering with the World Wildlife Fund and four other companies, 3M negotiated a significant discount for employees on services and materials to create solar-powered homes. The programme gave them the resources they needed to make a sustainable change to the way they live and the impact they have on the environment. The solar PV systems available to 3M's employees could also be requested with 3M components such as: 3M™ Scotchshield™ Backsheet Film, 3M™ Solar Encapsulant Film, 3M™ Solar Tapes and 3M™ Anti-Reflection Coating. In the first seven months more than 70 employees installed solar PV systems in their homes and 443 more were registered to have their homes evaluated.

Outcomes and lessons learned

To meet its global goals, 3M reviews its Strategic Energy Management Plan annually to prioritise programmes. Longer-term action items are added periodically to achieve greater efficiency. The plan aims to continuously: improve results; leverage engineering expertise and advances; drive plant-level efficiency improvements; maintain top management support; and protect 3M.

Effects of energy and climate policies on long term planning

As a leader in sustainable technologies, 3M is keen to help government and industry achieves the EU energy and climate targets. It is key is to develop a single EU energy market.

3M believes that energy-efficiency is a cost efficient approach for all market players. 3M supports action leading to the creation of more energy efficient solutions.

With regards to energy transmission, 3M supports the introduction of a European electricity "smart" grid to reduce energy cost, as well as support the integration of renewables into the grid.

Part 2: Technology and engineering solutions

ENSTO

Saves Your Energy

Company profile

Business:	Ensto is an international cleantech company specialising in the development, manufacture and marketing of electrical systems and supplies for the distribution of electrical power as well as electrical applications.
International Presence:	Ensto is present in 20 countries throughout the world and has sales to over 100 countries. Products are manufactured in seven different countries.
Turnover:	€280 million (2014)
Employees:	1,700
Website:	www.ensto.com

Company's sustainability vision

"Ensto builds a better society by improving energy efficiency focusing on sustainable business."

Business case for low carbon

To achieve its sustainability vision Ensto has taken a pioneering role in the frontline of the electrical industry. Producing clean, recyclable, and innovative products and solutions, which are long lasting and have a low lifecycle impact on environment.

Ensto is constantly working to reduce their carbon emissions throughout their value chain

- Reducing energy consumption in their operations
- Exploring possibilities to use renewable energy
- Promoting innovative products based on recycled materials

Ensto's activities are guided by the following principles:

- Increasing demand for sustainability from customers and other stakeholders
- High energy costs
- Tightening legal requirements
- New business opportunities
- Respecting customers' green values
- Improving technology enabling sustainable products to be a more economic choice
- Environmental impacts of their own manufacturing and facilities

Benefits, savings & profits

Tightening legal requirements increase demand for sustainability from customers and other stakeholders. Thanks to their environmental actions and development projects Ensto has positioned itself as a preferential partner in the field of sustainable business. Entso's business has benefited from new business opportunities and customers who appreciate green values.

Energy efficiency and improved technologies have enabled Entso to achieve cost savings in the fields of energy consumption, waste management and material efficiency. Ensto have achieved reputational benefits and has confirmed its brand as a one of the leading cleantech companies.

Company climate goals

- To reduce energy consumption and consumption of the other natural resources in their facilities and operations
- To increase environmental awareness of their customers
- The continuous improvement of environmental awareness and competence of Ensto employees
- Preventing waste and increasing the recycling of waste

Ensto Finland Porvoo and its Mikkeli factories are committed to reduce 9% of their energy consumption by 2016 (compared to 2009)

The company's progress so far

Life cycle assessments (LCAs) of Ensto's products and solutions show that the largest share of Ensto's carbon emissions result from indirect sources such as purchased electricity and the use of main raw materials.

Examples of how Ensto has reduced its environmental impacts include:

- Products made from recyclable materials
- 50% reduction of waste in new generation products packaging materials
- Use of biodegradable and non-toxic lubricants only
- Healthier fluids for both the environment and human eg vegetable oil based soluble grinding fluid and bio-based coolant technology
- Reducing environmental impacts and costs at the same time eg use of Zinc phosphate replaced by Oxsilan
- Extensive waste management

ENSTO *Saves Your Energy*

Low carbon investment examples

A. Product Innovation

Entso have developed several innovative products with environmental benefits. These include:

- EnstoNet which reduces the carbon footprint of electrified work points by 30%. Traditional cabling generates waste and requires more energy and manpower at the site. With EnstoNet, the components are delivered to measure and can be quickly plugged into each other. EnstoNet office electrification solutions save 57% of materials by mass as the cabling distributed is much shorter.
- Enervent Family air handlers and heat exchangers have two years' carbon payback time. After using the product for two years, the unit has paid back the CO_2 emissions it has caused in production. Such a short carbon payback time is thanks to the high annual heat recovery rate.

B. Energy-efficiency in European Factories

Estonia

From 2011-2013 Ensto invested in three new injection moulding machines for their Tallinn plant. Replacing the old machines helped to reduce energy consumption. Improvement projects had big impacts on machine-efficiency and machine time utilisation as well as electricity consumption. Solar panels now support local energy production in Ensto's factories in Estonia.

France

In France the addition of timer controls to heating systems have improved energy-efficiency and the use of transparent reflective tape on windows has reduced the need for air conditioning.

Finland

In Finland water-saving mechanisms as well as improved energy-efficient LED lighting has been installed at the headquarters of their production site in Porvoo, Finland.

Outcomes and lessons learned

Ensto has learnt that with small investments comprehensive results can be achieved in minimising environmental impacts. Through collaboration with customers and suppliers on environmental projects the scale of impact is increased and that active engagement in environmental initiatives attracts other companies and actors in to the field.

Effects of energy and climate policies on long term planning

Ensto is focusing on building a more sustainable world. They create clean, recyclable, proven and innovative products and solutions that are built to last and have a low environmental impact. Ensto's goal is to be the world's leading provider of energy efficient solutions.

Ensto has learnt that with small investments comprehensive results can be achieved in minimising environmental impacts.

Part 3

Communication

Part 3: Communication

Company profile

Business:	BT's purpose is to use the power of communications to make a better world. Activities include: networked IT services; telecoms services; broadband, TV and internet; and converged fixed/mobile.
International Presence:	BT is one of the world's leading providers of communications services and solutions, serving customers in more than 170 countries.
Turnover:	€23 billion (2014/2015)
Employees:	88,500
Website:	www.bt.com/purposefulbusiness

Company's sustainability vision

"Delivering our purpose to use the power of communications to make a better world."

Business case for low carbon

Information communication technology (ICT) is a vital tool in meeting climate change targets with benefits such as energy savings from the use of cloud computing, alongside resource and energy efficiencies. Cloud based services and applications increase server utilisation and reduce energy use from everything from surfing holiday sites to e-healthcare provision. It is for these reasons, and more, that worldwide adoption of ICT solutions can cut carbon emissions, fuel economic growth, and benefit society.

According to the *SMARTer2030* report, in 2030, ICT solutions have the potential to:

- Generate more than $6 trillion of additional revenues
- Realise $5 trillion in cost-saving opportunities
- Result in a 20% cut in CO_2 emissions
- Within the same timeframe, ICT could help deliver a 24% reduction in UK carbon emissions which is 12 times the carbon footprint of the ICT sector itself and equivalent to taking 26 million passenger cars off the road. ICT also could create £122 billion in economic value (cost savings of £63.5 billion and new revenues of £58.5 billion) through services such as remote health monitoring, or virtualising services through the cloud

One of the risks that affect BT is severe weather caused by climate change. Severe weather impacts BT's infrastructure and its ability to provide uninterrupted customer service keeping communities connected to the internet and telephone lines.

Benefits, savings & profits

BT's vision is to help society live within the constraints of the planet's resources through its products and people.

By 2020 it is BT's ambition to help customers reduce carbon emissions by at least three times the end-to-end carbon impact of BT's business.

BT's products and services, such as audio and video conferencing, help people make better use of the planet's resources and meet customer needs. At the same time they are leading by example by helping others, such as their suppliers, to also reduce their impacts.

BT is working with policymakers and external stakeholders to accelerate the move towards a low-carbon economy, promote renewables and take action to tackle climate change. BT is also an active participant in the We Mean Business coalition and supports the RE100 initiative.

Company climate goals

- Help customers reduce carbon emissions by at least three times the end-to-end carbon impact of its business
- Globally, where markets allow, source 100% of their electricity from renewable sources

The company's progress so far

Last year BT helped its customers reduce carbon emissions by 1.5 times its own end-to-end impact and quantified 20 ways in which BT abates carbon emissions. These products and services generated £3.4 billion in revenue, compared to £3.1 billion in 2013/14.

Last year's environmental performance highlights include:

- 83% reduction in UK total net carbon emissions below their 1996/97 baseline, exceeding their 80% reduction target, and representing the sixth consecutive year of net emissions reductions
- 1.4% reduction in their worldwide operational net carbon emissions, compared to 2013/14
- 4.5% decrease in worldwide energy use, compared to 2013/14
- 98% of UK waste recovered or recycled, reducing its waste to landfill by 34% from 2013/14
- 96% worldwide waste recovered or recycled
- 12% reduction in their water use compared to the previous year

Low carbon investment examples

A. Energy management and renewable energy

BT completed £26.4 million of energy management projects 2014/15 saving more than 48.4GWh in energy use. Last year BT set aside £440 million for renewable energy. Since 2012 BT has been sourcing 100% renewable energy in Great Britain and by 2020 aims to have 100% of its global operations powered by renewable energy where markets allow.

B. The Milton Keynes smart city initiative

Using the power of connectivity, the smart city initiative enable services like education, healthcare, mobility, and infrastructure to benefit from IT solutions by saving energy, reducing waste, and cutting costs. City-wide parking space optimisation, which provides real-time data on parking availability, has led to savings of at least £105 million in the city.

C. High-speed fibre broadband

Cloud-based IT services have been improved by high-speed fibre broadband. BT Cloud Voice and BT One Phone transfer office phone systems to a single service, hosted in the Cloud and accessed via the internet. Customers need less equipment, fewer engineering visits, and are able to work more flexible hours, which BT expects will reduce travel costs and emissions.

Cloud providers can share their capacity across various customers. This allows them to smooth out the peaks and troughs in demand, leaving less server capacity unused and less unnecessary energy expended. BT's cloud computing services for large organisations are delivered from more than 20 data centres operated by the company in 19 countries across five continents. The company has extended this capability further still with high-speed and private connections to over 30 international third-party cloud facilities.

Outcomes and lessons learned

ICT has a key role to play in decarbonising organisations and countries. Failure to tackle climate change continues to put us all at risk and it is why BT sees certainty at a policy level as paramount. The toughest challenge, however, is still in customer demand and inspiring people to take action on climate change. That's why in September 2015, BT launched 100% Sport to inspire millions of sports fans worldwide to switch to renewable energy. It also aims to encourage the clubs, organisations and the players fans love to do the same.

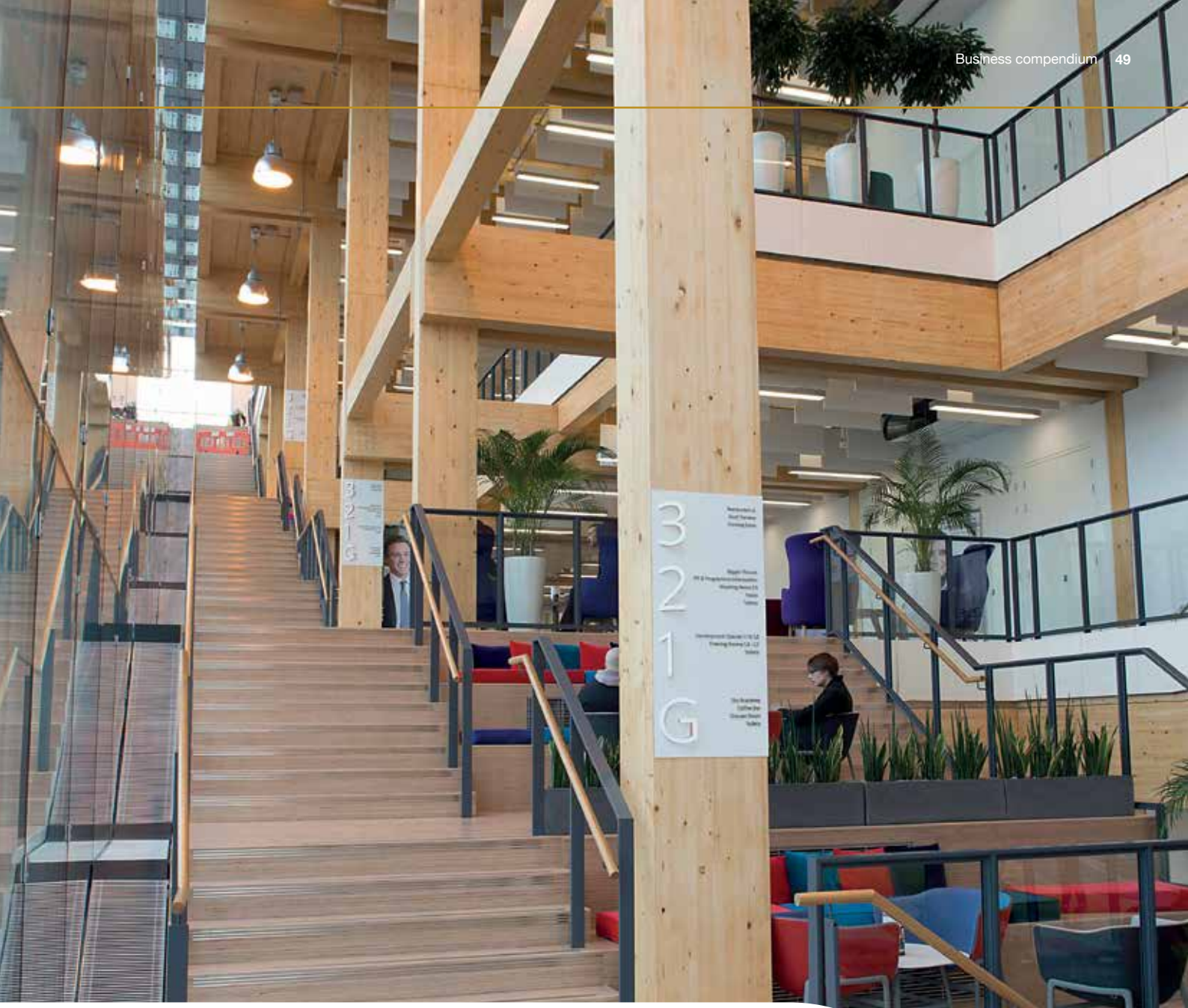
Effects of energy and climate policies on long term planning

The discussions at the Paris Climate Conference (COP21) highlighted the role played by business in delivering a successful outcome and showed that leading companies are keen to engage with governments around the world on practical ways to deliver the mechanisms for positive climate action.

A stable regulatory framework that provides the right incentives for organisations and countries to decarbonise is key.

Three things are needed to facilitate this:

- New financial instruments to help stimulate alternative energy and efficiency projects as well as green bonds
- An ambitious fifth carbon budget to help drive further reductions in UK emissions
- Continued strong support for the climate deal reached in Paris



Part 3: Communication

Company profile

Business:	Sky is a European entertainment company.
International Presence:	Sky serves 21 million customers across five countries: UK, Ireland, Germany, Austria and Italy.
Turnover:	€11.3 billion (2015)
Employees:	30,000
Website:	http://sky.com/biggerpicture

Company's sustainability vision

Sky's approach to sustainability is **Seeing the bigger picture**. Seeing the bigger picture is part of Sky's business strategy, and reflects Sky's belief in better ethos, their commitment to constant renewal and improvement. It's part of how Sky builds long-term relationships and earns the trust of their stakeholders.

Business case for low carbon

Sky wants to build a business that is durable for the long term. This means ensuring that they create the conditions for sustainable success whilst also delivering results in the short term. Sky has a rigorous focus on operating efficiency. By ensuring that Sky has an efficient and agile operating model they are able to consistently drive down costs to invest more where customers see the greatest value.

Sky's Chief Executive and Management Team have responsibility for Sky's approach to helping tackle climate change. Senior leadership involvement guarantees business integration of the environment and climate change risk management process, positively impacting the way Sky works and grows as a business.

Sky maintains their own set of challenging environment targets to have fewer impacts as a business, better more sustainable products, and inspire action on climate change. Sky's environment policy sets out the importance of operational efficiency, save energy and use resources wisely.

As a result of their work, Sky is better prepared for future climate change impact(s) and is developing different business models, for example moving from product ownership to rental agreements for new product offerings.

All of this has been in tandem with growing Sky's business. They are now working on setting targets at group level in line with European Commission targets.

Benefits, savings & profits

Integrating climate change risks and opportunities is central to Sky's overall business strategy, making their operations more robust and efficient, and building deeper relationships with their customers and business partners.

Sky uses an internal price of carbon to help decision making on investments such as in energy efficiency and on site renewable energy. This helps to build a more robust business case particularly for on-site renewable energy when simple pay backs are typically longer than other business investments made.

Sky has a commitment to invest £30 million into low-carbon efficient projects over the next four years. So far more than £8 million were invested in on on-site renewables such as a combined cooling and heating plants (CCHP), wind power, photovoltaics and two biomass boilers. Total generation of roughly 2.5m kWh of energy and a saving equivalent to £3.5 million in avoided energy costs has been made. They contribute just under 10% of the overall energy demand.

In terms of Sky's products, improved efficiency resulted in 4.4 million tonnes of CO_2 or £5.5 million in terms of avoided energy costs.

