

# LOW CARBON COMPENDIUM

BY THE PRINCE OF WALES'S EU CORPORATE LEADERS GROUP



UNIVERSITY OF  
CAMBRIDGE

PROGRAMME FOR  
SUSTAINABILITY LEADERSHIP



THE PRINCE OF WALES'S

EU CORPORATE LEADERS GROUP ON CLIMATE CHANGE  
UNIVERSITY OF CAMBRIDGE PROGRAMME FOR SUSTAINABILITY LEADERSHIP

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# Introduction by HRH The Prince of Wales



CLARENCE HOUSE

All too often, those who argue against taking action on climate change like to proclaim how difficult, costly and ineffective it will be. They say that it is not possible to grow, be profitable and reduce environmental impact all at the same time. I am afraid I have never accepted this and that is why, in 2005, I brought together a number of senior business leaders to form my Corporate Leaders Group. These enlightened and far-sighted businessmen and women saw at once that, by coming together, they could issue an unequivocal answer to the naysayers.

Six years on and I am now delighted to be able to introduce this Compendium, which collects together examples from across the European Union of companies that are not only including action on climate change as part of their core business, but also thriving as a result.

Even the most cursory of glances at this report will reveal a truth which, to my mind, has always been utterly self-evident – namely that the best results are achieved when there is a genuine partnership between the public and private sectors. It would often seem, for instance, that policy is made without actually speaking to the men and women who run our leading companies. By the same token, it is incumbent on as many businesses as possible to be clear about the frameworks they need to be both profitable and sustainable. It is apparent that it is only by extending this concept as far as possible, and including the N.G.O. community, that we will begin to make progress on the scale that is required.

That is why I am so proud of the leading position taken by my Corporate Leaders Group companies and why I pray that, as you read the case studies contained in this Compendium, you will feel inspired to reach out to others to develop the solutions which will address this most pressing of problems.

*Charles*

# About the The Prince of Wales's Corporate Leaders Groups on Climate Change (CLG):

**The Prince of Wales's EU and UK Corporate Leaders Groups on Climate Change (EU CLG and UK CLG) were set up to bring together leaders from a cross-section of international businesses who believe there is an urgent business objective to develop new and longer-term policies for tackling climate change.**

The UK group was established in 2005, and focused on pushing the agenda domestically, whereas the EU group, which followed in 2007, focused on influencing EU-wide policy. Both groups were brought together under the patronage of The Prince of Wales and are managed by the University of Cambridge Programme for Sustainability Leadership (CPSL).

Businesses who participate in the groups share the perspective that tackling climate change is a pro-growth strategy central to the successful operation and development of their companies in the years to come. They also understand that inherent in moving towards a low climate risk economy are huge business opportunities that must be seized now if they are to bear fruit and if we are to avoid locking ourselves into a high-carbon future. Companies involved in the CLG are committed to the idea that business can and must play a central and critical role in creating a sustainable economy.

The EU and UK CLG currently have a combined membership of 29 individual companies, as shown opposite.

The defining characteristic of both groups is that they are deliberately cross-sectoral and kept small to enable them to be effective, flexible and progressive on joint actions.

The groups' main activities and achievements to date include independent actions at crucial policy points, such as the UK group's public support of a strong Emissions Trading Scheme and bold targets in an open letter to the Prime Minister; and the EU group's support, in contrast to many mainstream business groupings, for the European Commission's Climate & Energy Package in 2008, and the more ambitious 2020 greenhouse gas reduction targets and the 2050 low carbon road map goals.

The groups' activities have also focused on: convening international business roundtables in Japan, Brazil, Germany, Poland, Hungary, Spain and Italy; meetings with key policy makers and political leaders to discuss climate-related decision making; and joint actions focused around the annual Conference of the Parties for the United Nations Framework Convention on Climate Change.



The Bali Communiqué (2007), the Poznań Communiqué (2008), the Copenhagen Communiqué (2009) and the Cancún Communiqué on Climate Change (2010) received global media coverage and declared business support for an ambitious, robust, effective and equitable deal. Building on the success of the previous interventions, the Copenhagen Communiqué received overwhelming support from over 950 global companies from more than 60 countries, ranging from the world's biggest multinational corporations to small- and medium-sized enterprises. In 2010, the groups urged global governments to keep up momentum in a joint statement, the Cancún Communiqué, which fed into negotiations at the Conference in Mexico.

For more information please see: [www.cpsl.cam.ac.uk/clg](http://www.cpsl.cam.ac.uk/clg)

**EU CLG Mission** The mission of the EU Corporate Leaders Group is: "To communicate the support of business for the European Union to move to a low-carbon society and a low climate risk economy, and to work in partnership with the institutions of the EU to secure the policy interventions that are needed to make this a practical reality."

**UK CLG Mission** The mission of the UK Corporate Leaders Group is: "To trigger the step change in policy and action needed both to meet the scale of the threat posed by climate change and to grasp the business opportunities created by moving to a low climate risk economy."

# The Low Carbon Compendium

**The purpose of this report is to demonstrate how the activities of some of the world's largest companies are contributing to the delivery of a low climate risk economy. Profiles and examples of the activities and climate projects are given for each of the member CLG companies featured, including their carbon reduction goals and how these are being met. The group felt it important to communicate and share examples of best practice and innovation, to support their current focus on driving the delivery on transformational change across all sectors. As Corporate Leaders the members wished to demonstrate what this meant for them in practice. This Low Carbon Compendium is an example of 'walking the talk' and demonstrating that low carbon industrial practices can be good for business and society at large.**

## **Summary of key findings: Lessons learnt and core messages**

Taking account of company experiences as a whole, it is clear that a number of core themes emerge as being of particular learning value:

- Individual businesses have a responsibility and an ability to play their part in reducing their own carbon footprint; however, the real business and environmental opportunity lies in providing enabling goods, services and infrastructures that can help others (suppliers, consumers and society) to reduce their carbon emissions.
- Business and government must work together successfully to combine ambitious objectives with practical action. There is an ongoing need for 'big solutions' that go above and beyond what individual companies can achieve alone to create the conditions for systemic, and systematic, change that builds on voluntary initiatives and always stays ahead of industry best practice.
- Companies have found that good environmental stewardship and good business go hand in hand, and that sustainability and low-carbon development are vital in assuring business success for the future.
- Understanding the risks of climate change but being able to perceive these as business opportunities is central to developing a strong market position in a robust and flourishing green economy of the future.
- Partnerships across business and between sectors have proven to be extremely fruitful in finding innovative ways to address critical sustainability challenges.
- The move from pilot projects to large-scale demonstration and implementation is challenging, but with leadership, and through a combination of innovative technical, financial and policy-based solutions, this can be achieved.
- Senior leadership commitment, provision of dedicated resources and visibility of projects are crucial to ensuring the success of reorienting business towards low-carbon growth.
- Continuous innovation and the regular setting of more ambitious and stringent internal company and external policy targets is key.

## What measures would help to accelerate your existing and future low-carbon investments?

### Barilla

The agrifood sector could play an important role to decarbonize our economy. For this reason it is important to:

- Promote eco-sustainable lifestyles and diets
- Promote sustainable agricultural policies
- Re-localise crops, reduce incidence of zootechnical activities, protect forests ([www.barillacfn.com/en/fg-pubblicazioni](http://www.barillacfn.com/en/fg-pubblicazioni))

### EDF Energy

“It is important that the UK maintains momentum for investment in secure, low-carbon and affordable energy including nuclear, renewables and carbon capture and storage. The Carbon Price Floor is important for all low carbon technologies as it restores the carbon price to what was originally intended. It will support the economics of renewables and carbon capture and storage and can reduce the need for specific measures to support those technologies. For nuclear, helping to restore the carbon price to what was originally intended is important to encourage investment in new build.”

Vincent de Rivaz, CEO, 2011

### John Lewis Partnership

We wish to see a commitment to longer-term measures, giving the certainty to support low-carbon investment, as well as a greater provision of funding for carbon reduction pilot schemes. For example, we have been piloting the use of pure plant oil in our fleet; however, the removal of the UK fuel duty incentive of 20 pence per litre means this is no longer cost-effective. We would like to see the reintroduction of a biofuel duty differential that is proportionate to the carbon reduction potential of the alternative fuel and is based on audited numbers. It would also be helpful if the UK government could facilitate the publication of audited official figures for all fuels, so that customers are provided with robust information on true carbon reduction potential and sustainability.

The development of a central registry of carbon initiatives and technologies, which have proven whole life-cycle reductions, would support businesses by reducing the investment into research and development that is currently required. Consistency of application would also drive volume through proven technologies, thereby reducing capital expenditure requirements. Local small-scale energy generation, for example, will become increasingly important to companies. Feed-in tariffs are a good step forward; however, the current incentives are not sufficient.

Greater financial benefit for larger renewable energy-generating solutions would enable these to become more cost-effective, allowing end users to drive volume into these technologies and generate better payback terms.

Building regulations are driving energy and carbon reduction; however, these are still limited in their coverage. The targets set need to be stronger to support the delivery of our own absolute carbon reduction commitment. All aspects of the carbon usage within buildings should be considered to maintain a rounded view on emissions. Energy rating a building allows external parties to understand the buildings they operate within. However, Energy Performance Certificates are still not required to be displayed publicly; thus, there is no linkage to company brand or the ability to benchmark confidently. Centralising the results in a governmental database could allow linkage to the Carbon Reduction Commitment league tables as well as giving suitable and accurate benchmarking information.

Improved and more consistent local authority recycling services are needed. Retailers have developed a common on-pack recycling label to encourage recycling but inconsistencies between local services in the UK remain a significant barrier to increased customer recycling. Substantial improvements in

anaerobic digestion and other waste infrastructure are also required to give reliable and realistic alternatives to landfill.

### Shell

In the near-term, governments can accelerate the pace of development with specific and time-bound support to assist new technologies in the demonstration phase. In addition, governments can support a transition to a lower-carbon energy system by taking a market based approach. This would ensure that all CO<sub>2</sub> mitigation measures are used, starting with those that are the lowest cost and fastest to implement. A market based approach combined with a robust price for CO<sub>2</sub> would provide confidence for industry to make the necessary investments.

### Skanska

Skanska actively engages in national Green Building Council discussions and international multi-stakeholder projects such as the Energy Efficiency in Buildings project facilitated by the World Business Council for Sustainable Development. Through these engagements, Skanska has obtained an early and advanced understanding of barriers that exist against transforming our building stock into a Deep Green building stock. Barriers that need to be addressed to progress transformation are well researched and documented by the Energy

Efficiency in Buildings' first publication entitled 'Facts and Trends'. These barriers can be summarised as: limited awareness of the environmental impact of buildings; the complex and fragmented nature of the building sector, which has no real champions; a lack of know-how and experience in green construction; lifestyles not being focused on energy saving; energy efficiency not being an investment criterion; and a lack of financial instruments to reward energy efficiency.

To achieve and accelerate transformation within the industry, the following policy and economic actions need to be given priority by policy makers, governments and authorities:

- To accelerate transformation in the short term, commitment from governments on economic and market-based instruments as well as fiscal incentives and instruments need to be addressed. Energy efficiency measures need to be rewarded and incentivised. Subsidies are needed to reduce initial costs for introducing innovative solutions to the market, and to enable capacity building in the supply chain of energy-efficient technologies. For new buildings and renovation programmes, such instruments should prioritise those measures and projects that show proof of a holistic or whole-building approach, thereby minimising the total cost to society.
- A short-term financial commitment must be supported by a strong long-term

commitment from policy makers and governments to introduce strict requirements on the performance of both new and existing buildings, and commit to tighten these over time. The marketplace needs a strong and consistent message that investments in energy efficiency and innovation will generate revenue.

- Sustained public awareness programmes are needed to help overcome low awareness and inspire people to change behaviour and demand energy efficiency.

#### Vodafone

To assist the mobile industry to enable emissions reductions in other sectors, it is vital that policy makers consider the following:

- Delivering an appropriate price for carbon, for example by exploring appropriate opportunities to extend emissions trading schemes and progressively decrease free carbon allowances. This is the key factor in encouraging the uptake of opportunities to reduce emissions from information and communications technology (ICT), and would provide greater transparency and certainty to enable rational investment decisions.
- Stimulating investment in smart ICT solutions through appropriate subsidies or legislation to increase the adoption rate of smart technology. For example, regulation could require the integration of M2M modules into high-value capital

equipment or explore more definitive timetables for the roll-out of smart grid solutions to ensure widespread uptake and diffusion of the technology.

- Encouraging cross-sector collaboration between the mobile and other ICT sectors and the transport, buildings and power sectors, to promote interoperability and standardisation of services to enable wide-scale deployment across different countries and industries.
- Including mobile solutions in government policies and programmes with respect to smart grids, buildings and transport, and green operations in the public sector, for example by procuring embedded mobile-enabled smart building technologies in schools and government departments, and promoting increased tele-working among public sector employees.
- Promoting cap-and-trade and offset mechanisms that result in the transfer of ICT technology to developing countries.

#### United Technologies Corporation (UTC)

There will be policies to restrict greenhouse gas (GHG) emissions at local, regional and international levels, and UTC believes that to drive low-carbon investments, these should focus on:

1. equitable consideration of sectoral impacts;

2. strong mechanisms to incentivise energy efficiency in the building sector, where emission abatement can be achieved at least cost;
3. funding for research, development, demonstration and deployment of GHG reduction technologies;
4. financial incentives, including investment and production tax credits, for renewable energy and clean energy efficiency products; and
5. a reliable and reasonable carbon price.

As a producer of energy-saving equipment for the building sector, both commercial and residential, UTC is very aware of the enormous savings and emissions reduction potential in this sector, particularly in refurbishing the existing building stock. However, due to the dispersed structure of the markets, strong building codes, equipment standards and fiscal and financial incentives are needed to drive low-carbon innovation and achieve the emission reduction potential. Equipment standards should be globally harmonised and strictly controlled and enforced. Due to the large building stock owned or rented by the public sector, local and regional governments can drive low-carbon investments in this sector by adopting strong energy savings criteria in public procurement and setting ambitious energy savings targets.



# RETAIL AND CONSUMER GOODS

## Company Profiles:

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# Barilla

## Company Profile:

**Business:** Barilla is the world leader in the pasta market, a European leader in ready-made sauces, the leader in Italian bakery products and the leader in the Scandinavian crispbread market

**International Presence:** Barilla owns 43 production sites (13 in Italy and 30 outside Italy) and exports to more than 100 countries

**Turnover:** €4.0 billion (2010)

**Employees:** 15,000



**Company Vision:** “We help people live better, by bringing wellbeing and the joy of eating into their everyday lives.”

## Barilla's climate goals are:

- Barilla has set two priority commitments:
  1. to reduce the greenhouse gas emissions it generates in line with the objectives of the Kyoto Protocol; and
  2. to minimize other environmental impacts along the entire production chain, with special emphasis on reducing and recycling packaging materials.
- The specific ecological footprint objectives that the company aims to achieve during 2008–2014 are: to develop and apply the ecological footprint calculation method to all Barilla products, and fixing global targets; to reduce the carbon footprint of Barilla products by 15% (2008 baseline); to reduce the direct and indirect energy global warming potential by 30% (2008 baseline); and to increase the percentage of recyclable packaging on the market to 95% of total packaging (2008 baseline).
- With respect to energy efficiency, Barilla aims to develop products and processes that are as energy efficient as possible along the entire production chain, seeking where possible to reduce its dependence on fossil fuels including coal. Specifically, the company has set targets to reduce total energy consumption per finished product by 10% (2008 baseline) during 2008–2014.

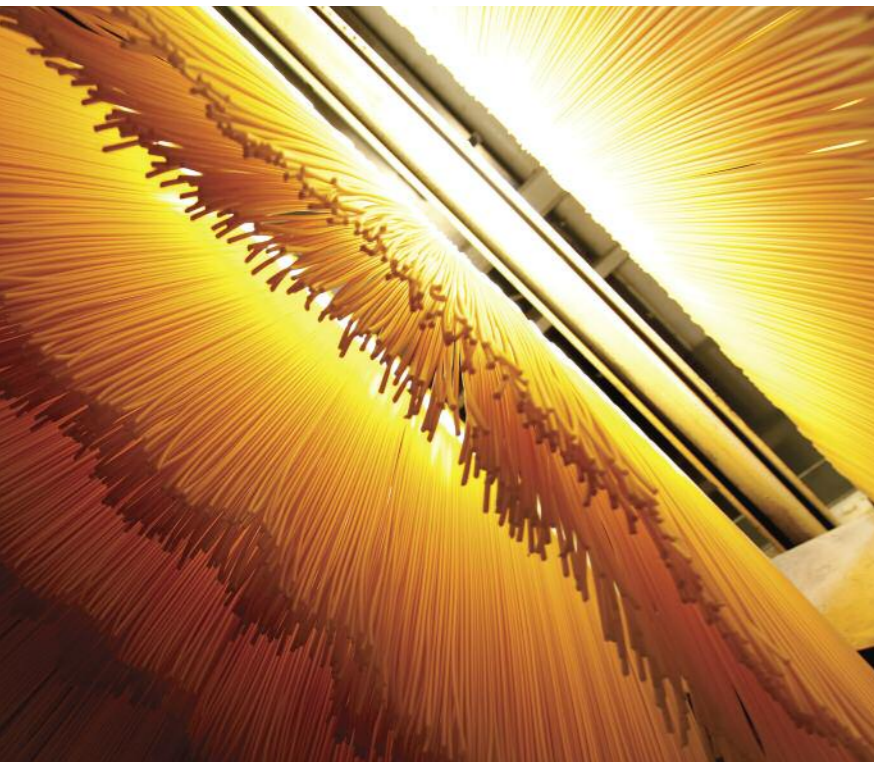
- With respect to the management of water resources, two main objectives are to be achieved between 2008 and 2014: to develop and apply the water footprint calculation to Barilla products, fixing targets; and to reduce the water consumption of finished products by 30% (2008 baseline).

## Barilla's progress so far:

- The implementation of The Energy Saving Project in all bakery plants, the development of a cogeneration plant in Pedrignano (Parma) and the investment in a Renewable Energy Certification System has assisted Barilla in meeting several of its climate and energy objectives.
- In 2009, Barilla updated its life-cycle assessment study on Durum wheat semolina dried pasta produced in Italy in paperboard boxes, and achieved the Environmental Product Declaration certification.
- The same year, Barilla reduced the carbon footprint for its Italian pasta production by 15%, thanks to its Pedrignano cogeneration plant, which reuses heat and power that has been produced from methane gas in the production cycle.

The Mediterranean Diet Model has an environmental impact that is 60% lower than a typical North American equivalent per 100 calories.

- Global energy consumption across the company was reduced by 1% during 2008–10 (the reduction of energy consumption per unit of finished product was 3%).
- According to the Renewable Energy Certificate System (RECs), global warming potential was reduced by 15% during 2008–10. The reduction of global warming potential per unit of finished product has been more than 16%.



#### Low Carbon Project Examples:

##### A. The first food company with an EPD system

In 2010 Barilla developed a certified system to calculate environmental impacts and release the climate declaration for the products.

##### B. Cogeneration plants

The cogeneration plant for the combined production of heat and power became operational in Pedrignano at the end of 2008. The plant uses methane gas to produce heat and power, both of which are completely reused in the production cycle, resulting in a significant reduction in CO<sub>2</sub> equivalent emissions. Furthermore, construction of a trigeneration plant (producing power, heat and cooling) was completed at the Caserta facilities in 2010.

##### C. Renewable Energy Certificate System

The Renewable Energy Certificate System (RECs) is an international instrument created to stimulate the use of renewable energy. A certificate is issued for each megawatt of electrical energy produced from renewable sources. Where possible, Barilla is considering switching to low carbon energy sources; in this respect, all electrical energy required for the production of Mulino Bianco and WASA products has been covered by Renewable Energy Certification (RECs).

##### D. Sustainable cereal cropping systems

As farming has been widely shown to be one of the significant contributors to the environmental impact of pasta and baked goods, Barilla has promoted a specific project with the aim of analysing and comparing more sustainable cropping systems for the cultivation of Durum wheat. Several Mediterranean multiple year crop rotations that also include Durum wheat have been investigated from a full life-cycle perspective. The systems analysed are typical of different Italian regions and included analysis of: crop rotation and precession, tillage activities, crop yields, fertilisers, herbicide and pesticide use, carbon impacts and relative emissions to air and water. The results obtained were then integrated with specific economic and agronomic indicators, to provide guidance on the sustainability and the feasibility of the cropping systems. Furthermore, the analysis has been integrated into Barilla's corporate guidelines to promote activities aimed at developing a more sustainable and low carbon way of cultivating Durum wheat; the project will be extended to soft wheat and rye.

##### E. Barilla Center for Food & Nutrition – Double Pyramid (life-cycle assessment study on food)

The Barilla Center for Food & Nutrition is a center for multidisciplinary thought and practical proposals. It was founded in 2009 with the environmental objectives of:

- Identifying the fundamental issues regarding people, the environment, science and economics in our society.
- Developing proposals and recommendations about food and nutrition and making them available to all major opinion leaders and decision makers in order to promote better quality of life and widespread and sustainable wellbeing for all people.

**Barilla**  
**Center**  
FOR FOOD  
& NUTRITION

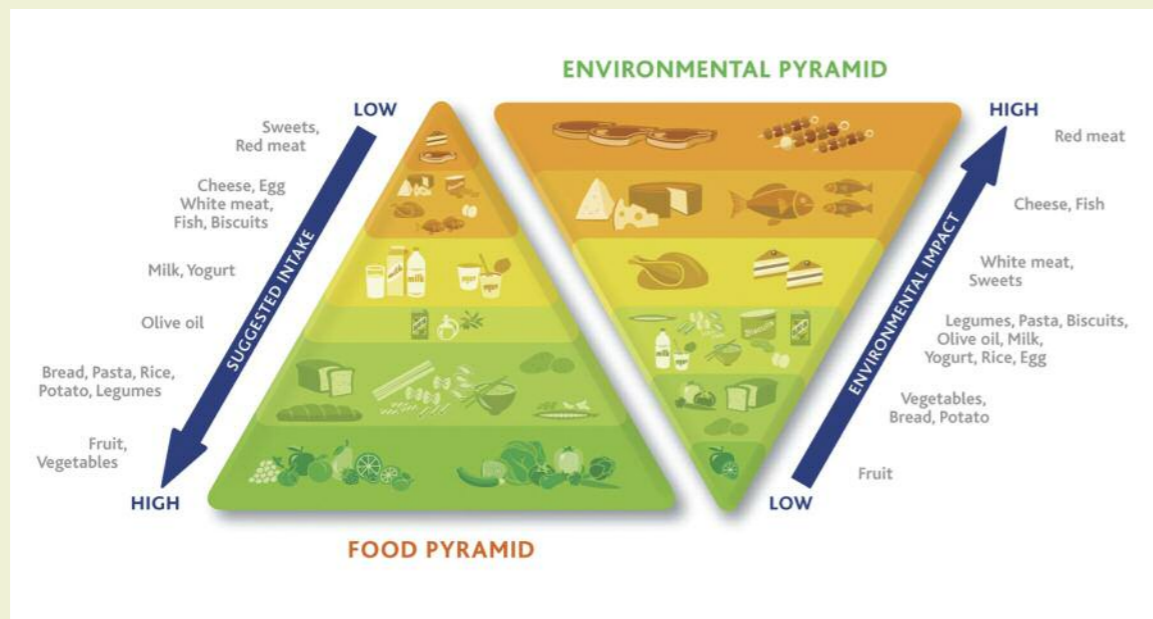
**Project Outcomes:**

The first 'food pyramid' explaining how to adopt a nutritionally balanced diet was conceived in 1992 by the US Department of Agriculture. Now, the Barilla Center for Food & Nutrition has presented a modified double version of the pyramid that positions foods not only according to their nutritional benefits but also in terms of their impact on the environment through the evaluation of the Ecological Footprint Indicator.

This new 'double pyramid' shows how the foods that should be consumed most often, like fruit, vegetables and pasta, are the ones

that leave a smaller carbon footprint, in other words a smaller impact on the environment. On the other end of the scale, foods with a larger ecological footprint, so those which have a greater impact on the environment, are also those that should be consumed less frequently. Hence, Barilla's food pyramid demonstrates the link between two different but equally important goals: health and environmental protection.

Measurement of the carbon footprint for each food has begun, using public data banks and scientific studies. Impacts are graphically shown below for each indicator

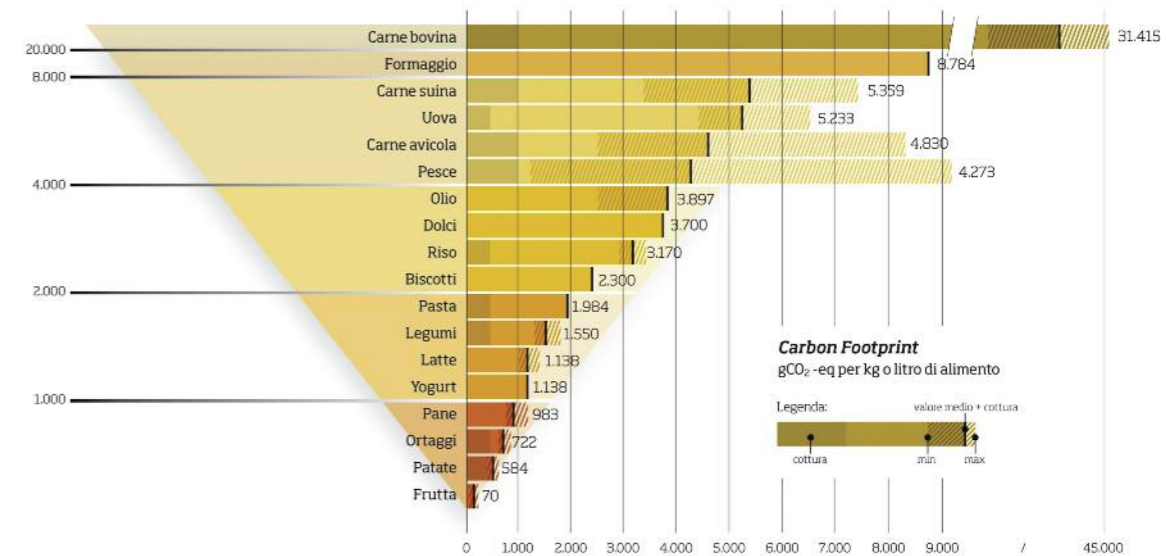


and their analysis provides the value that is then transformed into the corresponding environmental pyramid. Despite the fact that the data acquired for some foods vary quite significantly, the impact of individual foods is nonetheless sufficiently clear: red meat is the food with greatest environmental and carbon impact, whereas fruit and vegetables have decidedly limited impacts.

To maintain a healthy, environmentally/carbon friendly diet, all we need to do is adopt (and continue to follow) the Mediterranean Diet

Model, as has been recommended by experts from around the world for some time now.

For 100 calories, the Mediterranean Diet Model has an environmental/carbon impact that is 60% lower than that of a typical North American equivalent consisting of meat and animal fat rather than plants and cereals. References are listed in the document 'Double Pyramid: healthy food for people, sustainable for the planet'. ([www.barillacfn.com](http://www.barillacfn.com))



Environmental Pyramid: Carbon Footprint

# John Lewis Partnership

## Company Profile:

**Business:** John Lewis Partnership's 76,500 Partners own the UK's leading retail businesses John Lewis department stores and Waitrose food shops

**International Presence:** UK only

**Turnover:** £8.2 billion (year ending January 2011)

**Employees:** 76,500



**Company Vision:** "To take all reasonable steps to minimise any detrimental effects the Partnership's operations may have on the environment and to promote good environmental practice and look actively for opportunities to contribute to the wellbeing of the communities where we operate."

## John Lewis Partnership's climate goals are:

- To reduce its absolute carbon emissions by 15% by the financial year 2020–2021 (against a 2010–2011 baseline). This marks a significant step change in the Partnership's approach to saving carbon, as it moves away from a relative to an absolute target to drive carbon savings. The commitment will be delivered by reducing emissions across both direct and indirect operations.
- To halve the direct impact of Waitrose refrigeration and cooling emissions on a 2008–2009 baseline by the end of 2012.
- To divert 95% of operational waste from landfill by the end of 2013.
- To reduce energy-related transport CO<sub>2</sub> equivalent emissions from shop deliveries by 15% (on a 2005–2006 baseline) by the end of 2013.
- To engage its workforce and set out to Partners what they can do to contribute to the achievement of the business' overall carbon target.

## John Lewis Partnership's progress so far:

- John Lewis Partnership (JLP) has already managed to make significant cuts in its CO<sub>2</sub> equivalent emissions relative to the size of its business. Sales grew by 10.6% in 2010–2011, but its total emissions only increased by 4.6% to 541,956 tonnes in the same period. A large proportion of this increase is attributable to including new sources of emissions such as water supply, water treatment and additional fuels used in its buildings. This equates to a 33% reduction in CO<sub>2</sub> equivalent emissions, on a normalised basis, from 98 tonnes of CO<sub>2</sub> equivalent per £million of sales in 2001–2002 to 66 tonnes in 2010–2011.
- However, the Partnership has recently repositioned itself to deliver more far-reaching reductions in its carbon footprint by setting an absolute reduction target underpinned by a clear, targeted and evidence-based carbon footprint reduction programme.
- JLP continues to fit the latest technology into its new shops and existing estate and is engaging its Partners to deliver reductions locally. JLP has improved the energy efficiency of new shops: new space opened in 2009 was on average 7% more energy-efficient than its existing trading estate.

- Against its target to reduce transport CO<sub>2</sub> equivalent emissions by 15% relative to turnover by 2013, JLP has made an improvement of 5.9% since its 2005–2006 baseline. Progress against this target has been impacted by growth in its store estate and an increase in customer deliveries plus additional backhauling (which reduces overall distribution mileage, but shifts the mileage from supplier vehicles to its own).



### Low Carbon Project Examples:

#### A. Improving store energy efficiency

John Lewis Partnership aims to use energy as efficiently as possible in its shops, head offices and equipment, and to use renewable energy where possible. Its approach is to make the right changes for the long term across its estate, so that improved energy efficiency becomes embedded into all new and existing shops. John Lewis Partnership brings together a number of new technologies and ways of working to deliver reductions in the carbon footprint of stores when compared with a typical older store, including:

- Sealing the building to stop air infiltration/leakage.
- Controlling the electrical input into the building.
- Monitoring and reviewing energy usage on a daily basis in all shops and taking appropriate action; data collection is via instant-read smart meters within every branch.
- Replacing inefficient heating and ventilation systems.
- Developing in-house biomass-driven combined cooling, heating and power systems.
- Redeveloping the lighting system using the latest technology including light-emitting diodes (LEDs).

- Recovering and reusing cold-air spillage from cabinets to cool areas of the shop that previously required mechanical air conditioning, further eliminating the usage of hydrofluorocarbon (HFC) refrigerants while delivering considerable energy savings.

#### B. Low-emissions refrigerant programme at Waitrose

In 2009, Waitrose completed a five-year programme to phase out ozone-depleting hydrochlorofluorocarbon (HCFC) refrigerants and, ahead of the EU ban on HFCs (greenhouse gases with a global warming potential of up to 3800 times that of CO<sub>2</sub>), it became the first major UK food retailer to commit to stop installing HFCs for refrigeration in all new and refitted shops from 2010.

To achieve this, the retailer has started to fit a new refrigeration system that uses a water- and propane-based natural refrigerant. This is more reliable and uses 20% less energy compared with an equivalent shop operating with traditional systems.

This new natural refrigerant was in use in 26 shops by the end of 2010; by rolling it out to all its Waitrose shops by 2020, John Lewis Partnership will reduce its carbon footprint considerably and make Waitrose shops totally HFC-free.

Waitrose's other efforts also include an extensive leaks prevention programme, trials of HFC-free options for transport refrigeration, and the implementation of sub-metering for refrigeration, lighting, heating, ventilation and air conditioning in all new stores.

Waitrose is also now linking refrigeration with heating, ventilation and air-conditioning systems, to enable the reuse of system by-products. For example, Waitrose Altrincham (opened in October 2009) uses a cold-air retrieval system that takes cold air from the chillers at floor level and circulates it to other areas of the store that previously required mechanical air conditioning, further eliminating the usage of HFC refrigerants.

The addition of a cherry and almond scent to HFCs to help detect refrigeration leaks is also being trialled in Waitrose shops in Wallingford and Monmouth. The trial is due to be extended to a larger number of stores.