Besides monetary savings, there has also been reputational benefits Sky is among 5% of the corporations participating in the Carbon Disclosure Projects (CDP) climate change programme to be awarded a position on the Climate A List, in recognition of its actions to reduce emissions and mitigate climate change. Sky has been among the top 5 companies in the FTSE 100 Carbon Reporting Performance Report for the last five years and they have retained The Carbon Trust Standard for the fifth year running.

Part 3: Communication *continued*

Company climate goals

Sky has a threefold environmental strategy to:

- Reduce its carbon footprint
- Make Sky products more sustainable
- Use its position as Europe's leading entertainment company to raise awareness and drive positive change on environmental issues amongst business partners, and to inspire customers to take action

Now with Sky's expanded group, they will align their environmental strategies across their territories, building on the commitments they have already made in the UK and the Republic of Ireland.

The EU's 2030 climate goals are important and will help influence Sky's focus and scope. Sky wants to push beyond these goals. Minimising Sky's environmental impact as much as possible sends strong messages to markets and governments to support a more competitive, secure and sustainable energy system.

The company's progress so far

Since 2008, Sky has reduced their emissions relative to revenue (tCO_2/£m) across their UK & Ireland territories by 38%. Sky remains on track to meet their target of halving their emissions relative to revenue (tCO_2/£m) by 2020. Sky has invested roughly £8.5 million in renewable energy and is investing further millions in a new sustainable campus at Sky's central offices, based in west London.

Sky has progressively integrated more and more energy efficiency measures and renewable energy across their property portfolio to support a pathway to reduced energy demand in the future.

Sky had some challenges while implementing its ambitious renewable technologies including constructing a bespoke CCHP and a 100kw wind turbine located on the main flightpath of Europe's busiest airport. However, commitment from the most senior levels in the business has been key to these projects successes and has helped to motivate the team.

Sky has exceeded the industry benchmark for energy efficiency of their data centres. This helps Sky to manage energy demand as their business needs increase.

Sky remains committed to their long-term investments in renewable energy, and are exploring ways to further complement their existing on-site solar, wind, biomass and combined cooling and heating plant energy generation.

Low carbon investment examples

A. Energy supply:

Sky has worked hard to futureproof its energy supply, reducing reliance on fossil fuels:

- In the UK, the CCHP and wind turbine at Sky's west London site produce 40% of the energy needs of Sky's broadcasting facility, Sky Studios. Sky's corporate centre, The Hub, is fitted with 753m^2 of solar panels. and Sky's biomass boilers in Scotland can produce enough heat and hot water for the entire sites they serve. In addition, new building management systems (BMS) at Sky's Scottish sites allow for better control and monitoring, leading to reduced gas and electricity use, saving 41% in one year
- Sky's operations in Germany use geothermal energy to heat the offices
- For operations in Italy, installing a tri-generation system is currently being investigated

B. Van fleet:

Sky has made changes to its engineer van fleet by replacing all vans with smaller, more efficient models and telematics have been installed across the entire fleet to embed more efficient driving techniques into the engineering teams operations.

C. Product sustainability:

Sky builds in a long term view on product and environmental sustainability by:

- Including product sustainability in the design sign-off process, and there is a process of continuous life cycle assessment, alongside a selection of sustainable design tools and workshops
- Focusing on the progressive operational improvements

Outcomes and lessons learned

Sky values the importance of having senior buy-in because it:

- Is key to leverage and motivate the team
- Helps focus, motivate and bring together the right teams in the business
- Highlights potential challenges and helps identify solutions, for example with implementing renewable energy, at the project outset
- Enables a strong business case to be built; supported by carbon abatement curves, so projects with the best carbon savings per £ spend can easily be identified

Sky has learnt to be ambitious, despite the complexities of developing and using the most up-to-date technology; difficult planning requirements and restrictions; and physical site restrictions. Setting clear internal targets and goals, linked with external targets has helped to add credibility and reinforce Sky's commitment.

Effects of energy and climate policies on long term planning

Further emphasis is required on UK and EU renewable energy generation in order for security of energy demand to be secured. This can be achieved through:

- Support for low carbon technologies in order to stimulate further investment by companies
- Renewable heating incentives and Feed in Tariffs
- Sourcing the majority of renewables technologies from the EU

Part 4

Infrastructure and Construction

Part 4: Infrastructure and construction

SKANSKA

Company profile

Business:	Skanska is one of the ten largest construction companies in the world with expertise in construction, development of commercial and residential projects, and public-private partnerships.
International Presence:	Skanska focuses on selected home markets in the Nordic countries, Central Europe and North America.
Turnover:	€16.6 billion (2014)
Employees:	58,000 (2014)
Website:	http://group.skanska.com/

Company's sustainability vision

Skanska aims to create value for its shareholders while also building for a better society.

Business case for low carbon

Skanska's experience shows that low-carbon projects can realise financial savings for clients, whilst also reducing environmental impact. Skanska has been a leading green development and construction company since 2009, when it embarked on its Journey to Deep Green™ and launched its Color Palette™ tool.

Skanska began its green journey in response to trends in legislative developments, green certification and a growing green market demand.

- The Color Palette™ considers operational energy and embodied carbon in construction
- Skanska developed its own carbon footprint tool, and has a Smart Design group working with low-carbon design

Skanska believes that customers, investors, regulators and society's expectations in general will continue to drive low-carbon projects. EU policy in particular fuels the demand for greener and lower-carbon projects in the built environment. For example, the Energy Efficiency Directive to reach 20% energy efficiency by 2020 and the Energy Performance of Buildings Directive that requires all new buildings to be nearly zero-energy by the end of 2020.

Climate resilience is important for Skanska in terms of the ability to cope with: greater temperature extremes, greater precipitation and drought. Skanska develops buildings with on-site features to cope with extreme precipitation events and manage site storm water. It also develops water-efficient buildings to minimise the use of potable water. On its civil infrastructure projects, Skanska focuses on minimising potable water use during construction, which can help to conserve precious water resources in areas already experiencing severe water-stress.

Benefits, savings & profits

Skanska believes that green projects deliver clear value, not only to its own business, but also to its customers, shareholders, suppliers and society at large.

Skanska's position as a green leader has strengthened its brand for investors and customers, and helps to attract and retain talent. It also helps to create new markets by offering innovative green solutions and by working with alternative business models that promote long-term resource efficiency.

Significant long-term financial and environmental savings have been achieved at Skanska's headquarters, in Stockholm, which uses 55% less energy than the Swedish energy code. This is equivalent to annual savings of around €190,000 and annual carbon savings of approximately 250tCO_2. Green and low-carbon buildings typically also provide greater occupant productivity and wellbeing.

Investors are increasingly interested in Skanska's green performance.

Company climate goals

Since 2010, every Skanska Business Unit has implemented targets and action plans to reduce project carbon emissions. These include emissions from embodied carbon during construction and from operational energy as part of wider green commitments, and involve working together with customers and other value chain partners.

- Skanska commercial development units in Europe are aiming to only develop green and deep green projects by 2020 - with deep green making up 20% of their project portfolios
- Two of Skanska's largest construction units are aiming for a 100% and 80% proportion of green projects in their respective project portfolios by 2020, which includes 15% and 5% deep green projects respectively

Such targets allow Skanska to monitor and provide proof of its progress on its Journey to Deep Green, which can be communicated to shareholders and other key stakeholders. This is important for Skanska's branding as a leading green development and construction company.

SKANSKA

The company's progress so far

Skanska commercial development units only develop green projects with some construction units delivering 75% green projects. The company also boasts a growing number of zero-energy and energy-positive buildings and high-profile landmark projects, which prove that it is possible to develop highly energy-efficient buildings and low-carbon projects with the current solutions available.

Low carbon investment examples

With over 10,000 projects each year, Skanska has great potential to promote a low-carbon society. The following are current examples:

A. Solallén, Sweden (2015)

- 21 townhouses designed and built by Skanska
- Sweden's first zero-energy neighbourhood
- Buildings use 50% less energy than the Swedish energy code and the neighbourhood generates more energy than it uses

B. Bentley Works, UK (2015)

- Skanska's regional engineering and servicing hub in Doncaster is designed to be zero-energy or net zero carbon according to UK regulations
- Achieves zero-energy by using 68% less energy than the UK building code through a photovoltaic system and two biomass boilers that generate energy on-site
- Total payback period of 11 years (biomass boilers 3.8 years and the photovoltaic system 7.4 years)
- Fulfilled Skanska's Deep Green criteria, and achieved BREEAM Outstanding (workshop) and BREEAM Excellent (office)

C. Powerhouse Kjørbo, Norway

- The world's first renovation of existing office buildings into energy-plus buildings
- 80% less energy use than the building code for new buildings in Norway
- Largest photovoltaic system in Norway on completion, which generates more energy than the buildings will use throughout their lifetime (including construction, operation and demolition)

D. Väla Gård, Sweden

- Skanska's regional office in Helsingborg was the company's first energy-plus building in Sweden
- The office uses 80% less energy than the code, and annually generates more energy than it uses through a photovoltaic system
- Väla Gård is certified to Leadership in Energy and Environmental Design (LEED) Platinum and met Skanska's Deep Green criteria

E. Highways England Area 2, UK

- 5 year contract to deliver highways improvement projects until 2017
- In a bridge repair project, Skanska redesigned the project to reduce the total carbon footprint by 85% and realise € 9.7 million in financial savings for the client

F. Sjiskjka & Mullbergs Wind Parks, Sweden

- Combined annual generation of around 450GWh
- Enough to supply around 96,000 households
- Both parks are 50% owned and operated by Skanska

Solallén, Sweden

Bentley Works, UK

Part 4: Infrastructure and construction *continued*

Outcomes and lessons learned

Skanska's experience shows that the hurdles or barriers to investment in energy-efficient buildings are rarely technological but a combination of:

- Lack of stakeholder awareness of the benefits
- Insufficient local workforce knowledge and skills
- Inadequate financing mechanisms
- Lack of long-term policy frameworks

Skanska is actively working to overcome such barriers by finding solutions on a local market level, as well as cooperating with other international actors and partners. Another key lesson from Skanska's experience is that long-term financial and environmental savings typically go hand-in-hand on well planned green and low-carbon projects.

Other key lessons learned are:

- **Zero-energy projects are possible:** It is possible to develop and construct zero-energy and energy-plus buildings and projects with the solutions currently available. Skanska has proved this for both new-build and renovation projects
- **Carbon savings equals financial savings:** Low-energy and low-carbon projects typically make long-term financial savings
- **Design low-carbon in early:** Low-carbon targets and potential solutions should be incorporated into project design as early as possible
- **Obtain management support:** The support of top and middle Business Unit management is important on demanding green and low-carbon projects
- **Form a competent team:** Forming a team with the necessary knowledge and experience is key to successfully develop low-carbon projects
- **Partner:** Cooperating with likeminded clients and partners is an excellent way of pooling resources and knowledge on challenging low-carbon projects
- **Build on carbon footprinting expertise:** Skanska has gathered lots of knowledge on embodied carbon and is now focusing more on realising project embodied carbon savings
- **Identify alternative funding sources:** Many of Skanska's green projects unlock alternative sources of public and private funding, which should be explored early in the design phase
- **Use innovative business models:** Innovative business models can enable energy efficient projects. Examples include Energy Performance Guarantees (EPGs) and Public Private Partnerships (PPP)
- **Share knowledge:** Encourage successful teams working with low-carbon projects to share their experience with other teams

Effects of energy and climate policies on long term planning

The EU energy and climate policies and directives, such as the Energy Efficiency Directive and the Energy Performance of Buildings Directive, have helped Europe to make tremendous progress toward a low-carbon society. They have also helped Skanska to drive its agenda as a leading green project developer and contractor in Europe and beyond.

More ambitious and comprehensive policies are needed to overcome barriers and accelerate the market for low-carbon projects in the built environment, and mainstream low-carbon thinking throughout the value chain. Skanska also believes more ambitious targets in combination with greater policy harmonisation will promote greater value chain cooperation and encourage the development of holistic and cost-effective solutions to further support energy efficient and low-carbon project investment.


Väla Gård, Sweden


Sjiskjka & Mullbergs Wind Parks, Sweden

Part 4: Infrastructure and construction

ferrovial

Company profile

Business:	Ferrovial is an infrastructure operator and municipal services company, committed to developing sustainable solutions.
International Presence:	Ferrovial operates in over 25 countries.
Turnover:	€8.8 billion (2014)
Employees:	68,000 (2014)
Website:	www.ferrovial.com

Company's sustainability vision

"To add value to our stakeholders, by developing and operating sustainable infrastructures and cities, focusing on talent, integrity, safety, excellence and innovation and ensuring efficient use of available resources and minimising the environmental impact of our activities."

Business case for low carbon

Ferrovial initiated new actions to take advantage of business opportunities in low-carbon solutions and respond to risks related to climate change. Legislation on carbon emissions had a significant impact on their economic decisions. They have set emissions reduction targets in every business area and for the whole Ferrovial group and see the business opportunities in developing technologies, infrastructures and services focused on a low-carbon economy.

Benefits, savings & profits

Ferrovial has been recognised as a leader in its operating industries, in the field of environmental responsibility and sustainability in ratings such as the Dow Jones Sustainability Index (DJSI) and Carbon Disclosure Project (CDP). Administration bodies have invited Ferrovial to participate in working groups on issues related to climate change and to pilot projects, which is an advantage over competitors.

Energy-efficiency, the use of natural resources, reduction of emissions and waste to landfills, are all priorities for reducing the organisation's global impact, but also because they are a source of innovation for the development of solutions which Ferrovial may later offer to its customers and users. In particular: energy efficiency in buildings, smart city management, and low-emissions mobility meet the expectations of modern society whilst also generating sustainable value for Ferrovial. More recently, conservation of biodiversity has become a priority stream, supported by advances in scientific and technical knowledge.

Company climate goals

- To stabilise emissions by 2020 compared to 2009 while their business will grow by 27% compared to 2009
- Reduce emissions in intensity terms by 21.3% by 2020 compared to 2009
- Create new business development in low-carbon solutions such as energy efficiency, water infrastructure, smart cities, smart forest, energy services efficiency, and energy rehabilitation of buildings
- Introduce energy-efficiency measures in R&D, focused on developing low-emission solutions for the transport sector and integrated municipal services
- Develop new financing models based on public-private cooperation

The company's progress so far

Emission reductions in 2014 were much higher than expected, 38.62% in relative terms and 28% in absolute terms, equivalent to 226.161 tons of CO_2, when compared to 2009.

Ferrovial's actions so far include:

- Incorporation of energy-efficiency criteria in procurement and sub-contracting of services
- Electricity procurement from certified renewable sources
- Use of alternative fuels and the increased use of alternative vehicles as well as actions to improve vehicle fleets
- A Sustainable Mobility Strategy for Ferrovial workers
- Development of technology and processes geared towards optimising the avoidance of emissions
- Inclusion of energy-efficiency measures in the buildings of the corporate headquarters

ferrovial

Low carbon investment examples

A. Birmingham and Sheffield integrated city management

Ferrovial is helping to reduce the carbon emissions of the UK second largest city, Birmingham, where they have launched an infrastructure project to optimise city processes, improve efficiency, and reduce environmental impacts. The scheme including roads, lighting, traffic management, pavements, and sewers has resulted in 20% efficiency improvements and a 30% productivity increase with initial estimates suggesting potential cost savings of 20%. Street lighting has been changed to LED technology, enabling the centralised control of lighting through 8,000 control points. The vehicle fleet uses intelligent software for route optimisation, minimising traffic congestion and reducing fuel consumption and green vehicles are powered by alternatives to fossil fuels.

B. Bilbao sports centre management

The implementation of an integrated sports centre management programme for 15 centres in the Spanish city of Bilbao has improved the energy-efficiency in lighting, air conditioning and hot water. The introduction of a centralised control system to monitor the facilities performance and the switch to renewable energy has also ensured energy-efficiency improvements.

C. Sustainable mobility

The SAVE feeder systems for highways and the DAVAO+ system for the detection of high-occupancy vehicles; were both developed in Ferrovial's framework for the Smart Infrastructure Innovation Centre (CI3) built in 2010. This has enabled Ferrovial to develop concepts like managed lanes and other infrastructures capable of reducing the carbon footprint of people's mobility on the roads, as currently seen in countries such as the USA and Canada.

D. Sustainable forestry management (Smart Forest)

Since 2012 Ferrovial has sought to detect opportunities linked to the conservation of biodiversity. In countries like Spain, mountains are a source of natural resources, economic activities and job creation. In partnership with ecologists from the Forest Stewardship Council (FSC) and the scientific community, Ferrovial is working with various public administrations in Spain to manage public mountains. In 2013, this model was launched in Catalonia (Spain) with the installation of the first biomass power stations.

E. Solid Recovered Fuel

In 2014 Ferrovial constructed the first plant for processing Solid Urban Waste. Due to its success Ferrovial identified the opportunity to produce a new fuel called SRF (solid recovered fuel) which is an alternative fuel to heating diesel.

Outcomes and lessons learned

Payback periods for investments continue to be the main driver as carbon emission reductions and carbon pricing payback periods are still challenging issues. Many energy efficiency projects in cities and buildings are affordable thanks to energy savings, but the low-carbon price makes many other projects non-viable.

Ferrovial believe proper carbon pricing schemes, reflecting the actual cost of emissions, should be an additional economic stream in order to activate further investments that are needed but currently have too long payback periods.

Ferrovial's "waste to energy" projects are driven by low energy prices and low carbon prices. As a result many potential investments, with significant impact in terms of carbon reduction and clean energy generation, are difficult to afford.

Effects of energy and climate policies on long term planning

Ferrovial is committed to long-term energy policies, in order to activate investments under a stable framework. Promoting a green economy requires predictable and transparent regulations to mobilise the necessary private capital. It is estimated that investments of around $4 trillion (2015-2030) are necessary to upgrade the energy infrastructures of developed countries.

In the EU, energy security is a critical driver and Ferrovial welcomes the increased ambition for greenhouse gas (GHG) reduction at the EU level.

Part 4: Infrastructure and construction

Company profile

Business:	Thames Water is the largest water utility in the UK and provides water and wastewater services to 15 million customers in South East England.
International Presence:	Thames Water services focus is SE England although their supply chain is global.
Turnover:	£2 billion (2014/15)
Employees:	4,600
Website:	www.thameswater.co.uk

Company's sustainability vision

"Our focus is to be here for you. Whether you are a household or business customer, a local authority, a delivery partner or someone who uses one of our many facilities for recreation, we're here to provide excellent service in an ever changing environment."

Business case for low carbon

The purchase of energy is Thames Water's biggest operational cost after employee costs. Water and sewage are heavy and moving them around is inherently energy intensive. Energy costs are in the order of £100 million a year therefore, reducing energy use and the associated carbon emissions are, good for their customers, good for the environment and can reduce pressure on the energy grid.

Historically, Thames Water focused on reducing greenhouse gas (GHG) emissions directly associated with their activities. However, there are significant GHG emissions associated with the goods and services from their supply chain. Thames Water works with their suppliers to reduce the GHG emissions associated with the goods and services they use. They are signatories to the UK Infrastructure Carbon Review and are seeking to significantly reduce the embodied carbon associated with the delivery of capital projects.

Adaptation measures are necessary to protect public water supplies and the environment in the future. Building and maintaining their understanding of the implications and impacts of weather and climate change, and making decisions based on sound understanding of risk and science, is essential to their business.

In 2013 Thames Water published 'Our long-term strategy 2015 – 2040', a 25-year forward look at issues for the business. Key issues are:

- Water resource planning
- Sewerage design and capacity
- Resilience of their assets to flooding

Benefits, savings & profits

As an organisation Thames Water has significant energy demands (1293GWh/year) they are making progress managing this demand.

- Self-generating renewable energy 159GWh/year
- Improving energy efficiency by 149GWh between 2010-2015

Company climate goals

- To achieve a 34% reduction in emissions by 2020 compared to 1990 levels

Thames Water aim to focus on:

- Delivering a range of ongoing energy efficiencies
- Increasing capacity to generate renewable energy
- New combined heat and power (CHP) capacity
- Increase the amount of renewable biogas they generate
- Investing in new technologies such as thermal hydrolysis at seven key sites, to recover energy from sludge
- Continuing to invest in low carbon operational processes and assets

The company's progress so far

Self-generation of renewable energy at Thames Water now amounts to 159 GWh/year and energy efficiency to 149 GWh between 2010-2015.

Looking forward Thames Water has ambitious plans to reduce their grid energy consumption by almost 200 GWh/year by 2020. This can only be achieved by either

- Becoming more energy efficient in how they operate their existing assets

Part 4: Infrastructure and construction *continued*

- Replacing grid electricity through the self-generation of renewable energy
- By developing new infrastructure solutions that use much less energy to operate

Thames Water has made good progress integrating climate change into their business planning process and have:

- Reviewed and improved flooding resilience at 17 major water and wastewater sites
- Commissioned a desalination plant, powered by renewable energy, which can produce up to 150 million litres per day of potable water to improve the resilience of water availability
- Delivered a range of demand-side measures to reduce water consumption
- Met their leakage target for the last nine years
- Established clear goals to further improve our resilience to flooding and water availability and reduce their dependence on energy from the grid
- Developed new methods to understand the sensitivity of their business activities to the impacts of climate change

Low carbon investment examples

A. Thermal hydrolysis plants

Between 2010 and 2015 Thames Water invested £250 million in renewables from sewage sludge installing thermal hydrolysis plants (THPs) at their Beckton (Newham), Crossness (Bexley), Riverside (Barking and Dagenham), Beddington (Croydon), Oxford, Crawley and Chertsey Sewage Treatment Works (STWs). These THP plants 'pressure cook' the sludge before breaking it down in anaerobic digesters. Compared with conventional processes, THP produces up to 30% more biogas, which Thames Water will use to produce renewable energy. These improvements will enable them to reduce their reliance on non-renewable energy, improve the quality of the sludge, which is recycled to land, as well as save money. They have now started development of a further THP plant at Basingstoke STW, which should be operational in 2017.

B. Bucher press

Bucher presses are usually used for food processing, such as pressing apples for cider. Thames Water is using them in an innovative way to reduce the volume of sludge. This has resulted in less vehicle movements leaving their sites, therefore, reducing associated GHG emissions. Bucher presses are now installed at Oxford, Beckton and Crossness STWs.

Outcomes and lessons learned

Sewage sludge is not only the main by-product of wastewater treatment; it is also a renewable energy resource. Their 25-year Sludge Strategy continues to provide the framework for their sludge investment proposals to increasingly adopt treatment processes that will maximise the generation of renewable energy, reduce their GHG emissions, reduce their dependence on grid electricity, and minimise the volume of sludge produced thereby increasing their energy security.

Ensuring Thames Water has a resilient business which can cope with external shocks and challenges is essential in ensuring that they can deliver the water and wastewater services their customers expect. Climate change and weather are two such shocks. Weather is a challenge they deal with on a daily basis, while climate change is a longer–term challenge, closely related to changes in the weather they must expect to accommodate.

Thames Water has put a lot of effort into improving their understanding of how climate change could impact their ability to deliver for their customers. Their approach has evolved from mainly focusing on modelled projections of possible futures, to one which includes an understanding of the sensitivity of their activities to the potential impacts on climate change and associated risk.

Thames Water appreciates that they have more work to do, and they know that they cannot deliver climate resilience on their own. One lesson learned is that they want to build better relationships with their supply chain and other partners, based on a shared understanding of the risks associated with their activities and the impact they have on Thames Water's ability to deliver the essential service to their customers. They are already planning for 2025.

Effects of energy and climate policies on long term planning

In order for companies to plan for the longer-term it is essential that corporate boards have the confidence to invest in renewable energy generation, energy efficiency and energy avoidance.

The EU and national governments need to ensure that they support and maintain this confidence and be aware of potential unintended consequences of changes to legislation, policy and incentives.

Thames Water does not produce low-carbon technologies, products or services which they sell within the EU but they do use such products and it is, therefore, essential that the EU encourages their development and production to promote reductions in carbon and energy consumption.

The EU should look at how it can better promote climate resilience across businesses, the EU and across the globe. Thames Water believes that a twin track approach of managing the unavoidable impacts of climate change on their business combined with reducing their GHG emissions is essential if they are to overcome the challenges climate change represents.

Part 4: Infrastructure and construction

HYDRO

Company profile

Business:	Hydro is a global aluminium company with activities throughout the value chain, from bauxite, alumina and energy generation to production of primary aluminium and rolled products as well as recycling.
International Presence:	Hydro is involved in activities in 50 countries with main operations in Brazil, Germany and Norway.
Turnover:	€8.6 billion (2014)
Employees:	13,000
Website:	www.hydro.com

HYDRO

Company's sustainability vision

"To create a more viable society by developing natural resources and products in innovative and efficient ways."

Business case for low carbon

Primary aluminium is an electro-intensive material, meaning that aluminium producers have a strong inherent incentive to seek energy-efficiency measures to strengthen competitiveness. Increasing regulations and end-user demands for climate-friendly solutions are not only affecting Hydro, but also its customers.

By providing customers with innovative, emissions-reducing solutions, Hydro is strengthening its competitive edge as the world moves towards a low-carbon reality.

Aluminium is electro intensive in the production phase but:

- It can save significant amounts of energy and CO_2 emissions in the use phase
  - Lighter cars result in fuel savings and lower emissions
  - Aluminium façades can enable low-energy, even energy-positive, buildings
- Products and packaging in aluminium reduce transport costs and emissions
  - It helps to conserve food more effectively, reducing cooling needs and spoilage
- Aluminium can be recycled indefinitely without quality degradation
  - Requiring 95% less energy than primary production

Benefits, savings & profits

Since 1990, Hydro has reduced its direct greenhouse gas (GHG) emissions from the electrolysis stage by 70%. Hydro now has the lowest GHG emissions in the global industry.

At the same time demand for aluminium is increasing more than any other metal due to use in climate-friendly solution. These benefits for investments in Europe will mainly occur when a global CO_2 price has been achieved.

Competitors outside Europe do not have to carry CO_2 costs, these extra costs are deteriorating the industry's competitiveness in Europe. A significant part of aluminium used in Europe is imported.

Company climate goals

Hydro's ambition is to be carbon neutral by 2020.

This is the balance between Hydro's emissions and the benefits of their metal in the use phase.

- By taking a life-cycle perspective on production, Hydro's aim is to make sure that their activities have a net positive contribution in reducing global GHG emissions
- Hydro are making particular efforts to:
  - Increase renewable power-based production in Norway
  - Reduce direct emissions and increase energy efficiency
  - Recycle more post-consumer aluminium scrap
  - Direct metal production towards markets where benefits in the use phase can be demonstrated
  - Provide more metal for the automotive industry

The company's progress so far

- Since 1990, Hydro has reduced its direct GHG emissions from the electrolysis stage by 70%. Hydro now has the lowest GHG emissions in the global industry
- Hydro has invested in new scrap sorting technology and in new recycling facilities to support the target of doubling recycling of post-consumer scrap by 2020
- Hydro has increased its renewables power based aluminium production in Norway

Low carbon investment examples

A. Aluminium plants in Sunndal, Norway and Qatalum, Qatar

Hydro's primary aluminium plants have an energy consumption of 13.5kWh/kg compared to a global average of about 14kWh/kg. Hydro's next generation technology will deliver an energy consumption of 12.3kWh/kg or below.

At Karmøy, Norway, an investment decision of a 75,000 tonnes pilot plant for full-scale industrial testing of this proprietary technology was made 17 February 2016 with

Part 4: Infrastructure and construction *continued*

total investment costs of €410 million. Most parts of the plant will reduce energy consumption to 12.3 kWh/kg and with direct emissions of 1.4kg CO_2/kg aluminium only. The most advanced production cells will reduce energy consumption to 11.5-11.8kWh/kg. Hydro's R&D vision is to reach 10kWh/kg.

B. Automotive body sheet plant, Grevenbroich, Germany

In 2015/2016 Hydro invested €130 million in a new state-of-the-art production plant in Germany allowing automotive customers to find innovative solutions for more light-weighting vehicles, resulting in reduced CO_2 emissions.

C. Recycling

Aluminium can be recycled over and over again without degradation in quality and recycling uses 95% less energy than primary aluminium production. Hydro is already a large player in re-melting and recycling of aluminium using scrap from their own production, other companies and post-consumer scrap from the market. In 2015, Hydro invested €45 million in a recycling line in Rheinwerke plant at Neuss in Germany to process 50,000 tonnes of used beverage cans by installing world-leading technology to sort used products.

D. Recycling innovation and acquisition

Hydro has developed processes to combine clean scrap with post-consumer scrap and they plan to increase capacity by up to 20%. Around 70% of the required raw material will come from post-consumer scrap. In April 2015, Hydro acquired Wuppermetall Recycling GmbH with the most advanced scrap-sorting technology available. This acquisition enables Hydro to produce high-quality extrusion and sheet ingot from post-consumer building and automotive scrap.

Outcomes and lessons learned

Aluminium is a highly competitive and capital-intensive global industry. Within total production costs, energy is the main competitive differentiator and locational factor. The key focus for Hydro's technological development and R&D has for several decades been to increase its energy efficiency. One key lesson is that results are highly dependent on close proximity between R&D and actual production.

The shortest possible distance between theory and practice is essential to attract researchers, scientists and engineers into the industry. Norway, in particular, has a special position within the global aluminium industry.

Altogether, these are giving Europe a spearhead position within aluminium technology and innovation that is essential to the industry's future competitiveness.

One limiting factor is that aluminium is globally priced on the London Metal Exchange. One ton of primary aluminium has the same price all over the world. With higher electricity costs in Europe due to a number of factors, including EU regulations, it is of vital importance to ensure constant technology improvements meet growing climate related expectations and stricter regulations.

Effects of energy and climate policies on long term planning

To ensure Hydro's European presence in the industry and to improve their competitiveness, higher regulatory costs for electricity and costs of carbon should not, in the long-term, differ from competitors in the rest of the world. Current EU policies are not supportive of long-term investments by the aluminium industry in Europe. We believe, EU climate policies lead to carbon and investment leakage since sufficient measures to mitigate the risks for our industry have not been implemented.

The exposure of aluminium primary production to carbon costs from indirect emissions are six to seven times higher than the exposure to costs for direct emissions. The present and proposed EU ETS legislation absent some improved compensation mechanism, may also lead to carbon leakage, and the relocation of investments to regimes with weaker regulation, leading to potentially higher emissions. Direct and indirect carbon costs that are not shared by our competitors resulting from the EU ETS are both harmful to competitiveness and investments in our industry. The issue of an uneven global level playing field will remain critical as long as competitors in other countries do not face comparable direct and indirect CO_2 costs. Hydro believes the EU climate policies will be an important incentive for the increased use of aluminium in new climate solutions and energy-efficient products in various downstream sectors.

Part 5
Transport

Part 5: Transport

Company profile

Business:	Jaguar Land Rover (JLR) is the UK's largest automotive manufacturing business, built around two iconic British car brands: Land Rover, for luxury SUVs and Jaguar, for its sports cars and saloons.
International Presence:	From its UK manufacturing base JLR exports more than 80% of its production to 160 countries. Manufacturing facilities have been established in China and India, with plants under construction in Brazil and Slovakia.
Turnover:	€28.13 billlion
Employees:	38,000
Website:	www.jaguarlandrover.com

Company's sustainability vision

Engaging our customers through our brands by offering more sustainable choices.

Business case for low carbon

Fuel economy and CO_2 emissions regulations are driving technological change and innovation across the automotive sector. These include CO_2 tailpipe legislation in the EU, greenhouse gas (GHG) regulations in the US and fuel economy regulations in China. As the pace of technological change accelerates, CO_2 reduction has moved from a compliance issue to one of competitive positioning and increasingly an issue of total cost of ownership for customers.

At JLR, environmental innovation is key to future-proofing the business in a changing world where climate, resource constraints, growing populations and urbanisation as well as new consumer preferences will increasingly impact commercial success.

JLR has invested £11 billion in the last five years to transform its business, delivering new lower CO_2 emitting vehicles and more efficient manufacturing facilities in the UK. In 2014/15 alone, the company invested £3.5 billion in new product creation and capital expenditure, making it the UK's number one R&D investor in the advanced manufacturing sector, creating an export success story, and thousands of new jobs.

Almost £2 billion has been invested in the Solihull plant over the past three years, including Europe's largest capacity automotive aluminium bodyshop facility, which created 1,700 jobs.

Benefits, savings & profits

JLR expects to continue to achieve monetary savings from the deployment of its energy efficiency and renewables' programmes. However, pay-back periods on investments will continue to lengthen as the 'low hanging fruit' has been picked and the energy efficiency budget competes against other investment choices.

JLR have been working on closed-loop aluminium manufacturing for a number of years now and this investment in time, expertise and money has paid off in terms of millions of pounds in raw material cost savings. The potential to deliver environmental improvements and savings by applying closed-loop and circular economy thinking to other commodities also exists. To unlock the commercial benefits of these opportunities, new collaborations will be needed across the value chain and to be deployed faster.

Investment in low carbon vehicle technologies, whether these be advanced conventional or electric powertrains, more lightweight materials, and even-lower friction losses represent a significant challenge, whilst maintaining profitability, particularly for the lower volume manufacturers. Whilst hybrid, plug-in hybrid, and electric vehicle sales are growing, they still represent a relatively small proportion of vehicle sales.

Company climate goals

JLR's 2020 goals are:

- Make their vehicles amongst the leaders on CO_2 for tailpipe emissions in their respective segments
- Achieve 25% reduction in EU fleet average CO_2 emissions by 2015 (versus 2007 baseline)
- Achieve 30% reductions in key environmental impacts (including CO_2) over the product lifecycle (versus 2007 baseline)
- Achieve 30% reduction in manufacturing related CO_2 per vehicle produced (versus 2007 baseline
- Achieve carbon neutral manufacturing
- Use 75% recycled aluminium to make JLR vehicles

Combating CO_2 emissions is one of the biggest challenges facing the automotive industry today. For a manufacturer like JLR, that produces high-performance premium vehicles, the challenge is to significantly reduce the carbon footprint of the vehicle fleet while maintaining

Part 5: Transport *continued*

the capability, performance, refinement and comfort their customers expect. They also focus on the CO_2 impacts of their operations to future-proof the business against rising energy costs and legislative requirements.