#### C. Working to develop emerging technologies and robust carbon reporting for transport

John Lewis Partnership's distribution fleet is already an industry leader in carbon reduction, thanks to several initiatives. Its logistics and distribution operations already use computerised route planning, forward and backhauling on otherwise empty vehicles on outward or return journeys and 'load

Building Regulations are driving energy and carbon reduction, however these are still limited in their coverage.

consolidation' to avoid unnecessary journeys. Efforts to improve driver efficiency include in-cab telematics to help drivers and managers to assess driving styles and fuel efficiency. John Lewis Partnership trucks also have a range of features to reduce drag and improve fuel efficiency, and future developments include extending the use of sophisticated modelling to optimise the aerodynamics of vehicles. The existing fleet is of low height vehicles with rounded corners and fitted with low-resistance tyres; John Lewis Partnership is now also fitting a moulding to the front of double-deck trailers. This design, developed in conjunction with the research organisation Cranfield, offers a payback of under four months based on the fuel savings generated.

The Partnership has also pioneered the adoption of multi-deck trucks. Most of the John Lewis trucks are multi-decks and their use is now expanding to Waitrose following the recent introduction of the first multi-temperature multi-decks for carrying fresh and frozen produce. Generally two multi-decks will replace three conventional trucks, giving rise to at least a 20% CO<sub>2</sub> equivalent saving.

John Lewis Partnership also aims to devise a cohesive, long-term fuel policy using a range of technologies with the potential to become cost-effective alternatives to fossil fuels.

Having conducted initial research, it is currently exploring the carbon reduction potential, projected availability and cost of a range of low-carbon technologies and alternative fuels.

#### **D. Pushing for 'big solutions'**

John Lewis Partnership believes that businesses must work with government over the long term to successfully combine ambitious objectives and practical action for a sustainable economy. Through engagement and dialogue, John Lewis Partnership aims to work in partnership with others in areas where the challenges are too great to work in isolation. Its membership and involvement with The Prince of Wales's UK Corporate Leaders Group on Climate Change is an example of this ambition.

#### **Project Outcomes:**

John Lewis Partnership's projects indicate how by focusing hard on finding solutions in key areas with the most potential for reducing emissions, steps towards real progress can be made, particularly through harnessing the positive power of technology and by working in partnership with others.



# Kingfisher

## Company Profile:

**Business:** Kingfisher is Europe's leading home improvement retailer and the third largest in the world

**International Presence:** 840 stores in eight countries in Europe and Asia

**Turnover:** £10.5 billion/€12.3 billion (year ending January 2010)

**Employees:** 78,000



**Company Vision:** "To help consumers reduce the carbon footprint of their homes by providing affordable and innovative eco products and services and at the same time reduce the direct carbon emissions of the company's own activities."

## Kingfisher's climate goals are:

- To help people create sustainable affordable homes of the future.
- To reduce CO<sub>2</sub> emissions from energy and transport per £million retail sales by 20% by 2011–2012 against the 2006–2007 baseline.
- To reduce direct CO<sub>2</sub> emissions of Kingfisher's largest operating company (B&Q) by 90% by 2023 against the 2006–2007 baseline, with an interim target of 20% by 2012–2013.
- To ensure all new B&Q stores and all existing stores are 'zero carbon' by 2012 and 2023 respectively.

## Kingfisher's progress so far:

- Kingfisher has achieved a 22% reduction in CO<sub>2</sub> emissions from energy and transport per £million retail sales against the 2006–2007 baseline – meeting and exceeding its target ahead of schedule and thus requiring new targets to be set in 2010.
- B&Q has already achieved a 16% reduction of direct CO<sub>2</sub> emissions against its 2006–2007 baseline, and is therefore well on track to achieve the 20% cut by 2012–2013.

## Low Carbon Project Examples:

### A. Store lighting solutions

Following a trial in 2008, B&Q rolled out a half-lighting solution across 40 stores in 2009. This involves the installation of photocells and a dimming system that switches to half-lighting when there is sufficient daylight. The initiative is carefully designed to not compromise the store ambience or health and safety requirements. In 2010, B&Q invested £2.3 million to improve energy and the efficiency of lighting across 37 more stores. This is expected to result in a saving of approximately £0.9 million annually, with a payback period of about 2.4 years.

### B. Incorporating renewable energy across stores

Across the Group, a number of different renewable energy technologies have been incorporated into new stores. At B&Q's store in New Malden, Surrey, UK, a range of green technologies have been introduced including a building-mounted wind turbine, solar thermal water heating, underground boreholes for heating and cooling, rainwater harvesting and a green roof. At Castorama's store in Cormeilles-en-Parisis, near Paris, France, more than 2000m<sup>2</sup> of solar panels, an underground heat-pump system for heating

and cooling, and a rainwater-collection system have been installed. Castorama Poland has a ground-source heat pump at one store and is considering installing this technology in other stores. Brico Dépôt Spain has installed solar thermal water heating at seven of its 16 stores, in line with national legislation, while at Brico Dépôt France, new stores also have solar thermal water heating, including those in Strasbourg, Pamier, Cesson and Rodez. Koçtaş in Turkey has conducted a feasibility study into the use of solar photovoltaic panels, and plans to incorporate a ground-source heat pump into the new store at Fethiye, which opens in 2010.

#### C. Exchange of best practice

The company promotes the exchange of best practice in energy efficiency through Group property meetings (attended by the property directors from operating companies). For example, the property team in Castorama Russia have received guidance from B&Q UK on improving the energy efficiency of store lighting.

#### D. Energy monitoring across the Group

A number of Kingfisher's businesses use sophisticated energy-monitoring systems to enable them to benchmark energy efficiency across their stores and identify potential areas for improvement. B&Q UK sends out monthly performance league tables to regional managers to encourage improvement. Screwfix installed automatic metering systems across its stores during 2009. Castorama France is rolling out a new energy- and water-monitoring system and is training store security managers to monitor efficiency, while Koçtaş in Turkey has used detailed energy data to prioritise investment in energy-saving initiatives.

#### Project Outcomes:

Kingfisher's projects emphasise a continuous push towards best practice across its businesses. In this way, Kingfisher is able to share in-house learning and draw on its internal knowledge and technical expertise to strive towards constantly improving its performance.





# Tesco

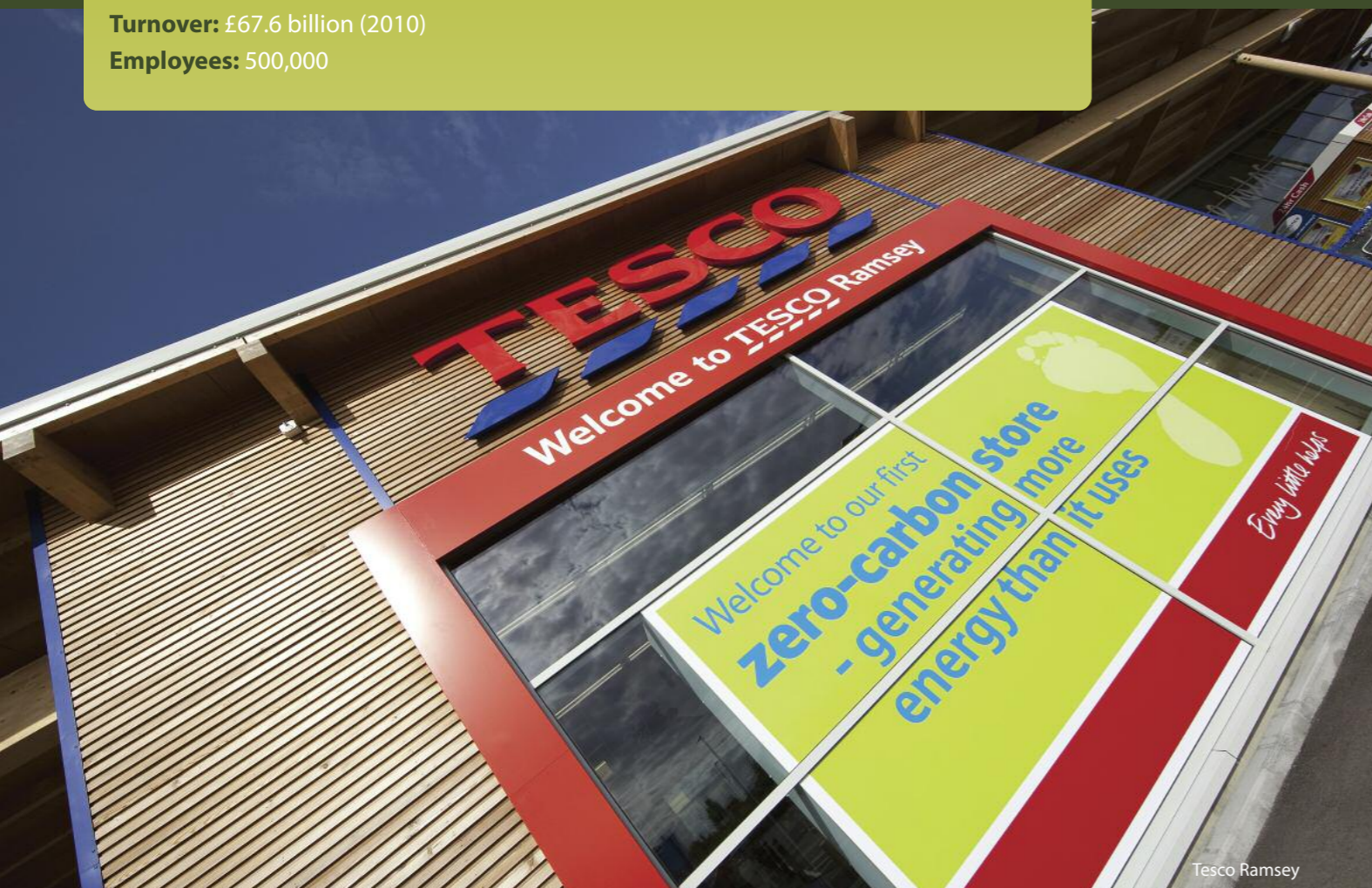
## Company Profile:

**Business:** Tesco is one of the world's largest retailers, active in food, non-food and retailing services

**International Presence:** Operational in 14 countries across Europe, Asia and the USA

**Turnover:** £67.6 billion (2010)

**Employees:** 500,000



Tesco Ramsey

**Company Vision:** "To become a zero-carbon business by 2050, and use our influence with suppliers and customers as a retail business to generate a mass movement to protect the environment."

## Tesco's climate goals are:

- To reduce the company's direct carbon footprint and work towards the ultimate target of becoming a zero-carbon business by 2050. This overall goal includes the following interim targets: by 2012, to halve emissions of each case of goods delivered against the 2006 baseline; by 2020, to halve emissions from the 2006–2007 baseline portfolio of buildings; and between 2007 and 2020, to halve the CO<sub>2</sub> emissions of new stores built against a 2006 baseline.
- To work with suppliers to reduce by 30% the carbon impact of products in the supply chain by 2020.
- To lead a revolution in green consumption, helping customers to find ways to halve their carbon footprint by 2020.

## Tesco's progress so far:

- Tesco has identified that achieving its 2050 zero-carbon goal will involve the reduction of absolute emissions in stores and distribution networks by being as energy efficient as possible and using low-carbon technologies such as natural refrigeration. The company has also committed to generating all the electricity and heat/cooling still required from renewable

sources. To offset any residual emissions that cannot be eliminated – for example from some forms of transport – the company plans to generate more renewable energy than is needed and pass on the excess to others.

- In working towards its zero-carbon commitment, 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.
- Investments to improve energy efficiency and reduce emissions are already saving the company £150m a year in avoided energy bills, thanks to its low-carbon store designs and energy efficiency measures.
- In helping consumers to go green, Tesco is working to break down the barriers that prevent customers from leading low-carbon lives by providing green products and services, giving consumers the information they need to make informed choices and incentivising green behaviour. Tesco also continues to work with the Sustainable Consumption Institute at the University of Manchester, which is seeking to answer questions about how to make a consumer society sustainable. Tesco has committed £25m to the SCI.

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.

### Low Carbon Project Examples:

#### A. Low-carbon stores around the world

Since 2006, Tesco has opened a number of environmental stores in the UK, which have been used to test new technologies and designs to save energy and reduce CO<sub>2</sub> equivalent, and which have embodied carbon benefits such as timber frames. Each store has achieved significantly lower environmental impacts than the previous one. In 2009, Tesco built its first store to use a new, low-carbon blueprint in Cheetham Hill, which has a carbon footprint 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. Where possible, some elements are also being 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, while in 2009, 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%.

The Riverside California Distribution Center has one of the largest roof-mounted solar

panel installations in North America. Solar installations are also present in the Czech Republic, Hungary, Korea, Thailand and Turkey, and the first LEED (Leadership in Energy and Environmental Design) -certified store in the USA is now open. On the other side of the world, Tesco China now has 24 low-energy stores, all of which use 25% less energy than standard designs.

#### B. The world's first zero-carbon store

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. Environmental design and technology features include:

- Roof lights and sun pipes that allow natural daylight into the sales floor, reducing the need for electric lighting.
- Rainwater-collection facilities on the roof to collect water that is used for the car wash and to flush the toilets, saving energy and water.
- A timber frame made from sustainable sources instead of steel, which significantly cuts the carbon associated with building the store.



- Energy-efficient equipment, such as low-energy bakery ovens.
- Refrigerant gases in the fridges, heating and ventilation and air-conditioning systems have virtually no negative environmental impact compared with traditional refrigerant gases. Natural CO<sub>2</sub> refrigerants are being used instead of HFC refrigerants.
- The LED lights in the car park and petrol station use less energy and last longer than normal bulbs.
- A combined heat and power plant runs on biofuels from renewable sources and generates sustainable energy for the store.

Compared with a conventional store, a zero-carbon store costs around 10–15% more to build but its environmental design and technologies cut energy use by 45%, paying back the additional investment in just a few years. For example, the cost of building the lobby on the front of the store is paid back in two years by reducing heat loss. Costs of building low-carbon stores are likely to fall in the future as the technologies become more widely used.

Tesco has since opened two more zero-carbon stores in the UK and one in the Czech Republic, with one due to open in Thailand later in the year.

### C. Carbon labelling of consumer products

Tesco has pioneered the use of carbon labelling. Since 2008, it has footprinted over 1000 products and labelled over 500. Working with the Carbon Trust to develop the label, Tesco aims to help consumers make greener choices by providing previously invisible information on a product's carbon footprint. The labels are designed to show how many grams of carbon or equivalent greenhouse gases were emitted as a result of growing, manufacturing, transporting and storing a product. They also consider the impact of preparing or using a product and then disposing of any waste. For some products, the label also compares the product's carbon footprint with that of similar products, so consumers can tell which one has the smallest footprint. Some labels also give tips about how to reduce a product's footprint when it is cooked, used or disposed of.

### D. 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 it in this endeavour. To help share best practice across sectors Tesco launched its online Knowledge Hub in autumn 2010 – this is a powerful new tool for Tesco and its suppliers to share knowledge and best practice through an online community.

Its next step is to pilot the development of carbon reduction strategies in three product categories, working with buyers and suppliers.

#### Project Outcomes:

Tesco's projects highlight how a sphere-of-influence approach can create large ripple effects, leading to innovations in ways of working. They also show how developing a successful portfolio of initiatives can push companies to better themselves and build on prior achievements towards greater goals.



# Unilever

## Company Profile:

**Business:** Unilever is a global market leader spanning 14 categories of product including home, personal care and food products

**International Presence:** Operational in over 100 countries

**Turnover:** €39.8 billion (2009)

**Employees:** 163,000



**Company Vision:** “To reduce our total environmental impact, including greenhouse gases, as we work to double the size of our business.”

## Unilever’s climate goals are:

- To halve the greenhouse gas emissions of our products on a lifecycle basis by 2020.
- To reach 200 million consumers by 2015 with products and tools that will help them to reduce their GHG emissions while washing and showering. Our plan is to reach 400 million people by 2020.
- To reduce the GHG impact of the laundry process by concentrating our liquids and compacting our powders and reformulating our products to reduce GHG emissions by 15% by 2012.
- To encourage our consumers to wash at lower temperatures and at the correct dosage in 70% of machine washes by 2020.
- To ensure that by 2020 CO<sub>2</sub> emissions from energy from our factories will be at or below 2008 levels despite significantly higher volumes. This represents a 63% reduction per tonne of production and a 43% absolute reduction (versus a 1995 baseline).
- To more than double our use of renewable energy to 40% of our total energy requirement by 2020.
- To ensure that by 2020 CO<sub>2</sub> emissions from our global logistics network will be at or below 2010 levels despite significantly higher volumes. This will represent a 40% improvement in CO<sub>2</sub> efficiency.

- To accelerate our roll-out of ice cream freezer cabinets that use climate-friendly (hydrocarbon) refrigerants. We will purchase a further 850,000 cabinets by 2015.

## Unilever’s progress so far:

- The Unilever Sustainable Living Plan, launched in November 2010, set a new direction for Unilever by setting targets across the whole lifecycle of our products. Previously our focus had been on reducing the impacts particularly in our own operations.
- During the past 15 years Unilever achieved over a 40% reduction in CO<sub>2</sub> from energy per tonne of production in absolute terms (while significantly growing our business).
- On our natural refrigerant ice cream cabinet programme we have already purchased 450,000 units with the new climate friendly refrigerant, and are chairing the Refrigerants, Naturally! partnership to accelerate the deployment of this technology worldwide.

## Low Carbon Project Examples:

### A. Reducing CO<sub>2</sub> emissions from manufacturing through renewable energy installation

Unilever has installed numerous examples of renewable energy generation in its factories around the world to eliminate fossil fuel use where possible. For example, the installation of solar panels to preheat water for steam generation at the Unilever factory in Cu Chi, Vietnam, eliminated the need for 60,000 litres of fuel oil a year and reduced CO<sub>2</sub> emissions by 172 tonnes. In China, at Unilever's detergent factory in Hefei, straw waste was previously burned by local farmers but is now collected and used as a second-generation biofuel, improving air quality, reducing CO<sub>2</sub> emissions and the use of fossil fuels, and providing farmers with extra income. In Sri Lanka, a biofuel-powered boiler has been introduced that uses coconut shells and sawdust to generate steam in the manufacturing processes; it is expected to reduce fossil fuel consumption by 3,200 tonnes per year. Eight out of nine Unilever factories in Germany, along with its new headquarters in Hamburg, began using hydroelectric power in 2010, which will save an estimated 60,000 tonnes of CO<sub>2</sub> per year.

### B. Investing in combined heat and power

At Unilever's Wall's and Magnum ice-cream factory in Gloucester, UK, CO<sub>2</sub> emissions from energy use will be reduced by over

3,000 tonnes a year through the installation of a combined heat and power plant. The 2.4-megawatt plant is primarily fuelled by natural gas, with heat in the form of hot water and steam produced as a by-product. This heat is reused in the manufacturing process. In Europe, Unilever now has four combined heat and power plants operational, in Caivano and Cisterna, Italy, and in Heppingheim and Stavenhagen, Germany. These plants are more environmentally efficient than those importing electricity from the national supplier because they fully utilise the waste steam and hot water from electrical power generation. Unilever's factory in Tatura, Australia, received a government grant of €700,000 to construct a 1.1-megawatt cogeneration plant, which generates both electricity and heat using natural gas and thermal energy. This cuts greenhouse gas emissions by an estimated 44% while making Tatura self-sufficient in meeting its high-energy demand.

### C. Sustainable construction

Unilever's new Hamburg headquarters building was constructed using ecologically sound building materials and is the world's largest building to be equipped with energy-efficient LED lighting. It also boasts a thermo-active cooling system and a heat-recovery system on the roof. These cost-saving efficiency features won the Building Exchange (BEX) Award for innovative and sustainable design. In Istanbul, Turkey,



Unilever's new office building received LEED certification for its environmental design, which helps reduce annual energy use by 30% and water use by 40% – it is the first building in Turkey to receive this certification.

### D. Commitment to climate-friendly refrigeration

Unilever, as the largest ice-cream business in the world, relies on around two million point-of-sale refrigeration cabinets worldwide. Since 2004, Unilever has been replacing these cabinets with climate-friendly, energy-

efficient alternatives using hydrocarbon refrigerants. This is because refrigerants used in cabinets and other storage facilities have a much higher global warming potential than CO<sub>2</sub>. To put it in perspective, CO<sub>2</sub> has a global warming potential of only one, compared with values in the range of 1200–8500 for hydrofluorocarbons (HFCs), hydrochlorofluorocarbons and chlorofluorocarbons. Hydrocarbons also do not contribute to ozone depletion and hydrocarbon-based cabinets are also about 10% more energy-efficient. To date, Unilever



Unilever's projects demonstrate the way in which companies can harness low-carbon technology solutions to reduce their environmental impacts and increase their company's energy efficiency standards.

has replaced around 450,000 cabinets with hydrocarbon refrigerants. For technical and legislative reasons it is not possible to replace all cabinets. In its recent report 'HFCs: A growing threat to the climate', Greenpeace commended the progress Unilever has made in introducing hydrocarbon cabinets. Unilever is the first company to pilot this technology in the USA, where, unlike in the EU, regulatory barriers currently prevent the use of hydrocarbon refrigerants. Ben & Jerry's, a Unilever subsidiary, has made a Significant New Alternatives Policy application to the Environmental Protection Agency for the use of climate-friendly refrigerants in ice-cream cabinets. In 2009, Ben & Jerry's continued its pilot test of 50 hydrocarbon cabinets in Washington DC, Boston and Vermont. The Environmental Protection Agency's pending ruling will pave the way for the introduction of hydrocarbon refrigeration in the USA.

In addition to a commitment to hydrocarbon cabinet refrigeration, almost all Unilever production facilities and cold stores use ammonia in their refrigeration systems. Ammonia has a global warming potential of zero and has no effect on the ozone layer if it leaks from a refrigeration system. Ammonia is also a very energy-efficient refrigeration gas for large-scale use. Not only is Unilever

exploring the development and use of new technologies in this area, but it is also engaging with stakeholders such as governments and non-governmental organisations to bring about regulatory change. In 2004, Unilever were founder members of a multi-stakeholder collaboration known as Refrigerants, Naturally! The initiative involves several companies in the food and drink business, and is endorsed by Greenpeace and the United Nations Environment Programme. It aims to promote a rapid shift away from hydrofluorocarbons towards natural, more climate-friendly refrigerants such as ammonia, CO<sub>2</sub> and hydrocarbons. In 2006, PepsiCo and Carlsberg also joined the alliance.

#### **Project Outcomes:**

Unilever's projects demonstrate the way in which companies can harness low-carbon technology solutions to reduce their environmental impacts and increase their company's energy efficiency standard. Unilever has made significant headway in delivering on its climate objectives, using the strategy of identifying key large-scale opportunities along its supply chain to find alternative solutions and to create business opportunities.



# TECHNOLOGY AND ENGINEERING SOLUTIONS

## Company Profiles:

<b>Philips</b> .....	<b>46-51</b>
<b>United Technologies Corporation</b> .....	<b>52-57</b>

## Company Profile:

**Business:** Philips is a diversified health and well-being company and a global leader in healthcare, lifestyle and lighting

**International Presence:** Sales and services in more than 100 countries worldwide

**Turnover:** €22.3 billion (2010)

**Employees:** 117,000

**Company Vision:** “To improve people’s lives while at the same time reconciling climate protection and economic growth by including the role of energy efficiency to a ‘greener recovery’ as well as business visions for a low-carbon society.”

## Philips’s climate goals are:

- To fully leverage sustainability as an integral part of the company strategy and an additional driver of growth.
- To offer meaningful solutions by meeting the company’s 2015 sustainability vision and targets, under the programme name ‘EcoVision5’, building on the 2007–2012 ‘EcoVision4’. For example, to improve the energy efficiency of the company’s overall product portfolio by 50%.
- To harness the power of the company’s technological innovation to address critical issues and needs, such as energy efficiency savings through the extended use of LED lighting, improved healthcare equipment and domestic appliances.
- To reduce by 25% the CO<sub>2</sub> emissions and energy consumption of Philips’s own facilities and logistics operations by 2012.
- To generate 50% of total revenues from green products by 2015.
- To double investment in green innovations to a cumulative €1 billion.
- To close the materials loop, thereby reducing emissions of waste materials by doubling global collection, recycling amounts and recycled materials in products by 2015 compared with 2009.

## Philips’s progress so far:

- Philips submitted the first entry in the US Department of Energy’s L Prize competition, which seeks high-quality, high-efficiency solid-state lighting products to replace the 60-watt incandescent light bulb. Named one of the ‘best inventions of 2009’ by *TIME* magazine, the Philips LED bulb emits the same amount of light as its incandescent equivalent but uses less than 10 watts and lasts for 25,000 hours – or 25 times as long.
- Philips is actively searching for alternative energy sources to reduce the company’s greenhouse gas emissions. One of these efforts is directed at using direct or indirect (through an energy supplier) renewable energy sources such as geothermal energy, wind and solar systems to produce green electricity to run company sites. In 2009, Philips doubled its purchase of green electricity from 7% in 2007 to 15%. By 2012, the number of sites that use green electricity should be sufficient to achieve the company’s 25% carbon footprint reduction target for 2012.
- For Philips’s non-industrial facilities (offices, warehouses, etc), the amount of facility space was reduced through co-location and workplace innovation



projects. Additionally, Philips focused on upgrading work-space lighting systems and introduced a 'Green IT' project.

- In 2009, overall CO<sub>2</sub> emissions from logistics decreased by 14%.
- The sale of green products grew by 19% in 2009, during a time of declining overall sales.

### Low Carbon Project Examples:

#### A. Creating liveable cities through efficient lighting

Approximately two-thirds of installed lighting solutions are old or inefficient lighting systems that were designed before 1970. Currently, only 3% of street lighting and 7% of office lighting is being replaced per year. The renovation of the old installed base with energy-efficient lighting would result in a 40% energy saving, representing approximately €28 billion in reduced energy consumption costs to European citizens.



These savings would, in turn, reduce the need for new power generation plants all over Europe. Philips therefore offers solutions and concepts enabling municipalities to create more liveable cities through the adoption of LED solutions. It is possible to slash the energy that is used for lighting our streets (which accounts for 15% of lighting electricity consumption), our public and commercial buildings (which represent 60% of lighting electricity consumption) and our schools, industries and homes through the use of Energy Efficient lighting, with a fast expanding range of attractive LED lighting. For outdoor living, the use of LEDs not only provides a significant energy saving, but also improves road and pedestrian safety and reduces night-time light disturbance. For offices and shops, Philips offers LED luminaire and control solutions; whereas for schools, the company runs a 'Brighter Schools Project', resulting in reductions of CO<sub>2</sub> and energy of as much as 57% and also substantial improvements to children's learning results. Within industries, homes and hotels, Philips promotes the replacement of 60-watt bulbs with Philips's LED replacement solution, which could potentially help save up to 80% of the energy used by older technologies.

Energy efficiency improvements truly constitute large potential emissions savings (more than 50% of all emission reductions are to be achieved through energy efficiency) as

well as a significant opportunity for green job creation (e.g. in retrofitting public buildings). Some examples of realised projects include: the Bullring centre in Birmingham, UK, which introduced LED lighting systems to promote the shopping centre's public image and create a unique shopping experience, cutting energy use by 85%; the Generali office building in Paris – the world's first building lit entirely by LEDs; and the Rundbau, a 40-year-old landmark building in Cologne, Germany, which uses LED lighting with presence detection and daylight regulation to achieve 75% cuts in energy use.

#### B. Encouraging replacement of old lighting infrastructure

Upgrading lighting systems to energy-efficient solutions is recognised as one of the most cost-effective ways to save energy and so help tackle the global energy and climate change challenge. For example, switching from older, inefficient lighting to new system technologies could enable average savings of up to 70% in energy use, costs and CO<sub>2</sub> emissions, while at the same time improving light quality. Yet, it is often the case that public sector and (public) building owners shy away from initial investments in lighting controls and efficient lighting systems, in particular where payback periods are more than three years. Philips believes that competitiveness in Europe and globally could improve if the European public sector increased its rate of investment in energy-efficient lighting solutions and took

Philips's projects demonstrate how a company can be a leader in harnessing key technological innovations and driving their application.

into account the total cost of ownership over the entire lifetime of buildings. Many public sector entities are discouraged from investing in energy-efficient solutions owing to the initial investment required to upgrade the installed base. Europe's cities, their buildings and its public infrastructure are often inefficient and old, and would merit specific focus and support. The structural funds could possibly play a role in upgrading the inefficient heritage from the past.

#### **C. Investing in green innovations and building up a green product portfolio**

In 2007, Philips pledged to invest €1 billion cumulatively in green innovations by 2012, and to generate 30% of total revenues from green products by 2012. Philips reached this green innovation target in 2010, two years ahead of schedule, and the green sales target even sooner in 2009. Philips therefore increased its target in 2010, and is aiming to generate 50% of its turnover through green sales by 2015. Most of these green products will have a higher energy efficiency to meet the company's 'EcoVision5' target – to improve the energy efficiency of the company's portfolio by 50% by 2015.

#### **D. Supporting EU legislation**

Working with the EU Corporate Leaders' Group on Climate Change, Philips has been involved in calling for leadership on climate change legislation post-Kyoto. The company supports cross-sectoral as well as sector-specific policy action. At present, Philips is working to encourage the adoption of EU lighting system legislation that would maximise the energy efficiency potential of lighting solutions. Under the EU27 framework directive setting EcoDesign requirements, much has been done to regulate the energy efficiency of individual products such as lamps and gear. However, for luminaires, energy efficiency regulations are fairly redundant as the energy use of a luminaire is largely determined by the lighting design and the way the product is deployed in application. When these products are put into existing schemes, they can deliver some 15% improvement in energy efficiency. All too often, however, they are put into service in poorly designed and operated lighting installations, resulting in bad lighting conditions and wasted energy. When lighting schemes are properly designed, the improved effectiveness of the lighting – in terms of both

quality and quantity – can reduce energy usage by up to 70%. To fully realise this savings potential, Philips encourages the EU to introduce lighting system legislation that focuses on energy saving with lighting systems put into service (both new and refurbished lighting schemes).

#### **Project Outcomes:**

Philips's projects demonstrate how a company can be a leader in harnessing key technological innovations and driving their application and benefit across a spectrum of situations, particularly by focusing on big wins in energy efficiency – the retrofitting and replacement of old, inefficient technology.



# United Technologies Corporation (UTC):

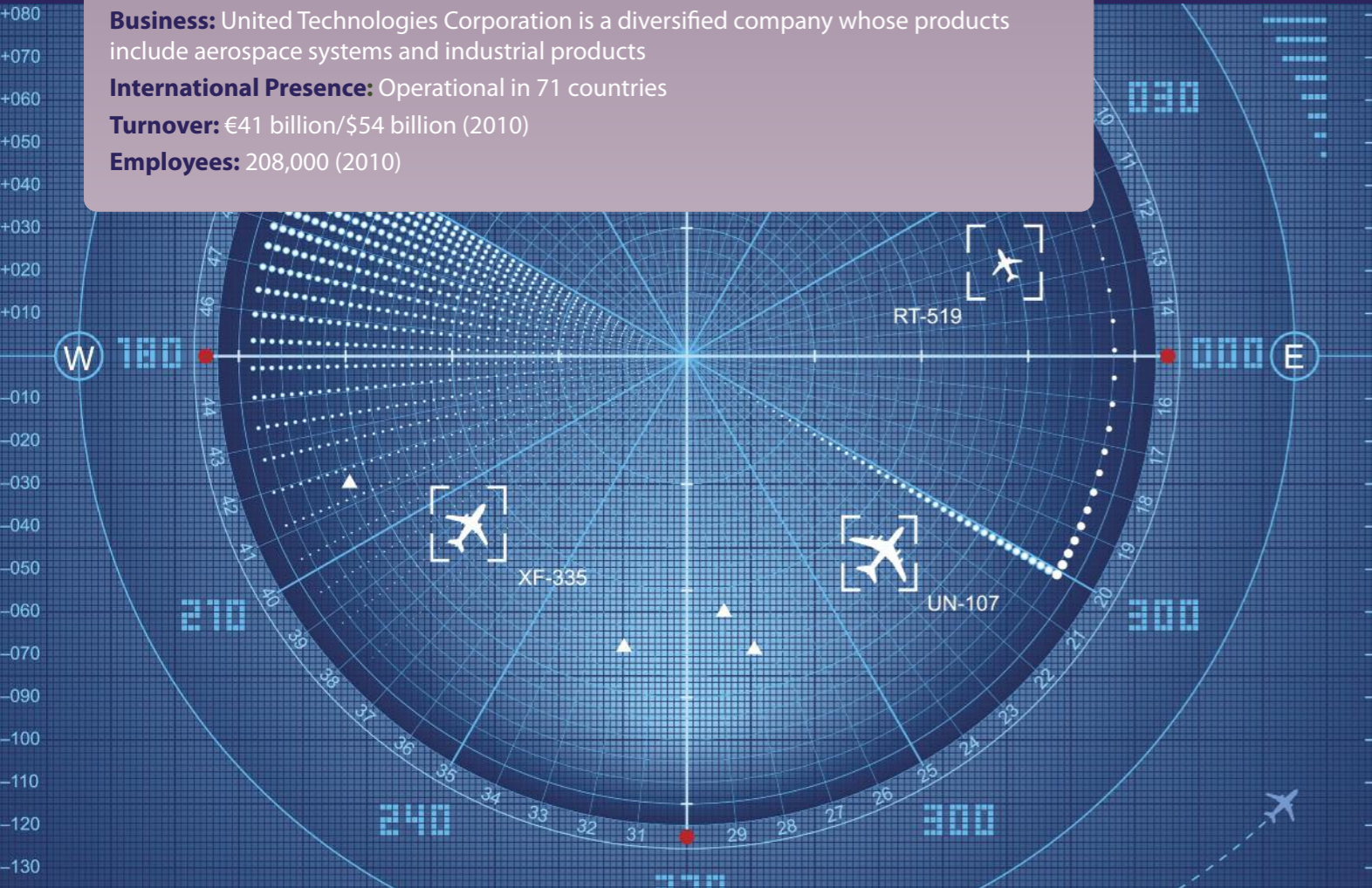
## Company Profile:

**Business:** United Technologies Corporation is a diversified company whose products include aerospace systems and industrial products

**International Presence:** Operational in 71 countries

**Turnover:** €41 billion/\$54 billion (2010)

**Employees:** 208,000 (2010)



**Company Vision:** “To reduce our impact on climate change and continuously work towards achieving ambitious goals for the reduction of greenhouse gas emissions from our operations and products.”