The company's progress so far

JLR's approach has helped their products to:

- Reduce their EU fleet average tailpipe CO_2 emissions by 25% since 2007 through light weighting, advanced aerodynamics, hybrid powertrains, and low-friction technologies. The 2015 target has already been achieved. They will continue to invest in emissions reduction technologies with further reductions being targeted by 2020
- Deliver 26% lower tailpipe CO_2 emissions for the Range Rover hybrid than the model (with a conventional powertrain) it has replaced
- Reduce Jaguar XE CO_2 impact by 12% when compared to any other Jaguar model over its lifetime
- Land Rover Discovery Sport has life cycle impacts in CO_2 terms more than 10% lower than the model it replaces
- Reduce Jaguar XE's tailpipe CO_2 emissions by 20% lower than the previous Jaguar of this type, with class leading emissions as low as 99g/km for a non-hybrid in its segment

At the same their operational carbon reduction has:

- Reduced by 30% in operational CO_2 per vehicle produced since 2007 (achieving their 2020 target)

JLR will continue to invest in energy efficient technologies and renewables going forward. Over £30 million of investment is being targeted in this area over the next three years. JLR continues to offset 100% of its UK manufacturing assembly CO_2 emissions. In 2014/15 this equated to 365,000 tonnes of CO_2 emissions. During the period 2009-2013, they invested in ten million tonnes of offsets around the world from both operational and vehicle programmes.

Low carbon investment examples

A. Powertrain Developments

Since 2008, they have doubled the number of powertrain engineers and invested in the R&D of future solutions for both the internal combustion engine and alternative powertrains. For the past seven years, JLR has been carrying out extensive R&D in advanced hybrid and battery electric propulsion systems. In 2013, they announced Evoque_e, a long-term pure research project looking beyond 2020 to explore all aspects of future hybrid and advanced battery technology in vehicles, part funded by Innovate UK. Outputs from this project include a new design of high performance electric drive module, as well as three technology demonstrators: mild hybrid, plug-in hybrid electric vehicle (PHEV) and battery electric vehicle (BEV). In 2015, Jaguar announced its plans to enter the Formula E competition to help further develop the technologies that will appear in future battery electric vehicles.

B. Aluminium Lightweighting and REALCAR

REALCAR (REcycled ALuminium CAR) is their long-term and constantly evolving closed-loop materials model that makes use of a recycled aluminium alloy RC5754. The Jaguar XE is the first car in the world to make use of this new grade of high-strength aluminium, which was developed by their teams in partnership with Innovate UK.

JLR has invested over £6 million in its press shops to ensure full segregation of scrap metal to create the closed loop system. During the period August 2014 to July 2015, they segregated in excess of 30,000 tonnes of press shop aluminium scrap to be recycled back into their vehicles. This approach delivers up to 50% recycled content in their vehicles. 95% of GHG emissions associated with primary aluminium production are avoided by using this recycled material.

Further research is underway through REALCAR2, to increase the recycled content of our aluminium architecture from 50% to 75% through the use of post-consumer waste eg aluminium drinks cans.

C. Low Carbon R&D Examples

The CARBIO project is looking at next generation carbon fibre to make it more environmentally friendly, reduce its cost, and improve its manufacturability. It is looking at combining carbon fibre with flax, to improve its sound-deadening properties and reduce its CO_2 footprint as well as replacing epoxy resins with more sustainable resins found in cashew nut oil.

The VARSITY project is examining how they can introduce carbon fibre panels into high volume manufacturing and mixed material structures.

The LANDS project is developing innovative new lightweight sound-deadening materials with a post-consumer recycled plastic combined with a filler, sustainably sourced from the sugar refining industry.

D. Carbon Working Group

In 2010 they established a Carbon Working Group with a dedicated budget to deliver energy efficiency projects across their UK estate. £21 million of energy investments have been delivered through this group since its inception. These projects are expected to deliver annualised savings 5,000TCO_2 and cost savings of £1 million.

Outcomes and lessons learned

The car is one of the most complex products the consumer can buy. Significant investment is required to deliver the low carbon innovations required to meet policy goals. Underpinning JLR's approach is their detailed understanding of CO_2 impacts of the product life cycle. This has enabled JLR to deliver real reductions in CO_2 over the lifecycle and not just shift emissions from one part of the life cycle to another.

Delivering energy efficiency improvements across an aging estate is challenging, compounded by the fact that their UK plants are undergoing significant redevelopment and expansion in response to the growth of the business. Two of their three main manufacturing plants in the UK date back to the 1940s requiring a great deal of investigation, feasibility studies and project management to deliver energy reductions. To be most effective this requires aligning energy efficient investments with site and building redevelopment plans and or plant shutdown periods.

Partnering with suppliers, academia and research bodies is critical as learnt through their work on closed-loop aluminium.

Effects of energy and climate policies on long term planning

In order to drive success over the long-term for automotive industry better targeting of investment and more collaboration is required. This will unlock and deploy the funds necessary to deliver the low carbon solutions of the future, at scale and at a price the customer is willing to pay. Many of the technologies exist today but have been developed outside of the UK. The UK needs to continue to fund the development of its own low carbon vehicle technologies if the success of the UK automotive sector is to continue into the future. In particular product development and product lifetimes typically extend over a ten year time frame. Certainty of CO_2 targets over these timeframes is, therefore, critical to investment strategies in the sector.

The effective deployment of battery electric vehicles is dependent on the decarbonisation of the power generating sector to ensure environmental impacts are not simply moved from the use phase of vehicles to the generation of grid electricity. Coupled with the need to decarbonise the electricity supply, there is the need for the widespread availability of electric charging points to overcome range anxiety of consumers. Policy integration of both the power generation industry and electric charging infrastructure is required.

Current ambition in the EU around carbon targets are already stretching for the automotive sector, with investments already high to deliver 2020 targets. Greater burden sharing from other sectors and solutions integration is needed to increase their contribution to CO_2 reduction to match the progress already made by the automotive sector. Low carbon policy and incentives need to be integrated across different sectors in their delivery, eg low carbon power for vehicle electric charging points.

JLR would welcome further technology support and investment for the automotive sector to meet future regulatory standards and remain competitive.

Photo © LHR Airports Limited

Part 5: Transport

Heathrow

Company profile

Business:	Heathrow, as the UK's only international hub airport and the UK's biggest port by value, serves 74 million passengers each year, with 76,000 people working for over 400 companies at the airport.
International Presence:	Heathrow provides connectivity with global markets, through the 80 airlines which serve over 180 destinations worldwide, creating economic growth for the UK.
Turnover:	£2.7 billion (2014)
Employees:	6,202 (2014)
Website:	www.heathrow.com/responsibleheathrow

Heathrow

Company's sustainability vision

"To give passengers the best airport service in the world – means making Heathrow the most environmentally responsible hub airport in the world."

Business case for low carbon

Heathrow is committed to playing its part in meeting the UK's long-term climate change reduction targets.

So far Heathrow's work with Sustainable Aviation has:

- Resulted in a carbon forecast for UK aviation up to 2050
- Shown that UK aviation is able to accommodate significant growth without a substantial increase in CO_2 emissions
- Shown that through technology, operational efficiency and increased take up of low-carbon alternative fuels, the level of UK air traffic can more than double without increasing the direct emissions from those flights

Heathrow's carbon reduction strategy shows how it is committed to reducing the carbon footprint from its energy use, from passenger and staff journeys to Heathrow, aircraft operations on the ground and in the building of new infrastructure.

Benefits, savings & profits

Using world-leading approaches to reducing carbon emissions at Heathrow, supports its vision to give passengers the best airport service in the world. Technologies such as e-gates at security and in the future, 'wearable-tech', will continue to revolutionise how people travel. Heathrow applies the same innovative approach to its sustainability goals and low-carbon investment decisions. Advances in technology, operations and sustainable fuels are helping Heathrow to cut both its own emissions and through the Heathrow Sustainability Partnership, Heathrow is helping its partners to reduce their impact.

As part of the Heathrow's commitment to reducing carbon emissions, since 2010, Heathrow has achieved a Level 3 Airport Carbon Accreditation, which confirms the airport has optimised its carbon footprint reduction by engaging with third parties when measuring and reducing its carbon footprint.

Heathrow continues to invest in transforming the airport including increasing the infrastructure to support zero emission vehicles; creating a low carbon, low energy, low cost heating network linking T2, T3 and T5; and designing SMART buildings with leading edge efficiency and low-carbon technologies.

Company climate goals

- 34% reduction in CO_2 emissions from energy used in buildings by 2020
- Reduce operational electricity demand to 6.5KWh per passenger
- Creating a low-cost, low-consumption and low-carbon energy supply that links its main terminals with the airport's energy centres, including the Heathrow Energy Centre, a 10MW biomass Combined Heat and Power Plant (CCHP)
- Every car or small van, owned or leased will be electric or plug-in hybrid by 2020
- Over the longer term Heathrow is committed to cutting CO_2 per passenger energy consumption by 86% with a fully operational third runway, based on 130 million passengers per annum

Heathrow categories its emissions into three categories: control, guide and influence.

- Controls: CO_2 emissions where it has operational or financial control
- Guides: By agreeing with airport companies the policies, standards and operating procedures used they can manage emissions within and close to the airport boundary
- Influences: CO_2 emissions at and beyond the airport

Part 5: Transport *continued*

The company's progress so far

Heathrow has made good progress against its headline 2020 target, with a 19% reduction in total CO_2 emissions from energy used in their buildings in 2014.

Heathrow established the Heathrow Sustainability Partnership (HSP), in 2010, which, led by a CEO board from the 13 biggest companies at the airport, works collaboratively to achieve long term sustainability improvements aligned to Heathrow's sustainability strategy, Responsible Heathrow 2020, and helps deliver change on a scale that wouldn't otherwise be possible. With World Duty Free Group, the HSP developed the Energy Code of Practice in 2014, helping companies understand the environmental and cost benefits of energy reduction. It has been already adopted by six of their top ten electricity consumers.

Heathrow also established The Clean Vehicles Partnership (CVP) which helps Heathrow companies reduce emissions from their fleet operations. The CVP facilitates collaborative working amongst Heathrow fleet operators and provides free advice, guidance and training to reduce emissions.

Low carbon investment examples

A. Airport Collaborative Decision Making

Emissions from circling and delays are estimated to increase aircraft cruise emissions by up to 8%. Heathrow introduced this scheme in 2012 to reduce the time aircraft have to wait in the air and on the ground. In 2015, through monitoring reduced-engine taxiing by departing aircraft, 25% of eligible departures reported reduced-engine use.

B. Airport Stand Improvements

Heathrow provides fixed electrical ground power (FEGP) and pre-conditioned air (PCA) at all new aircraft stands. This avoids prolonged use of aircraft Auxiliary Power Units (APUs), the small jet engine used to provide electrical power and heat or cool the ambient air in the cabin. FEGP is fitted to all pier served stands and PCA on over 50% of Heathrow stands. Heathrow will invest a further £16.2 million over the next two years to upgrade and extend coverage of PCA units.

C. 'Turn Heathrow Electric'

In January 2016, Heathrow committed to a £2 million investment to install over 135 more chargers for at least another 260 electric vehicles, signalling a greater ambition to turn Heathrow electric. Heathrow already has 21 electric vehicle chargers available to passengers in short-stay car parks free of charge and are adding zero-emission vehicles to its fleet of 400 vehicles, supported by a £250,000 investment in electric vehicle charging infrastructure during 2015.

D. Hydrogen

The UK's first publically-accessible hydrogen re-fuelling station is based at Heathrow.

E. Personal Rapid Transit System

The Heathrow Pod, its Personal Rapid Transit system, is the first of its kind in the world and provides zero emission transport between pod parking and Terminal 5, running entirely on rechargeable 12V batteries. Its usage has removed the need for 70,000 bus journeys and saves the equivalent of 100 tonnes of CO_2 a year.

F. Heathrow Energy Centre

The £34 million HEC is one of the largest biomass initiatives of its kind in the UK, and at full load, saves 13,000 tonnes of CO_2, around 5% of current emissions. The HEC is part of a broader programme of energy innovation at Heathrow. Heathrow's Energy efficiency programme, which totals over £20 million of investment, achieved a 16.5% reduction in carbon intensity across a portfolio of 25 buildings in 2015.

Outcomes and lessons learned

Throughout Heathrow's energy efficiency programme, installation needed to be carefully planned to deliver energy saving projects without impacting the schedule and passenger experience. Heathrow introduced trials of products such as LED lights to evaluate performance before full-scale roll out.

Heathrow has set more ambitious targets, including reducing operational electricity demand from 7.4kWh per passenger in 2014 to 6.5KWh by 2020. They are developing an airport-wide supply strategy to build on this and increase the on-site supply of low carbon energy with further connections to the wider airport under construction to extend the provision of low carbon energy supply.

Heathrow

Effects of energy and climate policies on long term planning

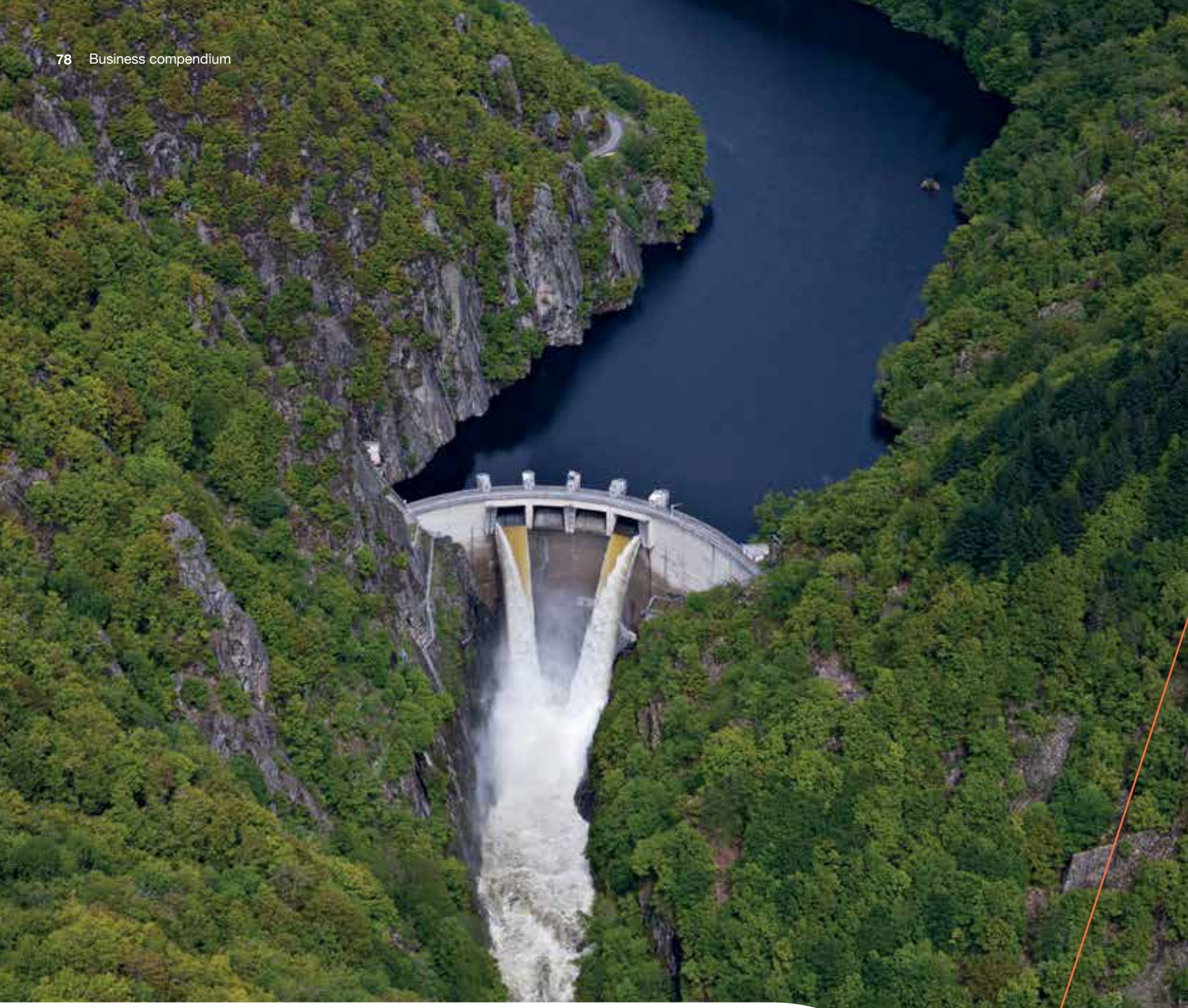
Heathrow supported aviation's inclusion in the EU ETS in 2012 and in 2015, and as a member of the Airports Council International, signed an open letter calling for governments to support the aviation industry's approach to climate change. The letter called for the industry's global regulator, International Civil Aviation Organisation (ICAO), to agree a mandatory carbon offset scheme to be introduced in 2020.

Following the conclusion of the UN climate talks at the COP21 at the end of 2015, the aviation sector is now fully-focused on working towards its own climate change framework. The market-based measure being developed by ICAO to address aviation emissions will provide the global mechanism needed for the industry. National and EU level policy interventions could pose significant risk to the industry, introducing competitive disadvantages and lead to perverse outcomes such as carbon leakage. For example emissions on a global basis could be higher for many journeys, which as a result of ineffective carbon policy become two-sector flights instead of a direct single flight. EU legislators should be encouraged to consider how to incentivise investment in aviation technology to address climate change.

Heathrow has set its energy strategy to align with EU legislation and the UK Government translations of those requirements. Heathrow's specific concern, as with most UK business, is the recent changes in the long standing UK Government energy policy, which undermines business efforts to tackle climate change. Consistent, stable and progressive UK government energy and climate policies that incentivise investment in energy-efficiency and carbon reduction could help businesses to deliver much more and support the UK to move towards a low carbon future.

Part 6

Energy



Part 6: Energy

Company profile

Business:	EDF is a leader in low-carbon electricity generation leveraging a diversified mix.
International Presence:	EDF is a major electricity producer in France, UK, Italy, Poland and Italy with a wider global presence in the US, Brazil, Laos and China.
Turnover:	€72.9 billion in 2014
Employees:	158,000
Website:	https://www.edf.fr/en/meta-home

Company's sustainability vision

To largely contribute to putting the world on a less than 2°C trajectory by being the leader of the low CO_2 growth.