## UTC’s climate goals are:

- To build on the successful reduction of energy used per dollar of revenue by 19% below 1997 levels in 2006, and reduce greenhouse gas emissions by 12% by 2010 in absolute terms from the 2006 baseline.
- To improve the efficiency of UTC’s product line by at least 10% from 2006 levels, and to invest \$100 million in energy efficiency projects.
- To expand and build on UTC’s energy efficiency focus on supply chain and product impacts since 2006, and to establish a new set of sustainability goals through to 2015.

## UTC’s progress so far:

- In 1988, the UTC Energy Council was formed, which set a goal to reduce energy costs by 20% per square foot for the top 20 UTC manufacturing sites by 1995. Subsequently, UTC set a goal to reduce energy used per dollar of revenue by 25% below 1997 levels by 2006. This goal was realised in 2001, and reset to 40% by 2006. Actual 2006 savings were 56%, representing a 19% absolute reduction compared with 1997 usage.
- Taking into account the 19% absolute cut between 1997 and 2006, UTC’s total absolute reductions will be over 30% from 1997 to 2010, or more than 2% per year for nearly 15 years.

With a corporation-wide energy team's support, by the end of 2009, over 1200 projects were identified, valued at over \$170 million in implementation costs

**Low Carbon Project Examples:**

**A. From the top down – making energy efficiency a core business strategy**

UTC provides high-technology products and services to the building systems and aerospace industries worldwide through seven businesses: Carrier air-conditioning, heating and refrigeration solutions; Hamilton Sundstrand aerospace and industrial systems; Otis elevators and escalators; Pratt & Whitney engines; Sikorsky helicopters; UTC Fire & Security systems; and UTC Power fuel cells. While the products and their specific uses differ, common to all of these businesses is the central role that energy plays in their industries. UTC has managed to integrate these diverse businesses with a concerted focus on energy efficiency and conservation as a core business principle and corporate

strategy. The company believes that energy and resource efficiency are essential for the development of a prosperous and sustainable future, both for the planet and its business. Senior leadership has played an important role in stressing the importance of eliminating waste in the supply chain and squeezing out the maximum efficiency from energy usage. Starting with the establishment of the UTC Energy Council in 1988, this evolved with the setting of environmental health and safety (EH&S) goals in the 1990s, and then onto looking beyond internal operations to supply chain values.

In this way, the company moved from compliance with environmental regulations in the 1990s, to voluntary energy reduction targets up to 2006, to a broader focus on supply chain and product impacts since then. Looking ahead, UTC aims to establish even broader sustainability goals through to 2015. The company's evolution is shown in the diagram opposite.

The commitment of senior leadership has also been attributed in large part to successful investment into energy efficiency across the company. As part of the company's 2010 goals, an ambition of investing \$100 million in energy efficiency projects was set. But this was not a ring-fenced corporate fund; rather, UTC business units were expected to make these projects a priority and fund them out of their overall business plans, relying on the

support and cooperation of senior leadership across the company. With the corporation-wide energy team's support, by the end of 2009, over 1200 projects were identified, valued at over \$170 million in implementation costs. Of these, projects worth \$116 million were funded, exceeding the 2010 investment goal early. Although economic conditions have made capital funding more difficult to come by, projects continue to be funded, as demonstrated by the 788 projects that have been approved. These projects had an estimated average payback of 2.5 years, but paybacks as long as five years have also been approved when other factors such as greenhouse gas reduction and energy price volatility were considered. Typical projects focus on lighting, compressed air, heating, ventilation, air conditioning, process improvements and cogeneration.

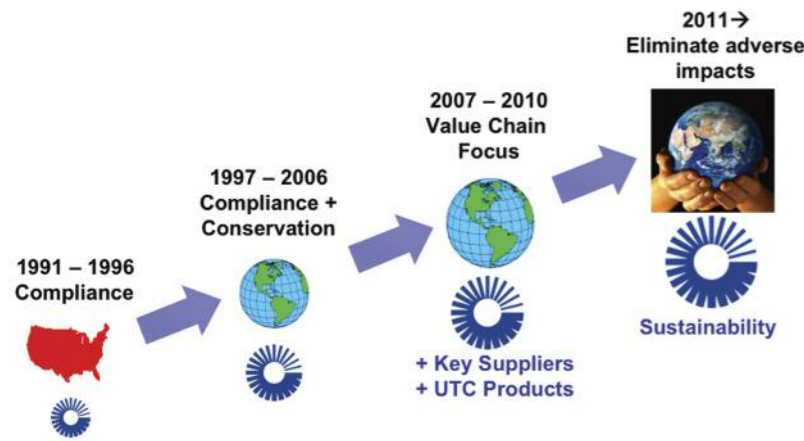
consumption and cost data; how to procure energy smartly; and how to manage electric loads. It goes on to provide technical guidance and best-practice lists on key topics including: operating schedules, lighting, compressed air, boilers/steam systems, heating, ventilation and air-conditioning systems and controls, cogeneration and building envelopes. The guidebook also includes a self-assessment checklist, enabling site managers to determine if they have the essential elements of UTC best practice in place. UTC also oversaw the development and implementation of a simple data collection, tracking and reporting system through the Energy Team. Comprising 10 people from across UTC's business units, the team also coordinated training and technical assistance, and supported the internal communications programme. Emphasis was on the visibility of project progress for the ease of use for decision makers.

**B. Standardising internal operations – providing tools and training**

UTC management has made the emphasis on energy efficiency easier by standardising its approach across the company, through its EH&S Policy, its EH&S Management System, and an Energy and Greenhouse Gas Reduction Standard Practice (known as SP-017). A detailed energy management guidebook, first issued in January 2007, provides a detailed 'how to' guide for energy, facilities, operations and EH&S professionals. The guidebook starts with the basics: how to collect, understand and use energy

**C. Creating better business by investing in energy efficiency**

Carrier, a UTC company, has completed a three-phase project for Hartford Hospital in Connecticut, USA, with the goal of improving patient comfort and increasing energy efficiency by upgrading the 867-bed facility's ageing and inefficient cooling system. Beginning in 1998, Carrier made system-wide improvements to the hospital's north campus, installing a Carrier Comfort Network® control system that enabled automatic adjustments





to match delivery of air conditioning precisely to actual building needs, saving the hospital \$1.2 million in annual operating costs. In 2005, Carrier expanded the chiller plant free cooling system, improved the cooling tower air recirculation and provided advanced lighting upgrades, which resulted in an additional \$250,000 of annual savings. Most recently, Carrier installed three Evergreen® 19XRV water-cooled centrifugal chillers that use non-ozone-depleting HFC-134a at a cost of \$5 million. The use of variable frequency drives further increase efficiency also by precisely matching motor speed with building demand. In addition, the variable frequency drives reduce mechanical stress and motor wear, requiring less maintenance and prolonging system life.

#### **D. Focus on the supply chain**

UTC estimates that its suppliers account for a footprint five times that of the company's internal operations, thereby representing a significant proportion of the challenge for the company's sustainability goals. Building on its work on ensuring initial compliance by suppliers of key EH&S principles, UTC would like to apply the World Resources Institute/World Business Council for Sustainable Development GHG Scope III reporting protocol, to begin requesting that suppliers report on energy and carbon figures going

forward. However, the disparate geographies, diverse operations and the vast number of suppliers dealt with by UTC make this a tough challenge.

#### **Project Outcomes:**

UTC demonstrates the way in which an integrated management strategy and senior leadership commitment focused on sustainability goals can transform a business towards the successful realisation of targets.



# INFRASTRUCTURE AND CONSTRUCTION

## Company Profiles:

<b>ACCIONA</b> .....	<b>60-63</b>
<b>CEMEX</b> .....	<b>64-67</b>
<b>Skanska</b> .....	<b>68-73</b>

# ACCIONA

## Company Profile:

**Business:** ACCIONA are a world leader in renewable energy, water services and infrastructure

**International Presence:** Operational in 30 countries across Europe, Africa, Asia, North America, South America and Oceania.

**Turnover:** €6.2 billion (2010)

**Employees:** 31,687



**Company Vision:** “To meet the challenge of achieving sustainable development in all our business areas and to meet the needs of the present without compromising the ability of future generations to meet their own needs.”

## ACCIONA's climate goals are:

- In line with its 2010–2013 Strategic Plan, to reduce emissions by 10% by 2013 against 2009 figures (from 1.11 million to 1.0 million metric tonnes) through its Environmental Efficiency Plan across production centres and offices.
- To seek to increase its ‘positive emissions footprint’ (net avoided emissions plus net emissions reductions) by 100% by 2013.
- To increase avoided emissions from 8.7 million tonnes in 2009 to 15.8 million tonnes in 2013, an increase of 86%.
- Attainment of these goals would mean that ACCIONA's contribution would represent 0.5% of the total reduction needed in 2013 to attain the International Energy Agency's proposal to stabilise global CO<sub>2</sub> concentrations at around 450 parts per million; 2.6% in 2013 towards the objectives set by the EU for 2020; and 11.2% in Spain in 2013 towards the EU objective.

## ACCIONA's progress so far:

- Measures to improve environmental efficiency were implemented in 2009 at all the company's offices for the first phase of the Environmental Efficiency Plan.
- Employee awareness raising, commitment by building maintenance crews and

involvement by general services staff to adapt facilities to working timetables all contributed notably to the results obtained during the year. An average reduction of 3.5% in electricity consumption was obtained in 26 offices included in the scope of the Plan.

- The second phase of the Environmental Efficiency Plan (2010–2013) started in 2010 globally at site level. During 2010, ACCIONA reduced its generated CO<sub>2</sub> emissions by 5% and increased its avoided CO<sub>2</sub> emissions by 31%.

## Low Carbon Project Examples:

### A. 'Zero-Emissions' Building

In the so-called ‘City of Innovation’ in Sarriguren (Navarre) ACCIONA built an office building for its own use, covering all its own energy needs without emitting CO<sub>2</sub>. A number of energy-saving measures and energy efficiency have been incorporated in the building, which consumes 52% less energy than an equivalent conventional building, with the remaining 48% covered by renewable energy sources: geothermal system for climatization, solar photovoltaics for electricity and biodiesel to supplement the heat input. The higher initial investment required for the building is offset in the medium term by savings in fuel and electricity. Operating since 2006, it is the first ‘Zero Emissions’ commercial building in Spain.

## **B. CO<sub>2</sub> Action – business commitments to reducing carbon**

ACCIONA participated in the CO<sub>2</sub> Action programme – the first voluntary multi-sector initiative in which Spanish companies set carbon emission reduction goals. Eighteen companies participated in the initiative in 2009. The 2009 report describes the significant actions, unrelated to the Company's production processes, undertaken by participating companies with a view to meeting their reduction targets. ACCIONA's noteworthy contribution is its Environmental Efficiency Plan – Operation 'Butterfly Effect' – the goals of which are to optimise energy and water consumption and minimise waste generation across all ACCIONA offices.

## **C. ACCIONA Energy's research, development and innovation**

ACCIONA Energy's research and development and innovation activities aim to develop technological processes and solutions that enable it to offer competitive products aligned with sustainable energy models. ACCIONA has made a clear commitment to renewable technologies in energy supply; it has various lines of research in progress, investigating power sources from hydrogen to biofuels, as well as solar and wind technologies, both onshore and offshore. One of ACCIONA Energy's most ambitious challenges in research and development is heading the European research consortium the Marine Renewable Integrated Application Platform (MARINA).

The goal of MARINA is to lay the technological foundations for viable, competitive deep-water integration of a range of renewable energies such as wind, wave and ocean currents.

ACCIONA is a world leader in concentrating solar power. Using solar through proprietary technology, the company installed the first plant of Concentrated Solar Power in the US and will open 5 more in Spain.

## **D. Alvarado I – ACCIONA's first concentrated solar power plant in Spain**

ACCIONA inaugurated its first concentrated solar power plant in Spain in Alvarado (Badajoz, Extremadura) in July 2009. The €236 million facility has an installed capacity of 50 megawatts and will supply 28,000 homes. The plant will result in avoided emissions of 55,998 tonnes of CO<sub>2</sub> each year. Alvarado I spans 130 hectares, or the equivalent of 170 football pitches. It is equipped with 184,320 mirrors laid out in rows and 768 solar collectors spanning almost 74 kilometres. ACCIONA has had an operational centre in the Nevada desert since 2007 using the same parabolic trough technology it is now implementing in Spain.

ACCIONA plans to have 5 CSP plants operational in Spain by 2012, with a total capacity of 250 MW. In these plants, solar production coincides with peak hours of the day, when air-conditioning demands are greatest.



## **E. LEED Gold certification for the Royal Jubilee Hospital Patient Care Centre**

ISL Health, a consortium headed by ACCIONA, obtained a 30-year concession to design, build, finance and maintain the 500-bed Royal Jubilee Hospital in Victoria, British Columbia, Canada. Client specifications required LEED Gold certification (i.e. a minimum of 39 points on the LEED scale). The project, which is under construction, has already obtained 40 points and is expected to attain a higher score upon completion. The score was achieved in the construction phase by using locally sourced materials to reduce shipping distances, as well as promoting the use of recycled materials and separating and reusing waste to minimise waste production.

## **Project Outcomes:**

ACCIONA's projects demonstrate the way in which business can be a standard setter in transforming the risks arising from the global challenge of climate change into opportunities for success. ACCIONA's activities are based on a combination of a portfolio of innovative low carbon projects and growth policies. The company is committed to business models that both anticipate market trends and society's expectations and respond to global demands for energy, infrastructure and water with sustainability as their focal point.



## Company Profile:

**Business:** CEMEX is a global building materials company

**International Presence:** Operational in over 50 countries across five continents

**Turnover:** €10.785 million (2009)

**Employees:** 50,000



**Company Vision:** “To address complex sustainability challenges, such as climate change, and support the development of a low-carbon economy by further reducing our impact on the environment and recognising that we have many opportunities to improve in this area.”

## CEMEX’s climate goals are:

- To reduce CO<sub>2</sub> emissions per tonne of cementitious product by 25% by 2015 against a 1990 baseline.
- To achieve a 15% alternative fuel rate (10% alternative fossil fuels and 5% biomass fuels) by 2015, increasing to a 23% alternative fuel rate (15% alternative fossil fuels and 8% biomass fuels) by 2020.
- To achieve an alternative raw materials rate of 12% by 2015 and 15% by 2020.
- To develop an energy portfolio that includes additional Clean Development Mechanism initiatives.

## CEMEX’s progress so far:

- During 2009, CEMEX reduced its specific net CO<sub>2</sub> emissions by 20.7% from the 1990 baseline, and remains on track to meet its 2015 target.
- CEMEX substantially increased its use of alternative fuels from 10.3% of its cement plants’ total energy consumption in 2008 to 16.4% – thus saving the equivalent of 1.0 million tonnes of coal and avoiding 1.2 million tonnes of CO<sub>2</sub> emissions. As a result, CEMEX has more than tripled its use of alternative fuels since 2005.