Business case for low carbon

As an electricity producer, EDF's objective is to remain a frontrunner in low-carbon emissions. Innovative finance is a great tool in making renewable technologies competitive in the market.

Green bonds for instance, as an innovative funding tool provide EDF with access to an increasingly broad investor base while demonstrating to capital markets the volume of its current business as well as its commitment to renewable energy.

The Group's energy mix is now based on nuclear energy (main source in France and the UK), hydropower, with Europe's largest installed capacity; and other wind and solar. EDF's electricity mix benefits from sound investment decisions and now emits one of the lowest levels of greenhouse gases (GHG). It has been a natural course of action for EDF to commit to fighting climate change.

To be the leader in low-carbon growth, EDF will continue its action by:

- Developing new capacity in renewables (hydro, wind and solar) in partnership with regional authorities, and with the support of a high-performance, centralised system that is robust and flexible enough to enable the development of local intermittent energy
- Helping its customers find optimal consumption levels
- Developing new low CO_2 electricity uses to decarbonise the economy
- Building, operating and safely extending the lives of a GHG-free nuclear fleet in France and the UK in addition to and in support of renewable energy facilities

Benefits, savings & profits

Green Bonds are one example of significant savings for EDF. In 2013, the EDF Group was the first large corporation to issue green bonds raising €1.4 billion to finance the renewable energy projects of EDF. The funds financed 13 renewable energy projects (wind, photovoltaic solar and biomethane) developed by EDF in France and North America. The projects represent a total capacity of 1.8GW and a generating capacity of around 7 terawatt-hours a year.

In 2015, EDF issued a second green bond, the biggest ever in US dollars by an industrial company. The new $1.25 billion bond will be used by EDF to continue its investments in renewable energy development.

EDF Energy will extend the life of four of its eight nuclear power plants in the UK. This will safeguard 2,000 jobs and help with tight energy supplies. In total the programme has the potential to avoid 80 million tonnes of CO_2 emissions, equivalent to taking all the cars off the road in the UK for three and a half years.

Company climate goals

- By 2020, the EDF Group is aiming to generate 75% carbon-free power (for total gross installed capacity of around 160GW), of which 25% will be renewables, including hydro
- The EDF Group aims to more than double its global renewable installed capacity by 2030, taking it from 28GW to over 50GW
- In mainland France, EDF's goal for 2016 is to halve its CO_2 emissions from electricity and heat generation, compared with 1990 levels, for a total reduction of 12 million metric tonnes
- EDF aims at continuing a high level of investment to maintain the performance of its nuclear fleet with a 10 year programme of €55 billion in France. Also in the UK, the construction of Hinkley Point C will help the country meet its emissions targets. The electricity generated from Hinkley Point C will avoid 10 million tonnes of CO_2 emissions a year, and deliver secure and low carbon electricity

The company's progress so far

- In 2014, the share of renewables in the Group's installed capacity was 21% (of which 16% is hydro)
- EDF's CO_2 emissions in mainland France are one-third of what they were in the past from 23 million metric tonnes CO_2 in 1990 to 8 million metric tonnes CO_2 in 2014
- In 2015 EDF invested €1.6 billion in renewables

Worldwide EDF's emissions decreased from 113 grams/kWh in 2013 to 103 grams/kWh in 2014 and to 95 grams/kWh in 2015. This is five to six times lower than the worldwide average and three times lower than the EU average. Since 1990, it has more than halved its carbon emissions in mainland France generating close to 98% of its electricity with no CO_2 emissions.

In 2014, EDF beat its own record for new wind and solar power projects with the construction of 2.2GW of wind and solar capacity worldwide and in France ten wind farms were brought into service.

Water is the principal renewable energy source operated by EDF, which is the biggest supplier of hydropower in the EU. The Group has renewable installed capacity of 28.3GW, of which 21.9GW is hydro.

Low carbon investment examples

A. SMARTFLOWER™: Autonomous Solar Electricity Generation

SmartflowerTM is an intelligent, innovatively designed solar energy generator that allows individuals or organisations to produce their own energy. Comprised of 12 petals each equipped with 40 photovoltaic cells, the "sunflower" opens out fully in the morning and tracks the sun's course throughout the day, then folds up at night. Each flower has a capacity of 2.3kWp, which corresponds to annual production of around 3,500kWh or the equivalent of a year's consumption for a four-person household (excluding hot water and heating).

B. Singapore: See Tomorrow's City In 3 Minutes

EDF has developed an urban-planning platform for Singapore's largest social landlord. Its 3D interface enables local decision-makers to visualise the potential consequences of various energy scenarios being considered for the city. The tool also helped reduce CO_2 emissions. The platform includes 500 functions which cover the main urban issues (energy, transport, water and waste). It takes just three minutes to obtain simulation results.

C. Poutès: A New Generation of Dam

Resilience is integrated to EDF's business processes. The Group is adapting its low-carbon generating facilities to meet environmental challenges and extend their lives. The alterations to the Poutès dam in France are an excellent example. A first of its kind system of central valves will allow the flow of sediment while maintaining 85% of the dam's power-generating capacity, therefore, reducing its impact on water and biodiversity.

Outcomes and lessons learned

A diversified production mix is a great tool from an economic and technical point of view. Their nuclear and hydro fleet enable EDF to be sufficiently flexible in order to integrate intermittent sources of energy while remaining economically affordable for customers.

Effects of energy and climate policies on long term planning

The EDF Group supports the immediate introduction of a high carbon price to increase investment in low-carbon generation means and rapidly avoid CO_2 emissions. This is why one of the actions undertaken by the EDF Group is to support several companies that are asking for a high carbon price.

Setting clear and objective legislative rules encouraging CO_2 emission reductions in a continuous and cost effective manner is extremely important.

In France, EDF supports a CO_2 floor price of between 20-30€/t to be increased. This will send the right signal for long term investment and secondly, and most importantly, increase the competitiveness of low-carbon technologies. EDF want to see a strong signal on carbon now, and call for an international conversation on the subject.

Part 6: Energy

DONG energy

Company profile

Business:	DONG Energy is one of the leading energy groups in Northern Europe engaged in the development, construction and operation of offshore wind farms; generating power and heat from power plants, while replacing coal and gas with biomass in Danish plants; electricity distribution and providing smart energy solutions to residential and business customers; and producing oil and gas from the North Sea.
International Presence:	Operates across Northern Europe and in the USA.
Turnover:	€9.5 billion (2015)
Employees:	6,700 (2015)
Website:	www.dongenergy.com/en/

DONG energy

Company's sustainability vision

"Our vision is to lead the energy transformation. We want DONG Energy to be recognised as a winner in European energy. We are therefore undertaking a comprehensive transformation of our business, tailoring it to the new market conditions in the European energy industry."

Business case for low carbon

Between 2015 and 2035, the EU countries must replace and construct the equivalent of more than 60% of their current power generation capacity. It is a unique opportunity to build a more eco-friendly and effective energy supply as the fundamental transformation of the European energy system is expected to continue. It is, therefore, not a question of whether to invest in new energy infrastructure but rather a question of what to invest in. Offshore wind is expected to account for the largest build with a total capacity share around 20% in 2030.

DONG Energy sees a clear business case for both societies and companies to develop energy systems that are green, independent and economically viable. DONG Energy creates value for its customers, shareholders and all the other stakeholders in society by building competitive positions in markets in which its competences are unique. This applies, in particular, to its offshore wind business, which is more than twice as large as its closest competitors in terms of installed offshore wind capacity as well as employee numbers.

Since 2011, DONG Energy has adapted to the new market situation for conventional power and heat generation in Europe by consistently reducing its cost base and generation capacity through major streamlining initiatives and organisational adjustments. A biomass conversion programme of the Danish thermal power plants has been initiated to meet the target that 50% of production from Danish thermal plants will be based on sustainable biomass by 2020.

DONG Energy believes that acting with integrity and pursuing sustainability is the best way to operate their business and create long term value. That is why they are committed to continuously advancing the UN Global Compact principles on respect for the environment, human rights, labour rights, and anti-corruption.

Benefits, savings & profits

DONG Energy makes a clear connection between their vision to lead the green transformation of the energy sector and the ability to attract external finance from long-term investors such as pension funds. DONG Energy's financial partnership model ensures recycling of capital and profit sharing, through divestments of ownership shares in their offshore wind farms.

How society chooses to produce energy has a considerable impact on the environment. Therefore, the energy sector and DONG Energy attract a keen interest from politicians, public authorities, trade associations, NGOs and many other stakeholders. DONG Energy is in a position to engage in high-level political dialogue regarding future solutions in the energy sector supporting the continuous development towards a low-carbon society.

Dialogue with stakeholders is key to understanding the need to adapt and renew the sustainability strategy. Through their stakeholders, DONG Energy has obtained better insight into how their activities impact society. Opinions and expectations of their stakeholders also play a key role in the development of framework conditions for energy generation, supply, and trading.

Company's climate goals

DONG Energy addresses profound societal challenges through four strategic targets:

- To reduce carbon emissions from heat and power production by 60% by 2020, compared to 2006
  - This will be achieved by large-scale investment in offshore wind energy and the conversion of existing thermal power plants from fossil fuels to sustainable biomass

Part 6: Energy *continued*

- Construct offshore wind energy with an accumulated capacity of 6.7GW by 2020
- Reduce offshore wind energy costs by 35-40% by 2020 (Based on 2012-prices)
- Increase the share of sustainable biomass in thermal power plants to at least 50% by 2020

The company's progress so far

Up to 2015 DONG Energy had achieved the following:

- 48% reduction in CO_2 emissions compared to 2006
- Construction of 3GW offshore wind farms capacity
- 30% share of biomass in Danish combined heat and power production
- Recent auction results for offshore wind have shown that the offshore wind industry is on track towards the LCOE-target of 100 €/MWh

Through investments, especially in offshore wind farms, DONG Energy creates benefits for the local communities neighbouring offshore wind farms. Towards 2020 DONG Energy will eg. invest approximately €7.6 billion in three offshore wind farms in the Humber Region, UK. These investments are estimated to create an average of 1600 construction jobs per year from 2015 until 2020 and 500 direct and permanent operation and maintenance jobs to service the three offshore wind farms throughout their lifetime.

Outcomes and lessons learned

Low carbon investments are aligned with the societal needs for decarbonisation, which has fostered a stable investment climate around these green energy investments compared to fossil fuel based investments.

Low carbon investment examples

A. Offshore wind power

During 2014 DONG energy invested €1 billion in offshore wind power and €1.4 billion in 2015.

B. Conversion of fossil based thermal power plants

Between 2014 – 2017 €500 million will be spent converting existing fossil fuel based thermal power plants to those powered by sustainable biomass. DONG Energy is currently converting the following combined heat and power plants to biomass:

- Studstrup unit 3 - 360 MW (electricity capacity), expected commissioning 2016
- Avedøre unit 1 - 252 MW (electricity capacity), expected commissioning 2016
- Skærbæk unit 3 - 95 MW (electricity capacity), expected commissioning 2017
- Asnæs unit 6 - 25 MW (electricity capacity), expected commissioning 2019

Totalling a combined biomass fired power electricity production capacity of 1.2GW in 2020.

Towards 2020 DONG Energy expects offshore wind and bioenergy to account for more than 80% of their investments.

Effects of energy and climate policies on long term planning

Current EU and national energy and climate policies are insufficient to ensure the needed market visibility for the long term transformation of the energy sector. The EU 2030 CO_2 target and renewable energy targets are progressing in the right direction but they are not sufficient enough to ensure the needed investments.

DONG Energy believes that significant investments in the necessary infrastructure is required to fulfil the ambition of reaching a fully integrated and effective EU-wide electricity network. A more ambitious EU policy will enable more low carbon investments, while a higher price on CO_2 emissions will make renewable energy investments more attractive and send a clear signal to all stakeholders. Strong and clear legislation is needed to fulfil the 2030 renewables target, which in turn will incentivise the EU member states to create national markets for renewable technologies.

Part 6: Energy

Company profile

Business:	E.ON is an international privately-owned energy supplier.
International Presence:	Ten regional units manage E.ON's national sales operations, regional energy networks, renewables and distributed-generation businesses in Europe. E.ON is also active in the USA.
Turnover:	€112 billion (2014)
Employees:	58,000 (year end 2014)
Website:	www.eon.com

Company's sustainability vision

"To make energy "cleaner & better" in and outside Europe."

Business case for low carbon

Making climate protection advancements demands extensive investment in energy-efficient technologies. This requires a pan-European approach and the right frameworks to offer investors security.

E.ON supports global efforts to create a policy framework to establish a climate-friendly world of energy. Together with national and European industry associations E.ON recognises the need for governments to develop a consensual solution despite differing national interests.

The approval in October 2014 of the EU Climate Change and Energy Package for 2030 by the European Council was welcomed by E.ON. They believe that more ambitious climate targets for 2030 could lead to faster recovery and stabilisation of emission certificate prices. This way the European Emissions Trading System (EU ETS) would quickly regain its regulatory function in terms of restructuring European energy systems, which in turn, would provide the necessary impulse to invest in lower-emissions technologies.

Benefits, savings & profits

Renewable energy generated by E.ON assets makes a substantial contribution to climate protection. E.ON's green generation fleet has so far displaced the emission of more than 60 million metric tonnes of carbon, about as much as a major city like Berlin emits in six years.

As recognition for its efforts E.ON is ranked among the top companies in the CDP Climate Top Ranking 100.

Company climate goals

- Halve the carbon intensity of their power generation in Europe from a 1990 baseline of 0.63 to 0.32 tonnes of CO_2 per MWh by 2025
- Increase renewables' share of their owned generation to more than 20% by 2020
- Reduce indirect carbon emissions (those not resulting from power generation) by 20% from a 2010 baseline by 2020

E.ON's businesses are taking action to help it reach its targets. E.ON's renewables business intends to achieve significant reductions in capital expenditures per MW of new capacity by 2015 (relative to 2010) through:

- 25% for onshore wind
- 40% for offshore wind and
- 35% for photovoltaic

These improvements will promote the further expansion of renewables.

The company's progress so far

E.ON monitors and manages its climate performance by measuring its progress towards its decarbonisation targets. In recent years, E.ON has taken numerous steps to enhance the efficiency of its assets and increase its renewables capacity, thereby changing E.ON's energy mix. E.ON's key indicator for assessing its decarbonisation efforts is carbon intensity.

As of year-end 2014, E.ON reduced the carbon intensity of its power generation in Europe by 35% from a 1990 baseline.

E.ON's former strategy committed it to providing cleaner and better energy solutions in and outside Europe. E.ON's new strategy, Empowering customers. Shaping markets, takes this commitment a step further.

Under E.ON's new strategy, its conventional generation and renewables businesses, although part of two separate companies starting in 2016, will continue to do their part to support the transformation of the energy system. E.ON factors in climate protection into its long-term planning, investment decisions, and risk management. In conducting dispatch planning and operating its power plants, E.ON treats carbon emissions as a factor of production which they continually try to

use more efficiently, just as they do with other factors of production like capital and fuel. In doing so, E.ON carefully weighs considerations like profitability, supply security, and climate-protections requirements against each other.

Low carbon investment examples

A. Amrumbank West wind farm

The offshore-wind farm Amrumbank West, situated 35 kilometres north of Helgoland (Germany), has an installed capacity of 302MW and can supply about 300,000 households with renewable energy while helping to reduce CO_2 emissions by more than 740,000 tonnes.

B. Photovoltaic projects

E.ON also develops PV projects with a focus on the European and US markets. E.ON recently completed a utility-scale solar project in the United States, Maricopa West, a 28MW photovoltaic farm in Kern County in Southern California. A tracking system ensures that its 89,000 panels are always oriented toward the sun. Maricopa West was completed ahead of schedule and under its budget of roughly €50 million.

C. Energy efficiency services

Alongside renewables E.ON is also advancing its energy-efficiency service to customers. First-class energy products go hand in hand with carbon emission savings. For example, E.ON Connecting Energies (ECT), an E.ON subsidiary specialising in integrated energy solutions, will install high-efficiency combined-heat-and-power (CHP) units at BMW plants in Dingolfing and Regensburg, Germany. The cogeneration of electricity and heat will reduce the plants' aggregate carbon emissions by about 10,000 tonnes per year. The project also showcases E.ON's focus on tailor made solutions for their customers.

Outcomes and lessons learned

The importance of taking into account the specific situation of a project and ensuring timely execution without any disruptions is paramount. As such, predictability and certainty of a project's circumstances at all stages is critical.

This holds true to large-scale wind projects, as well, where they are often impacted by shifts in government policy frameworks. Such shifts can mean delays or even lead to disruptions and non-completion. A stable policy framework is thus crucial to ensuring the success of our business.

Effects of energy and climate policies on long term planning

Investment security is extremely important for E.ON to achieve its decarbonisation targets. Many of the necessary investments are in capital-intensive assets with operating lives of several decades.

To have the confidence to build such assets, E.ON needs a consistent, predictable policy and regulatory environment. This is absolutely essential for E.ON to be able to do its part to help transform Germany and Europe's energy system, while at the same time ensuring supply security at affordable prices.

E.ON faces the challenge of operating in an increasingly disparate national, European, and international policy and regulatory environment. E.ON, therefore, engages in intensive dialogues with policymakers at the national and European level, particularly on the topic of climate policy.

Part 6: Energy

acciona

Company profile

Business:	ACCIONA are a world leader in renewable energy, water services and infrastructure.
International Presence:	Operational in over 30 countries across Europe, Asia, Africa, North America, South America, The Caribbean and Oceania.
Turnover:	€6.5 billion (2014)
Employees:	33,559 (2014)
Website:	www.acciona.com

Company's sustainability vision

ACCIONA's vision is to meet the challenge of achieving sustainable development in all our business areas, so that the generations of today and the future will have a better life.

Business case for low carbon

ACCIONA isn't a new entrant to the low-carbon economy. They first invested in renewable energy 24 years ago making it the first construction company to do so in Spain. They have had a clear vision about the future of energy, in terms of resource and environmental concerns, which show a clear long-term trends towards renewable energy.

Their activity is not only constrained to producing and running wind parks but they also work to accelerate the transition to a different energy market, decoupling it from the volatility of fossil fuels and environmental constraints.

ACCIONA is known for promoting a business model that attempts to remain several steps ahead of the risks and challenges of sustainable development. ACCIONA's new Sustainability Master Plan was launched in 2015 and is linked directly to the company's vision and mission, aligning with their strategic business priorities.

ACCIONA is taking on the responsibility of not only mitigating new risks but also responding successfully to new opportunities that arise from global challenges.

ACCIONA expect primary energy demand to increase by 33% by 2035 and carbon and climate change to strategically influence investment decisions, changing the future of the energy sector. ACCIONA Energy only invests in renewable energy and its sales have increased to €2.2 billion (2014).

Benefits, savings & profits

Renewable energy is the core of ACCIONA Energy's business. Since ACCIONA began investing in renewables 25 years ago, the Company has avoided the emissions of 125 million tonnes of CO_2, the equivalent of the 2014 carbon emissions of Denmark, Norway and Sweden combined.

ACCIONA's first five-year Sustainability Master Plan reduced group CO_2 emissions by 46% in five years and avoided the emission of 68.5 million tonnes of CO_2. ACCIONA has been recognised as a leader in the fight against climate change and was recently named the "greenest utility in the world" by Energy Intelligence as well as one of the most sustainable suppliers in the world by the Carbon Disclosure Project (CDP).

For the fourth consecutive year ACCIONA achieved Advanced Level in the Communication on Progress under the UN Global Compact.

Company climate goals

- 100% carbon neutrality across entire global operations by 2016
- Reduce or mitigate the adverse effects of climate change
- Decrease greenhouse gas (GHG) emissions mainly through renewable energy generation
- Promote energy savings
- Respond to global demand regarding renewable energy, sustainable infrastructures, water and service

2020 strategic goals

- Create carbon neutrality and climate risk map
- Adaptation and management of climate risks
- Climate change training
- Invest at least $ 2.5 billion in renewable technologies over the next five years
- 80% of new investments in developing countries
- 10,500MW of renewable capacity installed, avoiding more than 20 million tonnes of CO_2, equivalent to the annual emissions of four million automobiles

ACCIONA also extends its commitment to its entire value chain. A multidisciplinary team is responsible for identifying and managing environmental risks, including those risks related to climate change.

Part 6: Energy *continued*

The company's progress so far

In 2014, ACCIONA produced 579,106 tonnes of CO_2 emissions, a decline of 9% compared to 2013 and 67% less than in 2007. It also avoided the emission of 16.3 million tonnes of CO_2, 28 times the CO_2 generated by its production activity.

ACCIONA calculated the total GHG emissions of its more than 28,000 suppliers in 2014, making them one of the first companies in the world to analyse its entire supply chain.

In 2014 alone, ACCIONA allocated €560 million to activities related to the environment. An 8.1% increase on the previous year.

In 2014 employees received a total of 129,039 hours of environmental training and the company's divisions identified, analysed, and evaluated 488 environmental actions to be taken into account when carrying out its activities.

Low carbon investment examples

A. Stable carbon pricing

ACCIONA Energy only invests in renewable energy, and with an appropriate and stable carbon price the competitiveness of renewable energy will become clearer. ACCIONA aims to help improve the EU ETS in order to have a stable and adequate CO_2 price and also improve renewable objectives. ACCIONA believe renewable targets should be nationally assigned to create more efficiency within the system. Mechanisms exist for countries to share their targets, although they have not yet been implemented. ACCIONA believe further development of the governance mechanism will help rectify this issue.

B. Low carbon business models

ACCIONA considers environmental variables when making decisions in its business operations to reduce the environmental impact of its activities. This is reflected in its commitment to low-carbon business models and in their objectives established in the 2015 Sustainability Master Plan.

C. Water treatment plants

The LIFE-BRAINYMEM research project led by ACCIONA aims to reduce energy consumption in treatment plants and minimise their environmental impact. The work consists of reducing both GHG emissions to the atmosphere and emergent pollutants in the water, significantly mitigating the environmental impact of the plants.

Outcomes and lessons learned

One of the key lessons learned is that by ACCIONA is that company's can't "freestyle" away from regulatory issues. Regulatory stability is an essential and a priority for any low carbon investment.

The second key lessons is that any carbon pricing system should consider, as demonstrated by the EU ETS, the need for an automatic prize stabilisation mechanism, like the Market Stability Reserve that will come into force in 2019.

Effects of energy and climate policies on long term planning

ACCIONA welcomes the commitment to maintain EU leadership in renewables, however, after the success of the Paris Agreement, the EU should go further and have greater ambition for GHG emission reductions. Renewable energy investments are by definition capital intensive and require long term stability. Currently, the effectiveness of EU energy and climate policy is weakened by a lack of alignment with other EU regulations.

Specific challenges which need to be addressed are:

- There should be specific R&D support for both existing and new technologies, and improved access to EU financing for renewable producers
- Consumers should become a more active part of the sector
- Adequate grid infrastructure will enable trade, competition and economic growth by maximising the comparative advantages of each market area
- Policymakers should design a proper and effective portfolio of actions to reinforce and prioritise the role of renewables in all sectors of the economy
- Stable regulatory frameworks and a robust, reliable, and transparent governance system are the keys to providing investor certainty for the post-2020 period and ensuring that the 2030 binding target will be met

Part 6: Energy

IBERDROLA

Company profile

Business:	IBERDROLA is a Spanish public multinational electric utility company with a focus on renewable energy, in particular wind power. IBERDROLA is one of the largest utilities in the world and the leading wind energy producer.
International Presence:	IBERDROLA operates in more than 40 countries and has over 28 million customers.
Turnover:	€30 billion net revenue (2014)
Employees:	30,000
Website:	www.iberdrola.com, www.just2challenge.com

Company's sustainability vision

"To be the leading multinational group in the energy sector at the forefront of a better future, sustainably creating value with a quality service for people: customers, citizens and shareholders."

Business case for low carbon

IBERDROLA integrates climate change issues both in terms of risk and opportunity in to its business plans.

Their strategy is based on the significant development of renewable energy, primarily from wind power, and thermal production technology eg natural gas combined cycle power plants.

IBERDROLA Servicios Energéticos was created to promote energy savings, efficiency and services aimed at enhancing comprehensive energy management in both public and private buildings and infrastructure.

Benefits, savings & profits

In 2014 IBERDROLA, through energy efficiency improvements, avoided CO_2 emissions of 11.8 million tonnes and green products and services avoided 118,301 tonnes of CO_2 emissions equating to savings of €1.2 million.

In terms of revenue generated in 2014 renewables equate to 19% of IBERDROLA's €1.3 million. The Green Bond created a benefit of €750,000 and recycling activities meant €7 million.

IBERDROLA actions on climate change have been recognised by the Carbon Disclosure Project, Dow Jones Sustainability Index, FTSE4GOOD, ACCO Award, Carbon Ranking Global 800, Newsweek's Green Ranking and the Rubin D´Honeur 2013 European Business Awards.

Company climate goals

- In 2009 IBERDROLA launched its first commitment for CO_2 emissions in the European energy sector of 0.275 tonnes CO_2/MWh

In 2015 IBERDROLA set new targets:

- 50% reduction of its emissions intensity by 2030 compared with its 2007 value
- Be carbon neutral by 2050
- Plan to replace 40% of its fleet, some 300 cars, with electric vehicles

The company's progress so far

In 2015, IBERDROLA's renewable installed capacity was 24,900MW. As well as closing coal facilities IBERDROLA's emissions are being reduced through a wide range of products and services that promote energy-efficiency and savings. Renewable energy from cogeneration facilities reduced fossil fuel energy consumption by 208 million GJ/year in 2014.

Other energy efficiency improvements include: hydroelectric generation, improved efficiency of distribution networks and smart grids, capacitor banks, luminosity regulators, energy managers, energy audits, climate control, efficient motors, frequency shifters for motor regulation, efficient gas boilers and micro-generation and other efficient solutions.

Low carbon investment examples

Main investments:

- Renewables, hydro and cogeneration
- R&D and innovation in clean energy
- Smart grids
- Energy efficiency in distribution networks - loss reduction programmes
- Electronic billing - as an ecological alternative to the use of paper
- Videoconferencing to avoid business travels

Green eMotion:

- Green eMotion is a four-year cross-European initiative to promote electromobility and has seen IBERDROLA partner with both government and industry partners.

IBERDROLA

Alliances with companies include:

- Opel, Mitsubishi, and Peugeot to increase access and use of electric vehicles
- Volvo to boost electrification of public transport in urban areas
- BMW to launch corporate electric car-sharing services

Partnerships with government authorities on Electromobility include:

- Installation of recharge points in collaboration with government authorities in the autonomous communities
- First public services for e-car sharing, in operation in Guipuzcoa, Basque Country
- First electric bus service in Vizcaya, Spain
- Electric fleet and electric recharge points for the government of Andalusia

Outcomes and lessons learned

IBERDROLA have learnt in several ways relating to their different roles as a company:

- As a utility, by incorporating clean, advanced and efficient production and distribution technologies
- As a vendor, by informing and educating customers and providing them with solutions that help enhance their energy efficiency and reduce the environmental impact of their energy habits and consumption. Tailor made solutions are being sold with the information provided by smart grids
- As an energy consumer, by ensuring continuous improvement in energy efficiency at its work centres and buildings; and in its vehicles, developing mobility plans and raising awareness among employees
- As a purchaser, by including environmental and social commitment clauses in supplier contracts and by preparing awareness and carbon footprint measurement campaigns within the supply chain

Effects of energy and climate policies on long term planning

Consistent climate and energy frameworks and policies at EU and national level are key to providing long term signals for investment. IBERDROLA believe that divergent national approaches, policies and goals at the EU level lead to distortions that jeopardise cost efficiency and effectiveness.

The EU ETS has been gradually weakened to a level where it no longer encourages investors to support low carbon technologies. IBERDROLA believe reform of the EU ETS is needed to ensure a strong carbon price as the most efficient signal to promote investment. IBERDROLA recommend environmental taxation based on the “polluter pays” principle and the extension of the EU ETS to other sectors, particularly transport.

IBERDROLA also recommend improvements to the European energy infrastructure. Investments are necessary to reinforce electricity transmission infrastructure, both cross-border and internally, to achieve a European energy market.

Renewables require networks that are stronger and smarter as well as back-up generation capacity that is flexible and efficient. Reducing emissions in diffuse sectors (especially transport) show the need for more investment in infrastructure such as charging infrastructure for electric vehicles.

Part 7

Finance

Part 7: Finance

mirova

Company profile

Business:	Mirova is an Asset Manager whose specificity is to offer a responsible and sustainable investing approach, through five products: listed equities, bonds, infrastructures, impact investing, voting and engagement.
International Presence:	Products invested at French, European and global levels.
Turnover:	€6.1 billion (2015)
Employees:	61
Website:	www.mirova.com

Company's sustainability vision

"Mirova is convinced that sustainability solutions create value for investors over the long term."

Business case for low carbon

The financial industry, especially the capital markets, possesses considerable leverage for driving change and addressing the needs and challenges posed by sustainability transition and climate change. This conviction is the cornerstone of Mirova's foundation as a business. Impending regulation and technological innovations that are transforming the economic environment will also impact the growth perspectives and competitiveness of Mirova's business model.

Policies such as the EU 2030 targets and regulations have contributed to help Mirova focus on sustainable investment opportunities and to invest into companies whose offerings lead to reduced or better managed energy consumption.

Indeed, legislative pressures also lead to the emergence of new technologies or products to invest in. This is the case for instance in the field of energy efficiency where improved transmission systems and vehicle light-weighting have followed standards limiting CO_2 emissions in the automobile industry. Innovative products such as green bonds are also becoming more relevant in a regulatory favouring low-carbon economy, especially in the context of volatile markets.

Mirova's business model is thus a conviction-based investment and performance-driven management that prioritises integration into its products of:

- Companies and projects that provide solutions for sustainability transition, for example with low carbon technologies and energy efficiency
- Companies with a better level of risks management (ESG and financial risks)

This overall strategy has proved successful so far, with an increase in both the company's assets under management and its headcount:

- From €4 billion assets under management in 2012 to €6.1 billion in 2015
- From less than 40 people to more than 60 at the beginning of 2016

Benefits, savings & profits

Benefits resulting from an increase of low carbon investments are central to Mirova's business and already account for an important part of its development.

Opportunities from developments in world markets are growing. For instance, although green bonds still represent only a limited part of all bonds issued at global level, less than 1% of the bond market, there has been a rapid growth to this market since 2013. By the end of June 2015, the total issuance for the year was already close to $60 billion, three times that of 2013. Worldwide investment in renewable energy represented $270 billion in 2014, marking an increase of 17% despite the sharp downturn in crude oil prices. Mirova will benefit from those market trends and opportunities that support the transition to a sustainable economy.

Mirova's team of Responsible Investment Research has positioned the company's choices toward a positive selection of companies providing solutions to environmental and social challenges, especially solutions to climate challenges. Their work was summarised in Mirova's publication INSIGHTS #4 which has been widely publicised to other stakeholders in the framework of the Paris COP21.

Company's climate goals

Mirova supports the Montreal Carbon Pledge and Portfolio decarbonisation. The company's overall approach to climate change is to:

- Invest into innovative companies and projects that will help the transition towards a low-carbon economy: low carbon energy (mainly renewable energies, transition technologies), energy efficiency (eg buildings, transport, industry), enabling technologies (eg electric vehicles, smart grid).
- Have no investment into fossil fuels energies

- Stimulate financial innovation (eg green bonds)
- Measure carbon footprints: Mirova has co-developed with Carbone 4 a robust carbon methodology (Carbon Impact Analytics) in order to assess the "carbon content" of its listed equities portfolio and its positive contribution to shift to a low-carbon economy; the methodology takes into account issuers' induced emissions (scopes 1, 2, 3) but also emissions avoided thanks to issuers' products and services.

The company's progress so far

Overall, all Mirova's products are already in a low-carbon trajectory with investment portfolios without direct investment into oil or coal companies.

Consolidated Equity Portfolio

In 2015 Mirova published a measurement of its equity portfolios' carbon impact (47% of its assets under management) carried out using Carbon Impact Analytics

- Mirova's Consolidated Equity Portfolio induced emissions were less than 50% that of a European benchmark (97tCO_2/million€ vs. 222tCO_2/million€)
- For its European strategy, Mirova portfolio's calculated avoided emissions were more than three times higher than the benchmark (-43tCO_2/million€ vs. -12tCO_2/million€)

Green Bonds

- Mirova Green Bond Global, an innovative SICAV with ESG analysis for all issuers and a Carbon Impact SICAV, was awarded the Novethic Green Fund Label

Infrastructure

- A dedicated team of 7 persons is investing in the European renewable energy sector, with funded projects that have avoided 1.4 million tons CO_2 and representing 585MW of clean energy

Low carbon investment examples

A. Consolidated Equity Portfolio

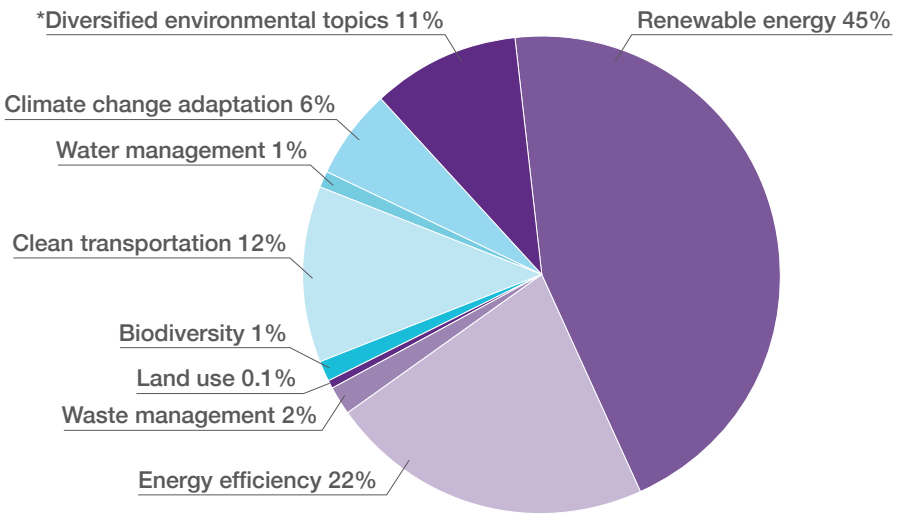
Mirova's Global Energy Transition Equity Fund invests in low carbon energy, energy efficiency, and enabling technologies.

B. Green Bonds

Mirova Green Bond is a comprehensive bond SICAV which allows investors to take advantage of various global yields, with a double impact strategy: It is a 100% SRI SICAV with ESG analysis for all issuers.