- In 2009, CEMEX achieved a 12% substitution rate for alternative materials, meeting its 2015 target, and remains on track to meet its 2020 target.
- In 2009, in relation to efforts to improve energy efficiency and reduce energy usage, the CEMEX plant in Broceni, Latvia, began operating a new dry kiln, which requires almost half of the thermal energy to produce clinker compared with the previous kiln. In the Port of Tilbury, CEMEX also opened a new cement grinding and blending plant with a vertical cement mill – the first of its kind in the UK – which uses up to 40% less energy than a conventional mill.
- CEMEX was named ENERGY STAR partner of the year in 2009 by the US Environmental Protection Agency for outstanding energy management and reductions in greenhouse gas emissions.

### Low Carbon Project Examples:

#### A: Cement carbon labelling (CEMEX UK)

On 7 April 2010, CEMEX announced that its UK operation (CEMEX UK) would be the first of its kind in the world to provide certified carbon labels for its cement. The measurement of the carbon footprint of cements over their life cycle includes: all raw materials and fuel extractions; processing; manufacture; transport; the in-use phase; and final disposal at end of life. CEMEX introduced the carbon-labelled cements during April to May 2010, providing its customers with a greater degree of transparency. As part of the labelling conditions, the company is committed to further reducing carbon over the next two years. The ambition is to increase coverage of carbon labelling across the CEMEX business worldwide. The aim of the project is to provide a new level of transparency, industry leadership and consumer education, and to set a standard in the industry to ensure a common method for CO<sub>2</sub> disclosure.

#### B: Sewage sludge drying (CEMEX Spain)

In November 2003, Cemex España SA signed an agreement with the 'Entitat de Sanajement de la Comunidad Valenciana' for the valorisation and drying of sewage sludge from water treatment plants in the province of Alicante. The drying plant will use the residual heat of the clinker cooler gases to dry the sewage sludge, and is designed to process 57,000 tonnes per year of sewage sludge. The innovative utilisation of exhaust gases from the clinker kiln removes the need for conventional fuels that are normally used for this kind of process (fuel, natural gas, etc). This has resulted in a significant reduction in CO<sub>2</sub> emissions associated with the combustion of those fuels. In addition, the dried sewage sludge further increases CEMEX's alternative fuel substitution, again resulting in a drop in CO<sub>2</sub> output. This is the first plant with this design, but the project can be repeated in other cement plants.

Opened in 2009, the 250 megawatt wind farm in Oaxaca, Mexico supplies 25% of CEMEX's annual electricity needs in the region and reduces CO<sub>2</sub> emissions by 600,000 metric tonnes a year.

#### C: Oaxaca wind farm (CEMEX Mexico)

Opened in 2009, the 250-megawatt wind farm in Oaxaca, Mexico supplies 25% of CEMEX's annual electricity needs in the region and reduces CO<sub>2</sub> emissions by 600,000 tonnes a year. The project has not only helped the company to reduce its reliance on electricity generated from fossil fuels but it has also generated Clean Development Mechanism credits for the successful completion of the project under the rules of the Kyoto mechanism. The farm is one of the largest onshore wind farms in the world and is the largest wind power generator in Latin America, with 167 wind turbines, each generating up to 1.5 megawatts of power. It delivers one of the largest emissions reductions of any cement industry project registered under the United Nations' Clean Development Mechanism and has one of the largest emission reduction indexes per installed capacity in the world.

#### Project Outcomes:

CEMEX's projects demonstrate the way in which heavy industries can find win-win solutions to reduce energy usage and costs, meet low-carbon targets and take advantage of international carbon reduction mechanisms. They also show how efficiency savings can be made across a diverse range of activities, and demonstrate that mutually beneficial solutions can be found to meet both global challenges and local problems such as waste disposal.



## Company Profile:

**Business:** Skanska is one of the world's ten largest construction companies with expertise in construction, development of commercial and residential projects, and public-private partnerships

**International Presence:** Operational in Europe, the USA and Latin America

**Turnover:** €13 billion (2010)

**Employees:** 52,000



**Company Vision:** “Skanska is determined to be the leading green project developer and contractor.”

## Skanska's climate goals are:

- To champion the efficient use of energy and reduce emissions of gases associated with climate change. This objective reflects an increased demand for low-carbon buildings and infrastructure, as well as Skanska's desire to create competitive advantage by identifying risks associated with climate change and to exploit them as opportunities.

## Skanska's progress so far:

- Skanska has gained external recognition from several quarters including a number nine ranking in the leadership index published in the Carbon Disclosure Projects 2010 Nordic 200 report, and is the only construction company in the top 20 listing.
- Skanska has also been awarded the US Green Building Council's 2010 Leadership Award in the private sector category for the company's vision, leadership and commitment in promoting the development of green building design and construction. Furthermore, Skanska was overall winner of The Sunday Times's Best Green Companies Award 2010.

- Currently, Skanska is active in nine Green Building Councils, and has senior executives on the board of eight of these councils including the position of Chair Elect on the US Green Building Council; it is also a partner to the European Regional Network of Green Building Councils.
- Skanska has worked on several leading-edge construction projects, and became the first to receive the highest levels of LEED certification in several of our home markets.
- Skanska's other internal achievements include the introduction of a Green Business Unit, which is tasked to bring new green business models to market; and also a Green Support Unit, to help develop strategies and tools for advancing 'green business'.
- The launch of Skanska's Journey to Deep Green™ and its strategic framework to develop and communicate Green Business: Skanska Color Palette™.
- In all its actions, Skanska is driven by its 'Deep Green' ambitions and takes policy guidance from the private and public sector actions defined in 'Roadmap for Transformation', issued by the Energy Efficiency in Buildings project.

### The Journey to Deep Green™

In 2009, Skanska launched the Journey to Deep Green™. Its Deep Green vision is embodied in the Vanilla to Deep Green Color Palette™. The palette is not only a strategic framework, but also Skanska's primary tool for engaging with its business units and stakeholders to describe the progression from legal compliance to near-zero environmental impact for construction and development. The Color Palette™ can also be used to measure progress on the Journey to Deep Green™, and describes three types of projects:

- Vanilla projects comply with national codes and standards.

- Green projects surpass compliance but cannot yet be considered to have near-zero environmental impact.
- Deep Green projects have near-zero environmental impact, and are considered to be future-proofed.

The Deep Green vision is expressed by a set of six indicators that encompass four priority opportunities: energy, carbon, materials and water. For further guidance, detailed stepping stones on the Journey to Deep Green™ are defined.



The Skanska Color Palette™

Skanska is taking voluntary action and introducing new business models to overcome the barriers we identify where progress is within our sphere of influence. In areas where the responsibility for progress is beyond the scope of our direct control, we seek partnership with innovative regulators, customers, suppliers and others business partners to catalyse change. Through our engagement with the Green Building Councils we pursue collective industry responses.

The following examples describe projects in which energy efficiency and carbon reduction have been the main focus and voluntary action has been taken to overcome the barriers hampering market transformation.

In the context of Skanska's Journey to Deep Green™, these examples demonstrate how our existing expertise can help develop buildings that move Skanska towards our Deep Green vision.

### Low Carbon Project Examples:


#### A. Energy efficient construction in action

In June 2009, a \$31.6 million project in Lintulahti in Helsinki, Finland, was completed and was the first commercial office project in the country to receive LEED Gold pre-certification during the design phase, which helped Skanska to communicate its ambitions to potential tenants of the building. On completion, the project achieved LEED Platinum certification, the highest level

achievable, and approval by the EU Green Building Programme. The building is expected to consume a third less energy than Finnish building code requirements and features a range of energy-efficient technologies including a remote monitoring system to manage the energy, heating and cooling, water and ventilation systems, facilitating low-energy operation. Each tenant's electricity consumption is individually metered, to raise awareness and encourage further individual energy savings.

Another project Skanska has worked on is Lindhagensterrassen – a multiple occupancy residential property in central Stockholm. In 2009, for demonstration purposes, the house was equipped with roof-mounted solar panels to generate electricity for lighting and electric-vehicle charging stations, and the residents were provided with an electric car.

The initiative is part of a wider cooperation between Skanska Residential Development Nordic and the energy company Fortum, and is known as the Sustainable Urban Living project. This cooperation allows the creation of buildings with a very low or net-zero energy consumption, and encourages those living in them to adopt more energy-efficient lifestyles. It also demonstrates the possibilities created when stakeholders in the building sector, in this case a developer and a utility company, cooperate to develop energy efficient and sustainable solutions for the built environment.



Skanska redesigned and retrofitted the 32nd floor of the Empire State Building.

### B. Retro fitting for low-carbon efficiency

In July 2009, Skanska's redesigned and retrofitted office became the first Platinum Commercial Interior in the Empire State Building. The 32nd-floor energy-efficient office obtains half its energy from renewable sources; it also has efficient cooling and ventilation systems, daylight and space occupancy sensors, and energy-rated appliances. Since Skanska USA took over the lease in 2008, energy use has been cut by 57% (instead of the anticipated 30% reduction) compared with a baseline set using data from previously occupied nearby offices. By retrofitting an iconic skyscraper without having an impact on its façade, Skanska took on a leadership role and demonstrated the opportunities for energy-efficient retrofitting.

In the UK, Kings Mill Hospital is undergoing major redevelopment, while remaining fully operational, to increase clinical efficiency, improve the interior environment and utilise hydrothermal energy from a nearby lake. The redevelopment is part of a \$590 million Private Finance Initiative contract to design, redevelop, finance and operate three Nottinghamshire Hospitals until 2035. The redevelopment project has been rated Excellent by the National Health Service Environmental Assessment Tool, which assesses energy, transport, water, materials,

We believe that while voluntary certification schemes, most effectively developed by industry consensus, are important tools, they alone are not able to produce the required changes in building design, construction and use.

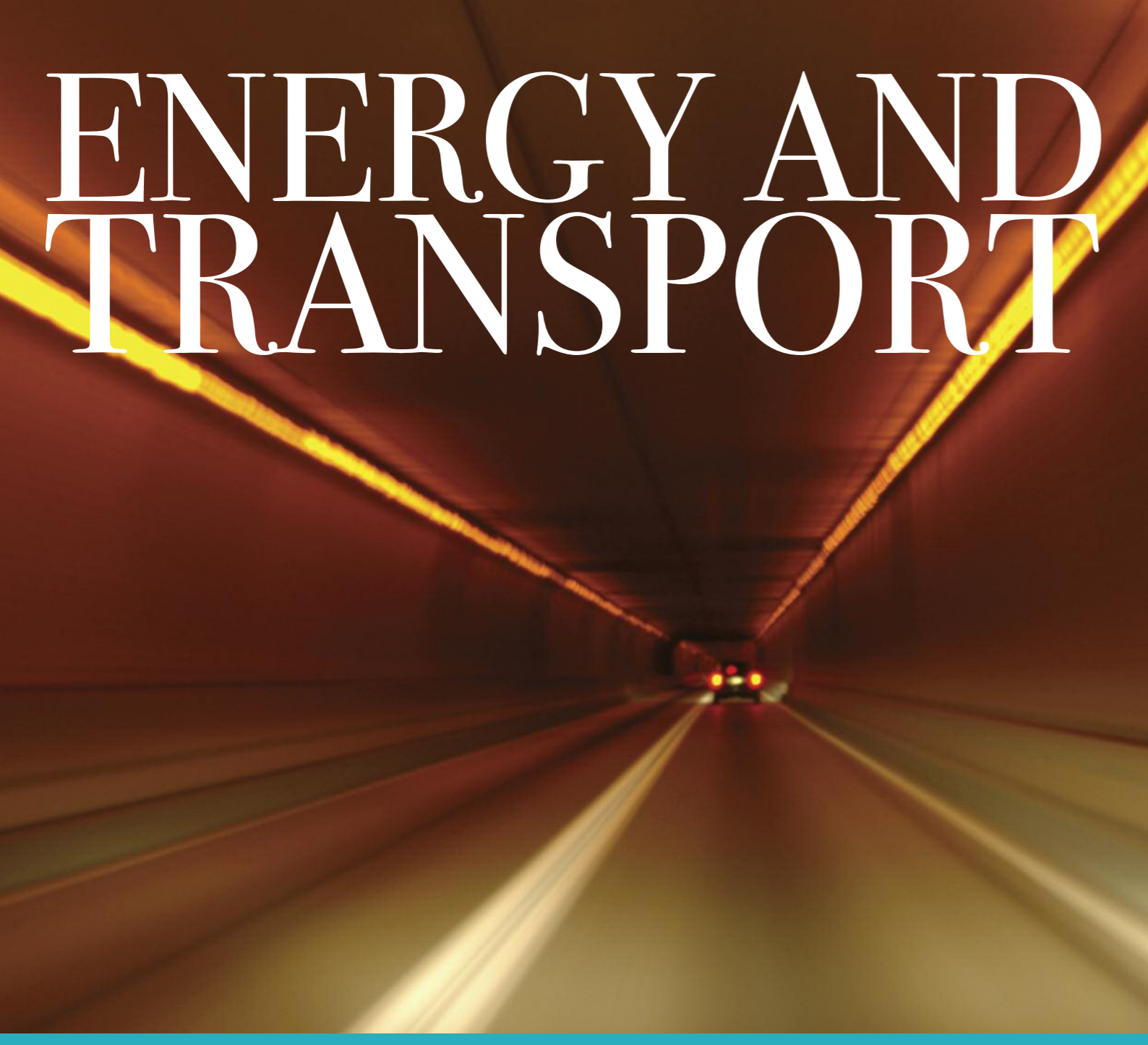
indoor environment and waste criteria. Life-cycle analyses based on long-term financial savings were used to make the case for more energy-efficient and sustainable technologies (e.g. fluorescent lamps, timers, motion detectors and daylight sensors to control the light intensity). The capital cost of the geothermal system is estimated to be repaid within 10 years. Annually, the system is expected to save approximately \$190,000 in energy costs and 1700 tonnes of CO<sub>2</sub>.

In Alingsås, Sweden, Skanska is involved in a \$55 million, five-year project with the local public housing company. The 299 apartments are being renovated to 'passive house' standards in a Swedish Million programme area, which was built to address a housing shortage during the 1970s. The project was developed by Skanska in close cooperation with the client and other partners as it progressed to promote innovation. All major project partners, including the plumbing, electrical and ventilation contractors were involved from the planning stages. It has been estimated that 'passive' houses in Sweden emit 40% less CO<sub>2</sub> throughout their lifetime than the average newly constructed residential building. Although the Brogården renovation project will mean housing costs around 25% more, the

total energy consumption of the refurbished apartments will be over 50% less, enabling occupants to make significant financial savings throughout the life span of the buildings; the installation of individual water and electricity meters will help residents to monitor and control their resource consumption, and increase financial savings.

### Project Outcomes:

As these examples demonstrate, we believe that significant progress can be made now, for new and existing buildings, to reduce energy consumption and carbon emissions cost effectively. Our Journey to Deep Green™ targets actions required to transform the market. By actively mobilising resources and capabilities in Skanska – in partnership with regulators, customers, suppliers and business partners – we intend to play an active part in providing solutions that transform the EU market for energy and carbon-efficient buildings.



# ENERGY AND TRANSPORT

## Company Profiles:

<b>Alstom</b> .....	<b>76-79</b>
<b>EDF Energy</b> .....	<b>80-83</b>
<b>Renault-Nissan</b> .....	<b>84-87</b>
<b>Shell</b> .....	<b>88-91</b>

## Company Profile:

**Business:** Alstom is a world leader in transport and energy infrastructure

**International Presence:** Operational in over 70 countries

**Turnover:** €23 billion (2009/10)

**Employees:** 93,000



**Company Vision:** “To provide the solutions that will meet the world’s future demand for power with a range of technologies that ensure higher efficiency and lower emissions today.”

## Alstom’s climate goals are:

- To achieve a 20% reduction in energy intensity and greenhouse gas emissions by 2015.
- To commit to CO<sub>2</sub>-free and low-carbon technology development, including significantly increasing the share of CO<sub>2</sub>-free technologies in the company’s power generation portfolio and developing carbon capture and storage technologies.
- To achieve the goal of an increase in production efficiency of 50% at Alstom coal plants and 60% at Alstom combined cycle gas plants.

## Alstom’s progress so far:

- The company is already pursuing a policy designed to offset the environmental impact of its sites and projects.
- Alstom is the world’s leading supplier of hydroelectric power equipment and provides a wide range of wind turbines and other clean technology.
- Production efficiency and flexibility for new and existing plants are being maximised across the company. Every percentage point increase in production efficiency has been found to reduce CO<sub>2</sub>

emissions by 2% at a coal plant and 1.5% at a gas plant.

- Carbon capture and storage (CCS) demonstration plants are working as planned, receiving validation at both operational plants.

## Low Carbon Project Examples:

### A. An enlarged portfolio in clean technologies

In 2009–2010, Alstom expanded its activities in clean technologies: tidal energy, wind, biomass, automation, carbon capture and sequestration, concentrated solar power and geothermal. This included the launch of a six-megawatt offshore wind turbine series for production in 2014 and a three-megawatt ‘ECO100’ onshore wind turbine. The company continues to invest in research and development and innovation, with spending in this area almost doubling between 2005 and 2010. (See Figure A.)

### B. CCS development – creating jobs, capturing CO<sub>2</sub>

Alongside its renewable energy development activities, Alstom is carrying out intensive efforts to develop the best available CO<sub>2</sub> capture technology for thermal power plants, focusing specifically on oxy-combustion and post-combustion solutions.

Alstom currently has 12 CO<sub>2</sub>-capture pilot and demonstration plants either in operation or in preparation across Europe and North America. Two of these are already capturing and storing CO<sub>2</sub>.

The first plant – the Mountaineer project in West Virginia, USA – was established in partnership with America Electric Power (AEP) and commenced operations in October 2009. The plant uses Alstom’s Chilled Ammonia post-combustion technology and, at 57 megawatts, is the world’s largest functioning CCS plant on a coal-fired power station. It is designed to capture CO<sub>2</sub> at the rate of 100,000 tonnes a year. The CO<sub>2</sub> is compressed and pumped into saline aquifers beneath the plant property. So far, the CO<sub>2</sub> captured has a purity rate of over 99%.

The second operational plant is the Total Lacq CCS project located at a natural gas facility in France. Coordinated by Total, it is the first CCS project with pipeline transportation and storage in Europe. Alstom performed retrofit works for the 50-year-old 30-megawatt boiler, converting it to oxy-fired combustion operation. The plant, designed to capture and store 60,000 tonnes of CO<sub>2</sub> a year, began capturing CO<sub>2</sub> in July 2009 and storing it in depleted gas fields in the Lacq region in January 2010.

These projects have already created over 200 new posts within the company, and this number is expected to continue to grow over the next few years. Each new job is estimated to create three more in the supply chain. The latest research suggests each industrial-scale CCS plant will support 1300 ongoing jobs across the CCS chain, and the construction of each plant will generate around 40,000 job years.

### C. Low-carbon transport solutions

In 2007, Alstom unveiled the AGV ultra high-speed train concept – the first of its kind to blend three different technologies: articulated carriage architecture, a distributed drive system, and synchronous permanent magnet motors. These combined to set a world record for rail speed on 3 April 2007 of 574.8 kilometres per hour. The trains are made of 98% recyclable or reusable materials and have an energy recoverable braking system, resulting in emissions of only 2.2 grams of CO<sub>2</sub> per passenger kilometre, 13 times less than a bus (30 grams), 50 times less than a car (115 grams) and 70 times less than a plane (153 grams). (See Figure B.)

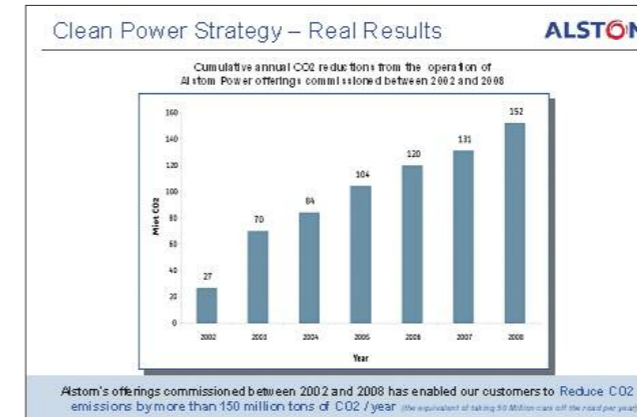


Figure A

### D. Alstom Grid – smarter grids for the future

In June 2010, Alstom acquired AREVA T&D’s transmission business and formed a new sector, ‘Alstom Grid’, alongside its Power and Transport divisions. This will bring all the advantages of Alstom’s expertise in world electrical grids, advanced technologies, renewable integration and network management solutions to contributing to the creation of the smarter grids of the future. Examples of this include smarter solutions for systems to manage distributed generation (such as wind), provide network stability, forecast load and ensure power quality, efficiency and reliability.

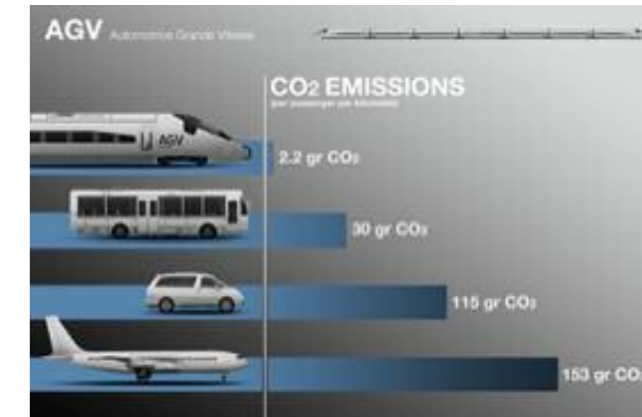


Figure B

### Project Outcomes:

Alstom’s projects demonstrate the way in which business can diversify to meet the demands and needs of a sustainable economy and harness integrated technological solutions to find new ways of working.



# EDF Energy

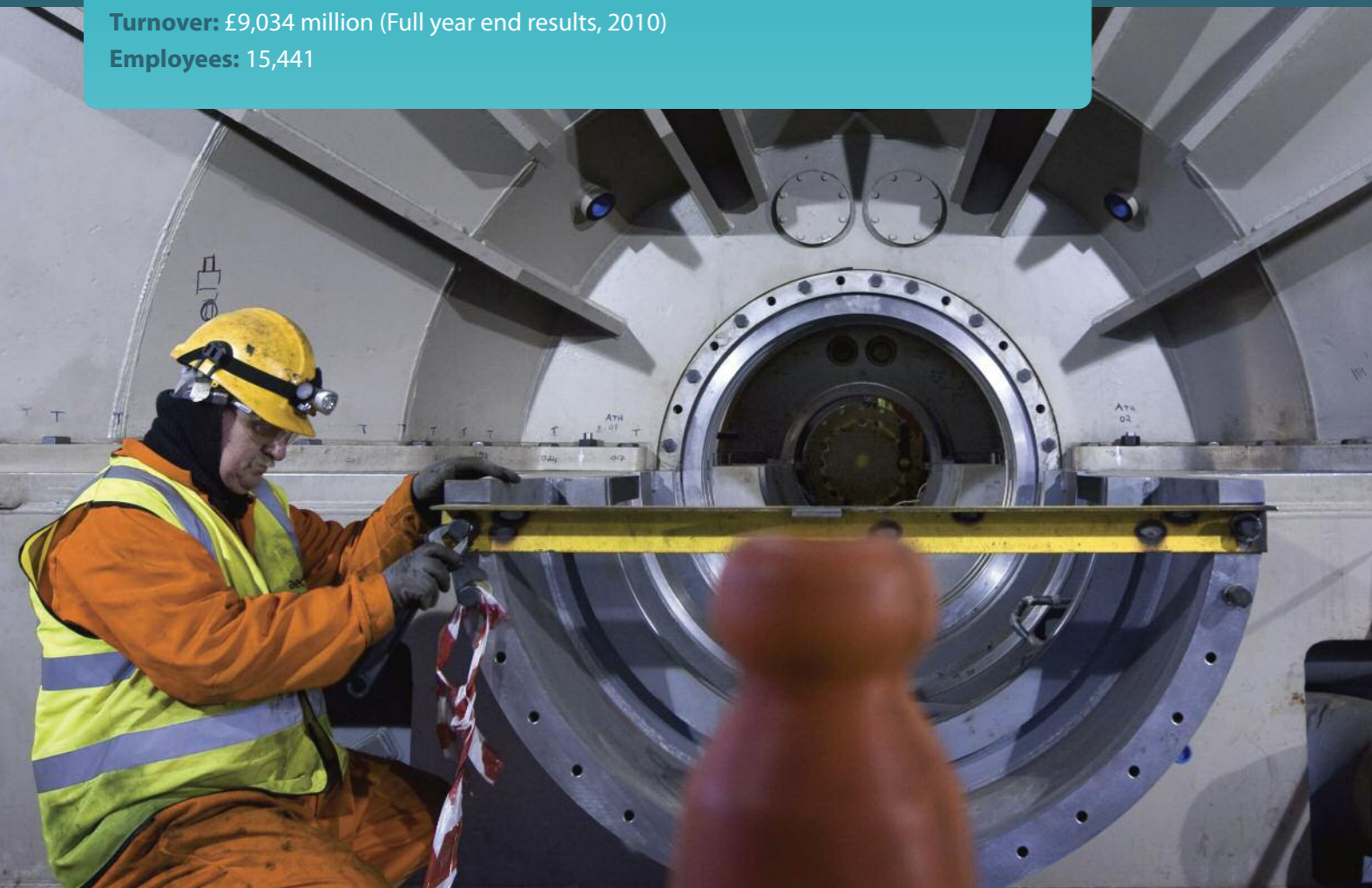
## Company Profile:

**Business:** EDF Energy, a wholly-owned subsidiary of the EDF Group, is one of the UK's largest energy companies and the UK's largest producer of low-carbon electricity

**International Presence:** Operational as EDF Energy in the UK only

**Turnover:** £9,034 million (Full year end results, 2010)

**Employees:** 15,441



**Company Vision:** "To lead the energy change, and bring low-carbon solutions home to everyone."

## EDF Energy's climate goals are:

- To reduce the intensity of CO<sub>2</sub> emissions from EDF Energy's electricity generation to no more than 250 grams per kilowatt hour by 2020 – more than a 60% reduction on our 2006 baseline.
- To cut CO<sub>2</sub> emissions from offices and depots by 30% by 2012, by installing voltage optimisers in buildings, upgrading insulation, introducing SMART metering and introducing energy-efficient cooling in data centres.
- To cut CO<sub>2</sub> emissions from company transport by 20% by 2012, by reviewing the fleet, giving employees defensive driving training to allow them to reduce fuel consumption, and installing speed-limiting technology in vehicles.
- To reduce the volume of waste from energy billing by 30% by 2020, allowing customers to opt out of paper billing.
- To eliminate waste sent to landfill by 2020, from office and depot waste
- To reduce the proportion of CO<sub>2</sub> arising from customers' energy consumption by 15% by 2020.
- To ensure that all employees understand how they can help to achieve the company's Sustainability Commitments, and to participate in 'Team Green Britain'.

## EDF Energy's progress so far:

- EDF Energy is on track to meet its target of reducing the intensity of CO<sub>2</sub> emissions from electricity generation to no more than 250 grams per kilowatt-hour by 2020, a commitment that will see EDF Energy going further than any of its competitors, through a combination of programmes including building new nuclear reactors and increasing the use of renewable and alternative energies. By 2030, EDF Energy anticipates achieving better than 100 grams per kilowatt-hour of carbon intensity in electricity reduction as low-carbon generation replaces high-carbon assets, representing a huge reduction on 2006 levels.
- In EDF Energy's '2009 Sustainability Progress Report', the company stated that it had made good progress in reducing energy consumption in offices and depots thanks to the appointment of an Energy Manager, the installation of voltage optimisation units, and energy audits at the company's sites.
- The company have now completed a five-year £30-million investment programme to improve the efficiency of its coal-fired stations. Modifications to boilers and the replacement of high pressure turbines have been made to improve efficiency. The company will continue to explore ways to improve efficiency and reduce emissions in the future.

As an energy company, EDF Energy believes it has a responsibility to help its customers, the communities it serves, and society to take steps to mitigate the environmental impact of energy usage.

- In 2011, EDF Energy was awarded 'Platinum Plus' status in Business in the Community's Corporate Responsibility Index, along with five Big Tick awards to recognise its leadership in responsible business practice.

### Low Carbon Project Examples:

#### A: Investment in CCGT technology

The Company are constructing a new 3-unit 1,300MW Combine Cycle Gas Turbine (CCGT) power station adjacent to the existing West Burton coal-fired power station which will be operational in early 2012. Serving 1.5 million homes over its 25-year life, it will contribute towards EDF Energy's 2020 ambition to reduce the intensity of its carbon emissions by over 60%. The civil and building works are over 95% complete, with the mechanical equipment and electrical installation over 60% complete; the current workforce of circa 2,000 have worked over 6 million hours to date.

#### B: Helping customers be more sustainable

As an energy company, EDF Energy believes it has a responsibility to help its customers, the communities it serves, and society to take steps to mitigate the environmental impact of energy usage. EDF Energy has a range of projects and schemes in place to help it achieve its goals. In 'Our Sustainability Commitments', EDF Energy committed to

reducing the proportion of CO<sub>2</sub> arising from customers' energy consumption by 15% by 2020. To support this, EDF Energy launched several green products and services. The EcoManager tariff provides consumers with an 'EcoManager' appliance – a wireless appliance controller that gives consumers an indication of the costs, and CO<sub>2</sub> costs, of connected appliances that are switched on or on standby, and also allows connected appliances to be turned on from one location at the touch of a button. An energy efficiency toolkit has also been launched, which provides customers with an individual energy report outlining ways to reduce consumption and information they need to make more informed choices, incentivising green behaviour.

#### C: Engaging communities in tackling climate change

EDF Energy has a number of initiatives designed to engage the communities it works in to help tackle climate change. Green Britain Day, which was launched in association with London 2012 and the Eden Project, is an annual event designed to be a focal point to rally people to take action on a daily basis towards a more sustainable lifestyle, inspired by the important milestone of 2012 and the spirit of the Olympic movement.

Over 800,000 people have now joined 'Team Green Britain'. London 2012 continues to provide great inspiration for change. 'The Pod' website is the online hub of EDF Energy's 'Programme for Greener Schools' – a programme intended to help schools and teachers by providing resources for teaching 'green issues'; it also provides advice to help schools 'go green'. More than 11,000 schools have joined the programme since its launch in September 2008.

#### D: Encouraging staff to play their part

Alongside projects aimed at engaging individuals and communities to live more sustainably, EDF Energy has programmes for its own staff to help them do the same. 'Helping Hands' is a volunteering scheme that allows every member of staff at EDF Energy at least two days' company time each year to support local community and environmental projects, while its 'Ambassador Programme', launched in 2005, gives 'ambassadors' from EDF Energy staff to spend a minimum of two hours a week to promote sustainable activities and initiatives in support of its Sustainability Commitments. EDF Energy is also working hard to encourage all employees to become leaders in sustainability, including using the company's 'Sustainable Steps' e-learning tool.



#### Project Outcomes:

EDF Energy's approach highlights the way in which companies can use their considerable resource power to motivate and engage both communities and staff in playing their part in tackling climate change, and how new products and services geared towards supporting this behavioural change can be a positive enabling factor – and that they are in demand.

# The Renault-Nissan Alliance

## Company Profile:

**Business:** The Renault-Nissan Alliance is the world's third-largest global vehicle manufacturer

**International Presence:** Significant presence in major world markets (USA, Europe, Japan, China, India, Russia)

**Turnover:** €92.7 billion (2009)

**Employees:** 304,834



## Company Vision: "Sustainable Mobility for All" (Renault) "Enriching People's Lives" (Nissan)

### The Renault-Nissan Alliance's climate goals are:

- Nissan set a target to reduce CO<sub>2</sub> emissions from its manufacturing operations by 7% in fiscal 2010 (against the level in fiscal 2005), as measured by CO<sub>2</sub> emissions per global vehicle (total emissions generated globally from Nissan vehicle-manufacturing sites divided by the total production volume of Nissan vehicles).
- Renault's goal is an annual reduction of 1.5% megawatt-hours per vehicle per year from 2009 to 2012. In addition, all potential investments should deliver a 10% energy saving per project.
- To work with suppliers and service providers to optimise the load ratios, transfer modes where appropriate, and reduce CO<sub>2</sub> emissions from the logistics operations.

### Additional goals include:

- To exchange best practices within the Alliance and with suppliers to optimise the packaging of components while eliminating any packaging-related waste.
- To continue to invest in a wide range of new technologies and design improvements, including engine down-sizing, start-stop, hybrids and biofuel-compatible engines to reduce the CO<sub>2</sub> emissions of thermal motor vehicles, and to innovate and introduce new mobility services.

- To revolutionise mobility and urban transport by becoming the leaders in electric vehicles.