Mirova Green Bond – Global:

Distribution by sustainability projects – December 2015



Part 7: Finance *continued*

C. Renewables infrastructures

Mirova has developed funds dedicated to renewable infrastructures such as:

- Euro FIDEME 2: launched in 2009, funded up to €94 million by private investors contributed to the creation of:
  - 300MW in land-based wind power
  - 100MW in photovoltaics
- MIROVA EUROFIDEME 3: launched in spring of 2014, allowed European institutional investors to finance project companies carrying renewable energy assets, essentially wind power and photovoltaics, in Europe

Outcomes and lessons learned

The main positive outcome lies in the company's positive results, with €6.1 billion of assets under management in 2015.

This demonstrates that integrating fundamental analysis of products and sustainability into investment choices, rather than benchmarked management of values, can be a reliable source of profit. It is possible to conciliate financial performance and investment into energy transition with listed equities, fixed income products like green bonds, and investment in green infrastructures.

Mirova have, however, encountered challenges. For example, measurement and choices with regards to what should be the carbon content of a portfolio is a complex question from a methodological point of view. There is no consensus investment scenario for reaching the objective of capping the global rise in temperatures at two degrees Celsius. The positive selection of companies providing solutions to climate challenges may in some cases guide investments towards more emission-intense industrial sectors, eg glass wool, which contributes to the energy transition despite high levels of induced emissions. In addition, Mirova has to maintain a balance between innovative and more conventional investments to mitigate the level of risks taken and ensure that all financial risks are taken into account with a certain level of profitability to its clients.

Effects of energy and climate policies on long term planning

It is Mirova's point of view that the EU has a crucial role to play following the COP21 to encourage institutional investors to integrate society long-term interests and systemic risks, including climate and ESG risks, into their investment strategies.

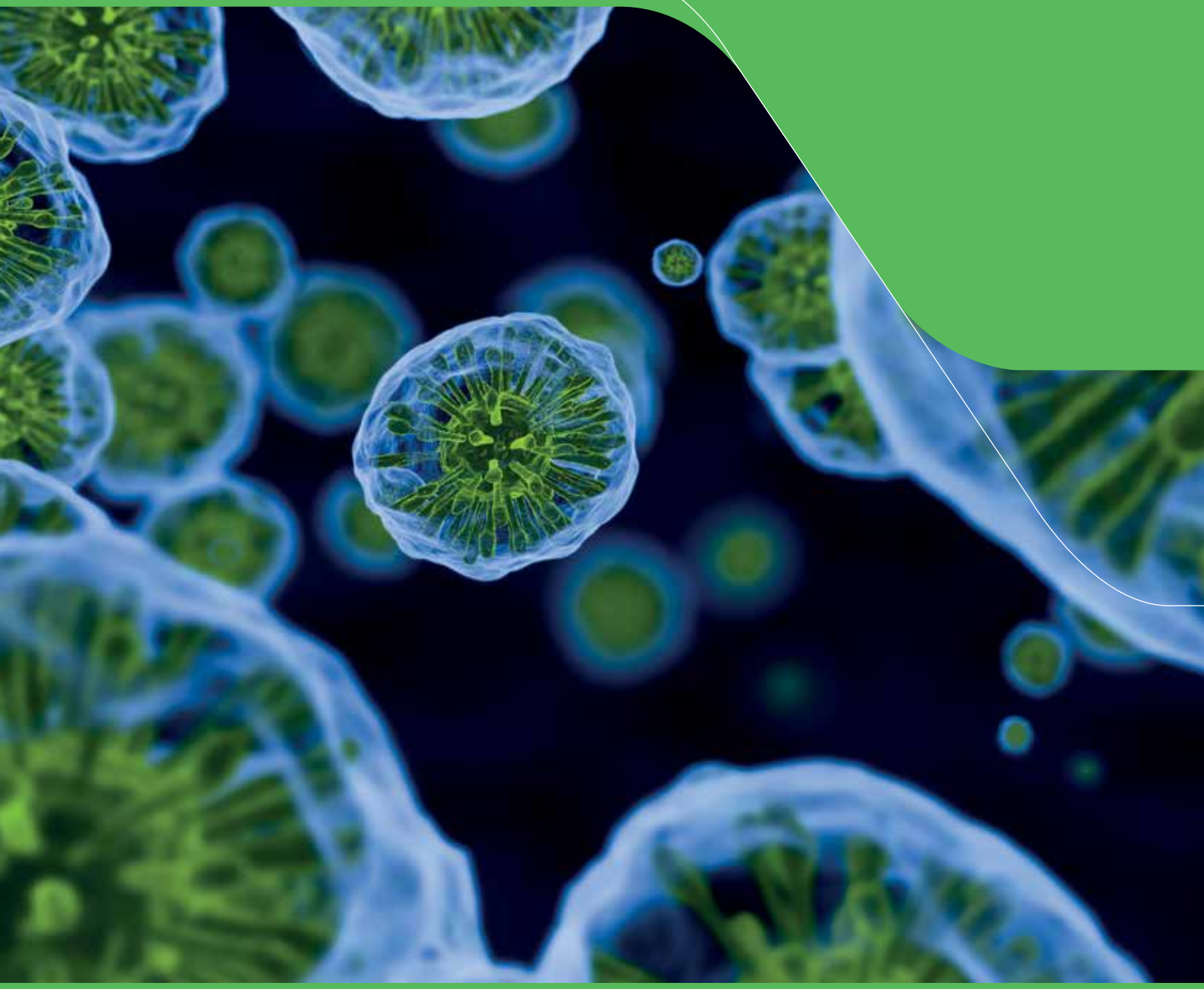
The EU remains the main market for their investment products dedicated to supporting the energy transition but:

- A more harmonised investment framework at the EU market level is needed in order to favour market access for green innovative projects and SMEs
- The current EU investors' demand for financial products favouring energy transition and sustainability as a whole should be fostered by adapted regulation
- The interests of investors for financial value creation, the overall need to finance the transition towards a low-carbon economy and the interest of issuers for affordable capital should be better aligned.

Along with the work of the Financial Stability Board and the G20 to integrate the potential risks posed by climate change into investors' rationales, there is a strong case for the EC to consider as a key priority how the Capital Markets Union and regulations such as Basel III and Solvency II can deliver more adapted financial frameworks. This is key to enable investors to better identify, price and manage climate and other environmental and social systemic risks and favour green growth for Europe.

Part 8

Pharmaceutical and materials



Part 8: Pharmaceutical and materials

Company profile

Business:	GSK is a research-based pharmaceutical and healthcare company.
International Presence:	GSK has a significant global presence in more than 150 markets, a network of 84 manufacturing sites in 36 countries and large R&D centres in the UK, Belgium, USA and China.
Turnover:	£23.9 billion (2015)
Employees:	almost 100,000
Website:	www.gsk.com

Company's sustainability vision

"As a science-led global healthcare company, our mission at GSK is to improve the quality of human life by enabling people to do more, feel better and live longer. We contribute to tackling the effects of environmental change, and the causes, with our vision of a carbon neutral value chain by 2050."

Business Case for Low Carbon

It is widely known that climate change leads to rises in global temperatures, which bring about extremes in storms, drought, flooding and heat waves. These will lead to many indirect environmental impacts including air pollution, water quality issues and land change.

GSK recognises that climate change will also exacerbate health issues, and increase stress on healthcare systems, presenting challenges to efforts being made by the global community to tackle health concerns and inequalities across the world.

Climate change is set to alter disease patterns and bring new illnesses to unprotected communities. More frequent extreme weather events will also require more provision for disaster relief and the need for robust business supply chain and distribution networks that can withstand such disruption. If GSK is to develop and supply the vaccines, medicines and consumer health products needed in the future it must play its part in conserving and protecting the natural environment. GSK has to strike a balance between meeting the healthcare needs of people worldwide, whilst striving to ensure that it is not indirectly exacerbating health problems elsewhere through the raw materials, manufacturing, supply or use of its products.

GSK has a clear role to play and has set ambitious goals to reduce carbon, water and waste across its entire value chain; from the sourcing of raw materials and management of the impacts of its labs and factories, to the use and disposal of its products by patients and consumers.

Benefits, savings & profits

GSK has reduced its carbon emissions by 21% since 2010 and has reduced its energy use by 12% (590GWh), with a cumulative saving of over £100 million and more than 1 million tonnes of CO_2.

This has been recognised by repeated certifications to the Carbon Trust Carbon Standard since 2010 for its global operations, as well as from its ratings in Carbon Disclosure Project's (CDP's) Climate Change Programme and the Dow Jones Sustainability Index (DJSI).

Around 40% of GSK's overall carbon footprint comes from the procurement of raw materials. GSK is engaging its extensive supplier base to deliver reductions in their emissions in line with commitments to the *UN Caring for Climate* programme and the Prince of Wales Corporate Leaders Group *Trillion Tonne Communique*. GSK's supply chain carbon reduction programme was recognised in 2015 wining an Ethical Corporation award.

Part 8: Pharmaceutical and materials *continued*

Company climate goals

- To be the most sustainable healthcare company by reducing its carbon footprint by 25% by 2020 and to have a carbon-neutral value chain by 2050
- By 2020, reduce water impact across the value chain by 20% (versus 2010)
- By 2020, reduce operational waste by 50% (versus 2010)

The company's progress so far

Since 2010 GSK has achieved a 21% reduction (400,000 tonnes CO_2) and a 12% reduction in energy (590GWh). To achieve this, the company has invested in energy efficiency and infrastructure:

- Installed 20 Combined Heat and Power (CHP) units across its global network
- In the UK and Republic of Ireland invested approximately £17 million in renewable energy (three wind turbines, an anaerobic digester and a CHP powered by biogas)
- In the EU invested £250,000 to reduce the release of fugitive emissions during the manufacture of metered dose inhalers (asthma inhalers)
- In Singapore invested £15 million in waste-to-energy technology and £68 million in a new process to manufacture antibiotics using enzyme technology
- In India investing £9.6 million in projects to reduce carbon emissions and water use across three manufacturing sites

GSK has begun to decouple environmental impacts from business growth and increased access to its medicines. In 2015, the volume of medicines, consumer health products and vaccines distributed by GSK was 40% higher than in 2010. At the same time, GSK's value chain carbon footprint only increased by 2%, meaning that the company reduced its carbon footprint per pack of product by an average of 25% across its entire portfolio.

Low carbon investment examples

A. Low carbon inhalers

GSK is a leader in respiratory healthcare. The sales value in 2014 of all respiratory inhaler products totalled over £6 billion. GSK developed Metered Dose Inhalers that do not use CFCs as their propellant, but instead use a hydrofluoroalkane (HFA) propellant, eliminating the use of CFCs. GSK is also committed to launching and promoting, when appropriate, the use of dry powder inhaler products, which are propellant-free.

In 2014 GSK launched new products for the treatment of Asthma and COPD. The company continues to invest in research and development of novel inhaler devices in an effort to further lower environmental impacts. GSK's 'Complete the Cycle' initiative also encourages patients and customers to return their old respiratory inhalers to participating pharmacies, to enable them to be recycled. More than 500,000 used inhalers have been collected in the UK since 2012.

GSK is also working with healthcare trusts across the UK to combine health and environmental messaging through regional projects such as 'Don't waste a breath' in the Grampian region and 'Breathe better, waste less' in Brighton, which educate patients on how to get the most out of their inhalers.

GSK has reduced its carbon emissions by 21% since 2010 and has reduced its energy use by 12% (590 GWh), with a cumulative saving of over £100 million and more than 1 million tonnes of CO_2.

B. Innovative supply chain programme

Ecodesk, an easy-to-use online platform, enables suppliers to report their environmental impacts to GSK. In two years the number of suppliers declaring to GSK has increased from 30 to 260 so that more than £900 million of GSK's spend on raw materials is linked to suppliers disclosing their environmental performance.

In 2014 the company launched a second online platform, the 'GSK supplier exchange', which allows suppliers and GSK to share practical ideas about improving energy-efficiency and reducing other environmental impacts. For example, GSK uses this platform to host webinars, engage suppliers with specific challenges and to run a supplier award scheme.

GSK is running a programme of workshops held at suppliers own sites to help the largest energy users in the company's supply chain to identify and implement energy saving opportunities. On average there is an opportunity to save 5000 tonnes of CO_2 per supplier site, and reduce energy costs by 20-30%.

Outcomes and lessons learned

GSK initiated its climate change programme with a central fund to allow for projects with an extended payback to be successful. It also established a centre of excellence to identify opportunities and partner with business units to drive implementation. In 2013 as investment in energy infrastructure was shown to be good business so central funding was no longer needed.

Almost one third of GSK's carbon footprint sits in its supply chain, spread across thousands of suppliers in over 100 countries. GSK needed a mechanism to systematically raise awareness of environmental impacts and the business benefits of delivering reductions. The company partnered with a third-party to begin to collect energy, water and waste data and also developed a platform to drive collaboration and innovation among suppliers in their global manufacturing and R&D divisions. The company is now sharing and taking forward practical ideas to improve energy-efficiency and reduce environmental impacts.

In five years' time, GSK aims to have reduced its overall carbon footprint by 25%. Partnership and coordination will be essential if GSK is to make the individual and collective changes needed. Post the COP21, GSK joins other key stakeholders including government, business and civil society in a dialogue around innovation, research and other actions to reduce the impact of climate change on health.

Effects of energy and climate policies on long term planning

EU and national energy and climate policies are not the most important driving force behind GSK investment decisions. GSK's operations are not energy intensive in comparison to some other industry sectors and the relative cost of energy is low compared to other operating costs.

However, GSK recognises that climate change will also exacerbate health issues, and increase stress on healthcare systems presenting challenges to efforts being made by the global community to tackle health concerns and inequalities across the world.

Part 8: Pharmaceutical and materials

novozymes®
Rethink Tomorrow

Company profile

Business:	Novozymes is a biotech company with a strong focus on enzyme production.
International Presence:	Novozymes have production sites in Argentina, Brazil, Canada, China, Denmark, England, India and the United States and affiliates and sales offices in more than 30 other countries.
Turnover:	€1.8 billion (2015)
Employees:	6,485 (2016)
Website:	www.novozymes.com

novozymes
Rethink Tomorrow

Company's sustainability vision

Together, we find biological answers for better lives in a growing world. Let's Rethink Tomorrow.

Business case for low carbon

Sustainability is a key part of Novozymes's value proposition and business model. Novozymes's products offer manufacturers more sustainable alternatives to traditional industrial processes.

Novozymes products help customers create 'more with less'. Improving the efficiency of industrial processes, thereby saves energy and raw materials and reduces waste resulting in higher quality production, lower costs, and improved environmental performance for their customers.

Sustainability has been a key part of their business model and success. Sustainability is evident in their agreements with suppliers, production processes, and their partners and customers.

Benefits, savings & profits

As more customers look to manage the environmental footprint of their supply chains and operations Novozymes has focused on sustainability which gives them a competitive advantage. Their market share in industrial enzymes is 48% and their sector is growing year on year.

The Dow Jones Sustainability Index (DJSI) ranks Novozymes among the top 3% of companies in the chemical industry. They also received a gold medal in the RobecoSAM Sustainability Yearbook in 2010-2013 and a bronze medal in 2014-2015.

Company climate goals

- Improve energy efficiency by 30% by 2020 (versus 2014)
- Improve water efficiency by 25% by 2020 (versus 2014)
- Reduce CO_2 intensity by 25% by 2020 (versus 2014)
- Achieve 30% renewable energy by 2020 (versus 2014)
- Save 100 million metric tonnes of CO_2 by 2020 (versus 2014)

Novozymes's corporate goal to reduce CO_2 intensity was framed based on internal feasibility, as well as external influences such as the Science Based Targets initiative.

The company's progress so far

In 2015 Novozymes had:

- Improved energy efficiency by 15%
- Improved water efficiency by 9%
- Reduced CO_2 intensity by 17%
- Sourced 24% energy from renewable sources
- Saved 60 million tonnes of CO_2

Novozymes has successfully managed to decouple CO_2 emissions from business growth over the long-term. This achievement was driven by two levers: improving energy efficiency and investing in renewable energy.

Over the long term, from 2009 to 2014, Novozymes has invested roughly 137 million DKK in 188 energy-saving projects throughout its operations, resulting in emission reductions of approximately 100,000 metric tonnes of CO_2 and annual cost savings of 84 million DKK.

Novozymes currently purchases 24% of its global energy mix from renewable sources. In 2011, they took a significant decision to purchase 100% of its electricity in Denmark from wind power. Novozymes and the Danish energy company DONG Energy entered into partnership in 2008 to invest in one of the world's largest offshore wind farms.

Novozymes's bio-solutions help mitigate climate change impact, as they typically offer customers reduced CO_2 emissions due to higher quality, lower costs, and improved environmental performance compared with conventional technologies. In 2015, their customers avoided an estimated 60 million tonnes of CO_2 emissions by applying Novozymes's products. The savings achieved are equivalent to taking approximately 25 million cars off the road.

Part 8: Pharmaceutical and materials *continued*

Low carbon investment examples

A. Biogas Reactor, Kalundborg, Denmark

This biogas reactor utilises wastewater from their production site to generate energy. When operating at full capacity, the reactor will reduce costs and CO_2 emissions by approximately 10,000 metric tonnes annually. In 2015, Novozymes initiated the process to expand the wastewater treatment capacity to meet potential growth in their production.

B. Biosolutions

Novozymes's bio-solutions help mitigate climate change impact, as they enable customers to produce more with less, thereby reducing their CO_2 emissions. Novozymes estimates that approximately 73% of their revenue comes from solutions that enable CO_2 emissions savings across the value chain. These savings have been documented through peer-reviewed, published lifecycle assessment (LCA) studies.

C. Low carbon bioenergy – cellulosic ethanol

One key area of focus in the bio-economy is low carbon bioenergy. Novozymes is working to mature and commercialise the market for cellulosic ethanol, an advanced biofuel from waste and residues that reduces GHG emissions by 80-90% compared to an oil equivalent. Novozymes invested in the world's first commercial scale advanced biofuels plant in Italy (Crescentino) and started production in 2013.

Outcomes and lessons learned

One of Novozymes's key learnings has been that reduced availability of oil-based fuels, greater volatility in oil prices, and the growing likelihood of a global price on carbon will continue to drive investment in operational eco-efficiency.

Novozymes believes that they will see an increase in global environmental regulations. Following the global climate agreement at the COP21, many countries will adopt low carbon development policies and this should encourage the EU to continue with ambitious energy and climate policies. This will drive demand for low carbon technology such as Novozymes's biosolutions.

For companies like Novozymes, it is essential that they can document how their biosolutions contribute to more sustainable business practices, through their peer-reviewed life cycle assessments (LCA).

Effects of energy and climate policies on long term planning

Novozymes strongly supports the agreement reached at the COP21, as this provides a clear and needed framework for governments to work with the private sector to provide long-term investment in the low carbon economy and climate resilience at scale.

EU and national energy and climate policies are supportive to long-term investment planning when stable and binding. The EU is on track to reach its 20% GHG emissions reduction as well as its 20% renewables by 2020. Both targets are binding. The energy efficiency target is only indicative and did not manage to trigger the level of investments required to achieve it.

Another binding target at EU level is the objective to have 10% renewables in transport in every Member State by 2020. This target although binding has suffered from instability and uncertainty with a lengthy process to review this objective to address indirect land use change (ILUC). This in turn has severely delayed most Member States' implementation and put a break on new investments. The current framework also failed to incentivise advanced biofuels.

The double counting mechanisms did little to promote the use of innovative advanced biofuels and the indicative target of 0.5% by 2020, set at national levels, is unlikely to trigger demand and investments. As a consequence, the European technologies that were developed with use of EU public money are being deployed outside Europe where the framework conditions are more favourable, such as in the USA.

EU climate and energy legislation should ensure all sectors of the economy decarbonise progressively and incentivise GHG emissions reduction.

Some sectors, like the transport sector, have higher CO_2 abatement costs and Member States may, therefore, have less incentive to decarbonise them. Sectoral policies are essential to ensure that investments are made early on and that longer term objectives are achieved cost-effectively by 2050.

DSM-Niaga: closed loop technology for carpets

Part 8: Pharmaceutical and materials

DSM

Company profile

Business:	DSM is a global science-based company active in health, nutrition and materials.
International Presence:	DSM has sites and offices in Europe, the Americas, Asia, Australia and Africa.
Net sales:	€7.7 billion (2015)
Employees:	20,750
Website:	www.dsm.com/climatechange

Company's sustainability vision

"We use bright science to create brighter lives for people today and generations to come."

Business case for low carbon

DSM believes that effectively tackling climate change is both a responsibility and a business opportunity. For this reason, DSM is dedicated to reducing its carbon footprint and enabling the low-carbon economy with its low-carbon solutions while advocating climate action.

DSM is active in a wide variety of markets and is committed to reducing greenhouse gas (GHG) emissions across the various value chains in which it is active. The company develops and sells various ECO+ solutions, which reduce environmental impacts such as GHG emissions across the value chain. ECO+ solutions are products and services that, when considered over their whole life cycle, offer clear ecological benefits compared to competing mainstream solutions.

Benefits, savings & profits

In 2015, DSM's ECO+ solutions accounted for 91% of DSM's innovation pipeline and more than half of its running business (57% up from 34% in 2010). ECO+ solutions are profitable products and innovations that have a better environmental impact than competing solutions in the market. Their sales consistently grow faster than non-ECO+ solutions sales and also have a higher profit margin.

DSM has been recognised among the leaders of the Carbon Disclosure Project (CDP) Super League Table for global chemicals companies and achieved the highest possible grade with respect to carbon regulation readiness in 2015. In addition, DSM has been recognised for integrating sustainability into its business, having been consistently ranked among the leaders in the Dow Jones Sustainability Index (DJSI) in the Materials industry group since 2004. RobecoSAM awarded DSM Gold Class in the DJSI in 2016. DSM is also listed in the FTSE4Good Index as well as the Corporate Knights Global 100.

Between 2008 and 2014, DSM improved its energy efficiency by 17%. In one structural improvement project in Greenville, North Carolina (USA), €340,000 alone was saved.

Company climate goals

- By 2020, DSM aims for 65% of its sales to be "Brighter Living Solutions" (ECO+ and/or PEOPLE+)
  - PEOPLE+ and ECO+ solutions are products and services that, when considers over their whole life cycle, offer better social and/or environmental impacts, compared to the mainstream competing solutions
- Improve GHG efficiency by 45% by 2025 (compared to 2008) through:
  - A combination of energy efficiency improvements (more than 1% annually)
  - Sourcing 50% of electricity from renewable sources
  - DSM has set an internal carbon price of €50 per ton CO_2 when reviewing large investment decisions

The company's progress so far

- DSM's ECO+ solutions accounted for 91% of DSM's innovation pipeline and more than half of its running business (57% up from 34% in 2010)
- Between 2008 and 2014, DSM improved its energy efficiency by 17%.

Low carbon investment examples

A. Cellulosic ethanol

Together with their joint venture partner POET, DSM is working on a new technology that converts agricultural residue into renewable fuel. In Emmetsburg, Iowa they have opened a commercial-scale cellulosic ethanol plant.

B. Yield-increasing coatings for solar panels

DSM is building a new business, DSM Advanced Surfaces. It has developed a high-performing technology for solar cover glass, enabling more light to penetrate and thereby significantly increasing the energy output of solar panels.

C. Reducing cow's methane emissions

'Clean Cow' is a multi-year investment in an innovative project to develop a feed additive that reduces daily methane production from ruminants by over 30%.

D. Enabling a new way of making, deconstructing and re-making carpet

Using pure materials only, DSM-Niaga has developed a closed-loop technology to endlessly reuse materials for carpets. This reduces energy use by as much as 95%.

Outcomes and lessons learned

An important challenge facing a company like DSM is that it often plays the role of "invisible enabler". The chemical industry's challenge is to shape markets in such a way that the environmental and social value that is created (for example, by DSM's sustainable innovations) is financially rewarded at some point in the value chain. In other words, creating market-readiness and a receptive, supportive ecosystem, including a supportive regulatory framework, is crucial for DSM's sustainable innovations to thrive.

Agricultural residue, feedstock for cellulosic ethanol
(GHG reduction of 85%-95%, compared to gasoline)

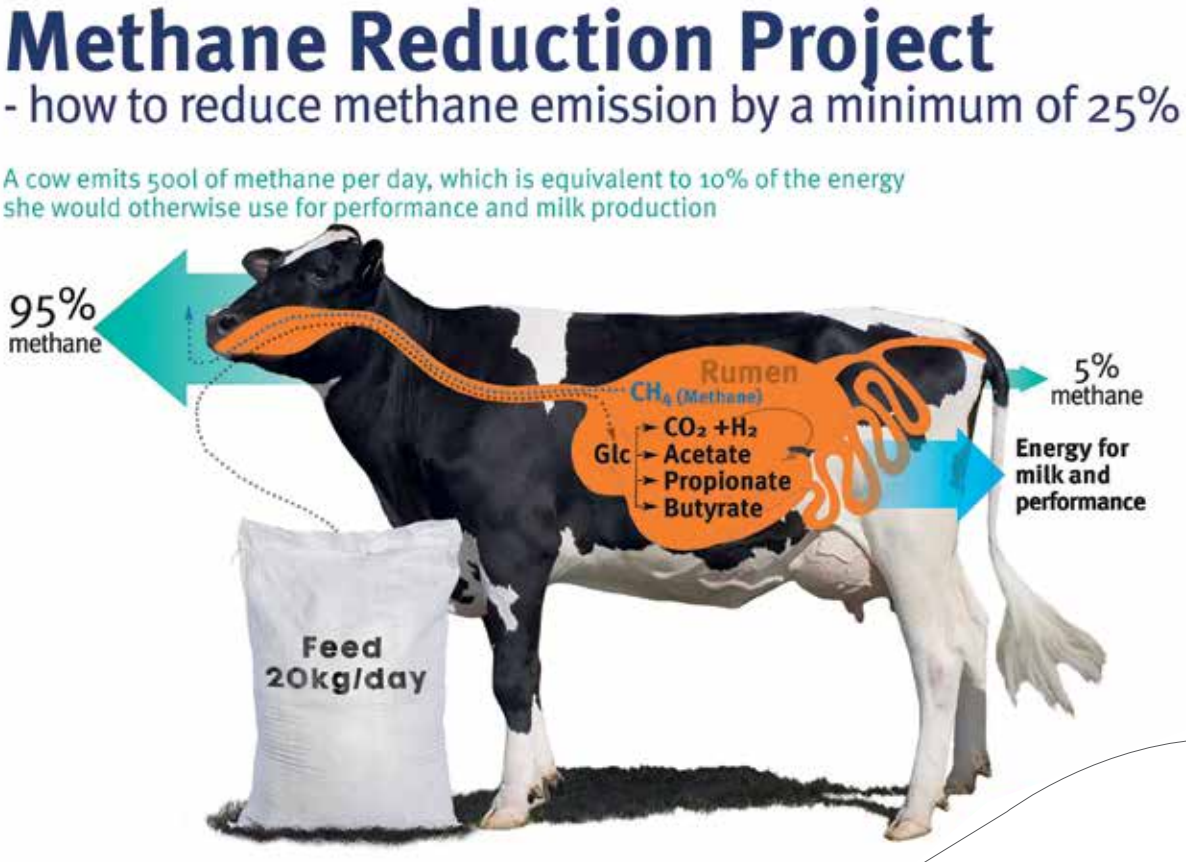
Part 8: Pharmaceutical and materials *continued*

Low carbon investments may, in some cases, face specific challenges. For example, when there are incumbent players with different interests, or when DSM has a product that helps address an environmental problem that the general public is (not yet) aware of.

Effects of energy and climate policies on long term planning

DSM welcomed the new global climate agreement and they recognise the leadership the EU is demonstrating in policy areas such as energy efficiency, renewable energy and energy savings. In the implementation phase of EU policy it is important to safeguard the competitiveness of energy intensive companies especially ones, like DSM, that compete in global markets.

The EU should encourage other countries and regions to implement similar policies, to stimulate investments in sustainable production, and prevent frontrunners in Europe facing uneven competitive circumstances. For EU-based companies this is especially important as long as carbon prices are not widely applied or, when applied, not high enough to have a material effect and while oil prices are low, which hampers the introduction of renewable energy solutions.



Part 8: Pharmaceutical and materials

Company profile

Business:	Stora Enso is global provider of renewable solutions in packaging, biomaterials, wood and paper.
International Presence:	Operates in more than 35 countries.
Turnover:	€10 billion in 2015
Employees:	26,000
Website:	www.storaenso.com

Company's sustainability vision

"Do Good for the People and the Planet."

Business case for low carbon

Stora Enso is transforming from a traditional paper and board producer to a renewable materials growth company. The production of renewable products that can substitute carbon-intensive products and the use of biomass energy are, therefore, at the core of its business strategy. Important developments include fibre-based packaging, plantation-based pulp, innovation in biomaterials, and sustainable building solutions.

There is great potential in new sustainable products and solutions in biomaterials to replace existing non-renewable materials. Plantation-based pulp, for example, allows Stora Enso to secure low-cost fibre for production of these products. And high quality building solutions using wood help meet the growing demand for low carbon materials and products in the construction industry.

Stora Enso expects carbon to significantly impact future business decisions and their EU ETS allowances are part of their carbon strategy. Stora Enso have a particular advantage as:

- They have access to and use biomass fuels
- They own and manage forests to sequester carbon
- Their raw material is renewable and recyclable
- Their renewable products substitute fossil fuel based products
- They focus on renewable product innovation
- Wood products store carbon and have a relatively long life cycle

Forests and tree plantations have become an increasingly important part of a wider global development agenda, especially in relation to combatting global warming. If forests and plantations are managed sustainably, new generations of trees replace those that are logged, sequestering more CO_2 from the atmosphere. Compliance with national legislation, however, is only the starting point. Stora Enso actively supports and implements voluntary forest conservation and restoration measures in land-owned, leased and managed by the company, and in other areas where they purchase wood.

Benefits, savings & profits

Stora Enso's products are based on renewable raw materials with comparatively low carbon footprints. Societies will demand low-carbon alternatives in response to climate change and resource scarcity. This makes Stora Enso an attractive investment and partner. Stora Enso's main raw material - wood - is inherently carbon neutral being sourced from sustainable managed sources.

Consumer behaviour is changing and the growth of the middle classes in developing markets, as well as growing population, is increasing the need for sustainable products. Climate change and stricter environmental regulations drive the need to substitute fossil materials. Stora Enso foresees an increased market share for their products with low carbon footprints.

Stora Enso aim to respond to market trends and customer requirements. They are investing in new technologies and processes for the production of renewable materials, such as Lignin and Micro Fibrillated Cellulose (MFC) which have many possible applications in packaging as well as in biomaterials for the personal and home care, coatings and adhesives, food, and pharmaceutical industries.

Examples of the savings Stora Enso have made include:

- In 2014, they sold 252,000 tonnes of wood pellets, to private homes and heating plants. They produced 1.2TWh, replacing 430,000 tonnes of CO_2 from light fuel oil
- Renewable carton board produced for consumer packaging has been estimated to save CO_2 emissions by up to 63% and consumption of fossil resources by up to 69% per carton
- Stora Enso's Sunila Mill in Finland replacing 70% of natural gas in the lime kilns with lignin saving 27,000 tonnes fossil CO_2 per year

Company climate goals

- Reduce fossil CO_2 emissions per saleable tonne of pulp, paper, and board by 35% by 2025 in comparison with its 2006 level
- 15% reduction of electricity and heat consumption per tonne of pulp, paper and board production by 2020, compared to 2010

The company's progress so far

- 32% lower fossil CO_2 emissions per saleable tonne of pulp, paper, and board in 2015 (2006 benchmark)
- 46% reduction of absolute emissions in 2015 compared to the 2006 baseline
- Approximately 24 million tonnes of fossil CO_2 emissions reduced between 2006 to 2015
- Transparent reporting on progress has resulted in a high ranking in the Carbon Disclosure Project's Nordic Climate Disclosure Leadership Index

Low carbon investment examples

A. Peeling technology, Varkaus, Finland

Stora Enso have invested €43 million in a new production line for wood building elements that will be located in Varkaus, Finland. Wood peeling technology and the new products complement their existing product portfolio. The wood products will meet growing urban construction needs, serve new geographical areas and markets, and offer customers a wider range of wood product solutions. Production of around 100,000m^3 is scheduled to begin in Q2 in 2016.

B. Lignin extraction, Sunila Mill in Finland

Lignin is a good substitute for phenols and thus a renewable biochemical alternative. The use in construction materials and industrial applications such as epoxy resins and coatings, plus it has the potential to be used in many other applications.

Part 8: Pharmaceutical and materials *continued*

C. Micro-fibrillated cellulose (MFC) pulp pilot plant, Imatra, Finland

This is the world's largest MFC manufacturing facility for board-related MFC grades and provides raw material for selected commercial consumer board solutions, enabling lighter weight packaging. The development of MFC solutions is continuing with a focus on even more sustainable fibre-based packaging that uses less raw material.

D. Innovation Centre for packaging, Helsinki

A venue for innovation and R&D work, where Stora Enso together with customers and other stakeholders can develop innovative and sustainable packaging concepts. It has among other things, a packaging design lab, presentation areas with advanced touch screen technology and virtual reality retail technology.

E. Innovation Centre for biomaterials in Nacka, Sweden

The centre has research, application, business development and strategic marketing all under one roof. Biomaterial and renewable solutions and products from second-generation biomass, such as wood, are being developed in order to replace fossil-based products. The centre is addressing societal problems such as climate change, increased urbanisation as well as water and land use issues.

F. Investments in low-carbon processes

Since 2010 Stora Enso invested €400 million in three multi-fuel biomass based power plants in Belgium, Germany and Poland. They have a centralised energy efficiency investment fund, which was set up in 2008 to support their mills' energy efficiency projects. In 2015, the fund amounted to €11 million available for allocation to "smaller" energy savings investments on an annual basis. These projects should generate reductions in energy consumption totalling at least 290GWh per year.

Outcomes and lessons learned

The most effective ways for Stora Enso to reach their targets is to further improve energy efficiency, and to keep increasing the share of bioenergy and other renewables.

Multi-fuel boilers have enabled fast reductions of fossil CO_2 emissions. They have also made investments in low-carbon technology (multi-fuel boilers, combined heat and power) to maintain a competitive edge.

Effects of energy and climate policies on long term planning

Stora Enso carbon target was established before EU's 2030 climate goals. At COP21 in Paris, Stora Enso was the only Finnish company that signed a science based greenhouse gas emissions reduction target pledge in the "We Mean Business" coalition, however, EU and national energy and climate policies have so far failed to support their long term investment planning due to uncertain regulatory framework.

Despite some positive elements to improve the predictability of the regulatory framework, policy is not yet sufficient in protecting the competitiveness of the energy intensive industries when it comes to emission trading, the role of renewable energy generation, CHP support or the future electricity market design.

The industry needs a level playing field in regards to indirect costs of carbon. The current energy infrastructure is not sufficient. The EU should consider the risk of carbon leakage in industrial activities to countries outside the EU due to undue carbon costs.

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