### Renault-Nissan Alliance progress so far:

- 2009 saw substantial progress towards the companies' objective to become the global leader in electric vehicles. With the first electric vehicle, the Nissan LEAF, launched in late 2010, the Alliance is investing €4 billion in research, engineering, product development and manufacturing. A further seven electric vehicles have been confirmed for production across the Renault, Nissan and Infiniti brands.
- During 2009, Renault-Nissan confirmed five all-new battery production plants to be built in Japan, France, the USA, the UK and Portugal. When fully operational, these plants will give the Alliance the capacity to produce 500,000 battery units per year.
- In September 2009, the Renault Foundation and ParisTech set up the Institute of Sustainable Mobility to advance progress in sustainable mobility and to encourage research into innovative mobility systems and electric vehicles.
- Renault is developing biofuel technology: 75% of the Renault vehicles sold in Brazil are flex-fuel models that run on either petrol or ethanol produced from the

country's abundant sugarcane industry. More biofuel-compatible vehicles are being developed and launched worldwide, including the Renault Mégane 110 hp 1.6 16V E85.

- Nissan has also been developing motors, batteries and inverters, which are the core technologies of electric-powered vehicles. In 2007, Nissan founded the joint-venture company Automotive Energy Supply Corporation with NEC Corporation and NEC TOKIN Corporation, which manufacture and supply compact lithium-ion batteries.

### Low Carbon Project Examples:

#### A. Developing electric vehicles for mass consumption

The Renault-Nissan Alliance is committed to revolutionising mobility and urban transport by becoming the global leader in electric vehicles. The Alliance has placed the widespread introduction of electric-powered vehicles that produce zero emissions at the centre of its strategy. The companies believe that electric vehicles are the solution to today's CO<sub>2</sub> emission concerns and reliance on petroleum. Technological innovations now make it possible to mass-market electric vehicles at a competitive cost. Not only will the Alliance produce electric vehicles, but it is also investing with partners to produce high-

power, lithium-ion batteries. With a range of 160 kilometres (100 miles), the Alliance's first electric vehicle product meets the needs of 70% of the world's motorists. As 50% of Europeans drive fewer than 20 kilometres a day and 37% drive only 20–60 kilometres a day, electric vehicles are the ideal solution for most trips. The Alliance will invest €4 billion into its electric vehicle programmes for new technologies and optimised vehicle designs during 2008–2012 and will launch up to eight different electric vehicles in five key vehicle segments. The Alliance's assessment is that electric vehicles will represent 10% of the market by 2020, with an expected capacity of 500,000 units from 2014. Launched in December 2010, the Nissan LEAF is a medium-sized hatchback that comfortably seats five adults. Renault will be launching the Fluence in 2011, which is a mid-sized saloon targeted at both private motorists and fleet operators. The Renault Kangoo Express ZE, a light commercial vehicle especially designed for professionals, will also go into production in 2011. The Twizy, a completely new type of urban vehicle in the form of an electric quadracycle, will be introduced in 2012. And the Zoe, a five-seat city car that is ideal for commuting, will also be launched by Renault in 2012. Nissan also plans to launch an electric delivery van and a sporty compact for the Infiniti brand by 2014.

The Renault-Nissan Alliance is committed to revolutionising mobility and urban transport by becoming the global leader in electric vehicles.

#### B. Stepping up lithium-ion battery production

The first battery production began in early 2010 with successive production sites, including in the UK and Portugal, entering production in coordination with the launch of electric vehicles in the different markets. Additionally, battery production has been planned in four countries in key geographical regions. At Nissan's Automotive Energy Supply Association, final tests of a high-power, lithium-ion battery began in July 2009. The new battery will be used in Nissan's electric and hybrid vehicles released in the USA and Japan, and in Alliance electric vehicles in Europe.

#### C. Working in partnership to deliver low-carbon solutions

Introducing an electric vehicle revolution in the marketplace cannot be done by vehicle manufacturers alone. It requires new kinds of partnerships with public authorities and also with energy and service providers. As of June 2010, the Renault-Nissan Alliance has entered into more than 60 partnerships to promote and ensure the successful uptake of electric vehicles in more than 20 countries around the globe. As well as the development of electric vehicles, the reduction of emissions during manufacturing is of central importance. An example of tackling this issue includes Renault's new manufacturing site in Tangier, Morocco, which is due to start up in 2012.

Thanks to a partnership between Renault, the Kingdom of Morocco and Veolia Environnement, CO<sub>2</sub> emissions at the site will be 98% less than at other bodywork-assembly plants.

#### D. Green Shop for Green Management across the supply chain

An example of the Alliance's commitment to reducing emissions from logistics operations, Nissan's Green Shop environmental management programme based on ISO 14001 was first rolled out in Japan, resulting in the certification of 2900 dealership outlets of 178 sales companies. Parts and forklift dealers will also be included by the end of 2010. The Green Shop programme introduces comprehensive CO<sub>2</sub> management measures into the dealerships with a focus on the environmental performance of office buildings.

#### Project Outcomes:

The Renault-Nissan Alliance projects show that a decision to become a global leader in low-carbon technology can create the necessary drive towards rapid innovation. By seizing low-carbon business opportunities and opening up new markets for green growth, the company has positioned itself at the forefront of a sustainable mobility revolution.

## Company Profile:

**Business:** Shell is a global group of energy and petrochemical companies

**International Presence:** Operational in more than 90 countries and territories

**Turnover:** \$368 billion (2010)

**Employees:** Over 97,000



**Company Vision:** “Invest in energy supplies for a growing world population, with the highest regard for communities and the environment.”

## Shell’s climate goals are:

- To produce more natural gas, which can be used to reduce CO<sub>2</sub> emissions from power generation
- To focus on sustainable biofuels to cut CO<sub>2</sub> emissions from road transport fuels
- To progress carbon capture and storage technology
- To implement energy efficiency measures in its own operations
- To develop a range of products and services that help customers use energy more efficiently

## Shell’s progress so far:

- Shell believes the use of more natural gas for power is a critical pillar of a new sustainable energy system. Generating power from natural gas produces 50–70% less CO<sub>2</sub> than a coal-fired plant. Natural gas will account for over half Shell’s total production in 2012.
- Shell believes the most practical, commercially viable way to reduce CO<sub>2</sub>

from transport fuels over the next 20 years will be low-carbon biofuels. In 2010, Shell sold 9.6 billion litres of biofuels in petrol or diesel blends, making the company one of the world’s largest distributors. In 2011, Shell announced a deal with Brazil’s largest producer of ethanol to form the Raízen joint venture. Brazilian sugar-cane ethanol produces around 70% less CO<sub>2</sub> than conventional fuels. Shell also invests in developing advanced biofuels.

- Shell is involved in several demonstration projects to help advance the technologies and understanding of CCS, including the world’s largest, most technically advanced CCS demonstration project in Mongstad, Norway. Rapid deployment of CCS by 2020 could account for 19% of the total CO<sub>2</sub> reductions needed by 2050, according to the International Energy Agency.
- Shell FuelSave – Shell’s most efficient fuel ever – is now available in 10 countries across Europe and Asia. Shell FuelSave can save customers up to one litre of fuel in a 50-litre tank, using a formulation that reduces energy loss in the engine.

## Royal Dutch Shell plc

The companies in which Royal Dutch Shell plc directly and indirectly owns investments are separate entities. In this report the expression “Shell” is used for convenience where references are made to those entities individually or collectively. Likewise, the words “we”, “us” and “our” are also used to refer to Shell companies in general or those who work for them. These expressions are also used where no useful purpose is served by identifying specific companies.

Shell believes the time for action is now. The company focuses its efforts on supplying more natural gas, more biofuels, progressing Carbon Capture and Storage (CCS) technology and implementing energy efficiency measures in its operations.

### Low Carbon Project Examples:

#### A. Focus on a low-carbon energy future

Shell's spending of \$1 billion on research and development in 2010 was the oil industry's largest, according to annual reports. Shell invested in developing advanced fuels and lubricants, as well as technologies to abate carbon dioxide emissions or to capture and store them. Over the past five years, Shell has spent \$2.1 billion on alternative energy, CCS and CO<sub>2</sub> research and development.

#### B: More natural gas

Shell believes cleaner-burning natural gas is essential to meet fast-growing demand for more energy, as the world builds a sustainable energy system. Around a third of the world's CO<sub>2</sub> emissions come from power generation. Greater use of natural gas for power generation, instead of coal, significantly reduces CO<sub>2</sub> emissions.

Over the longer term, combining natural gas with carbon capture and storage could reduce CO<sub>2</sub> emissions by 90% compared to coal. Natural gas is also abundant, with 250 years of supplies at current production rates. Natural gas will account for over half of Shell's total production in 2012.

#### C: Progressing CCS technology

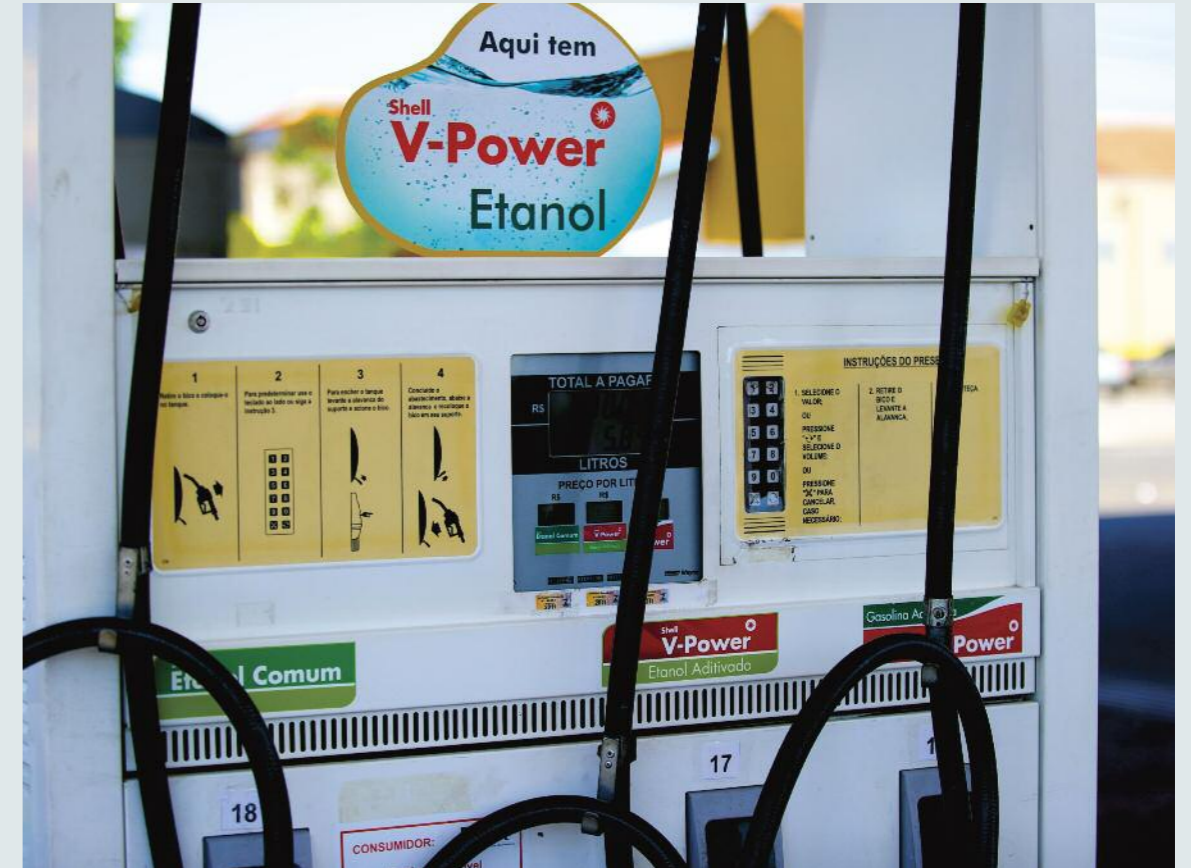
Shell is involved in demonstration projects to advance the range of different CCS technologies. This includes the Mongstad test centre in Norway, demonstrating post combustion capture.

Shell is also involved in plans for full-scale CCS projects. Shell's Gorgon LNG project in Australia will include the world's largest CCS project. It will capture nearly 3.8 million tonnes a year of CO<sub>2</sub> produced with the natural gas, and store it more than 2 kilometres underground.

#### D: Developing biofuels

Transport accounts for around one fifth of CO<sub>2</sub> emissions. Shell believes sustainable biofuels can play an increasingly important role in helping to meet customers' fuel needs and reduce CO<sub>2</sub> emissions.

In 2011, Shell finalised a deal with Cosan – Brazil's largest producer of ethanol – to form the Raízen joint venture. It is Shell's first involvement in producing biofuels on a large scale. Raízen will have the capacity to produce over 2 billion litres of sugarcane ethanol a year, with significant potential to grow.



From cultivation through to use, Brazilian sugarcane ethanol produces around 70% less CO<sub>2</sub> than conventional fuels and offers the best CO<sub>2</sub> abatement of all commercially available biofuels.

#### Project Outcomes

Shell believes the time for action is now. Shell acknowledges there are exciting innovations in the laboratories that may emerge over the next few decades. But with CO<sub>2</sub> emissions building up in the atmosphere, Shell believes what we do today is as important – maybe even more so – than what we're developing for tomorrow.

# MEDIA AND COMMUNICATIONS

ON  
AIR

## Company Profiles:

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# Deutsche Telekom

## Company Profile:

**Business:** Deutsche Telekom AG is one of the world's leading telecommunications and information technology service companies. It has almost 200 million customers and offers a variety of products and services for connected life and work. Deutsche Telekom focuses on major technical and social trends and plays a key role in shaping them: the increasing digitisation of many spheres of life, the personalisation of products and services, and growing mobilisation and internationalisation.

**International Presence:** Deutsche Telekom has an international focus and is represented in approximately 50 countries (including Europe, Asia and America) with half its revenue generated outside of Germany (2009).

**Turnover:** €64.6 billion (2009)

**Employees:** 260,000



**Company Vision:** “We aim to become a global leader in ‘Connected Life and Work’”.

## Deutsche Telekom climate goals are:

Since 1995 Deutsche Telekom has committed itself to reducing CO<sub>2</sub> emissions, and originally aimed to reduce its CO<sub>2</sub> emissions by 20% by 2020 with a 1995 baseline. In the meantime climate change has become a priority for the company. As climate change continues to be recognised as one of the burning issues for business and society, Deutsche Telekom has proactively founded a cross-functional Climate Change Group for the further development of a climate change strategy. Through a holistic approach, company functions such as network infrastructure, data centres, buildings, IT equipment, fleet, and travelling were analysed, and reduction potentials and measures were identified. From this process Deutsche Telekom has set the more ambitious target of CO<sub>2</sub> reductions of 40% by 2020 with a 1995 baseline, and from 2011, this strategy is to be internationalised.

## Low Carbon Project Examples:

### Data Centres

Deutsche Telekom commissioned a data centre 2020 in Munich, which is working as a data centre of the future, using the latest microchip technologies, with variable ceiling heights, temperatures and humidity. This test centre has the potential to show how current data centres could be run more economically and with greater energy efficiency – and therefore with lower CO<sub>2</sub> emissions. One area of considerable potential in data centres is the optimisation of climate control (HVAC – heating, ventilation and air-conditioning), which achieves approximately 30% less energy consumption.

As many customers use the full capacity of data centres only for short periods in the year, T-Systems, the IT unit of Deutsche Telekom, offers virtualisation (data centres as a service) with a reduction in energy consumption of up to 80%. This is an important cost saving for our customers.



### **Dematerialisation**

Dematerialisation is a part of Deutsche Telekom's core business. The reduction of paper consumption is not only interesting from the environmental perspective, but from the economic perspective as well. Related costs are reduced by around 70% (e.g. the purchase of paper, equipment maintenance, archival maintenance), and paper consumption can be reduced by up to 50%.

For example, the product Paper, Pen & Phone developed by T-Systems uses a special pen to record all the characteristics of handwriting via an integrated camera, thereby enabling digital recording and processing of documents written and signed by hand. In order to exploit this savings potential in our own Group as well, Deutsche Telekom launched Paper, Pen & Phone in its approximately 800 Telekom Shops across Germany.

Another example is Managed Document Services. Companies can reduce their consumption of paper and energy by transferring all or part of their processes into a digital workflow. T-Systems provides the entire document management process, from digitising through archiving, to the dispatch of information by e-mail or letter post, or for editing as a web page for the internet, and makes documents available in the archive to

be retrieved electronically by all subsequent work steps. This digital provision saves up to 90% of paper. The carbon emissions for the supply and transport of this saved paper are also reduced accordingly.

### **T-City**

T-City is the joint lab of Deutsche Telekom and the city of Friedrichshafen located on Lake Constance in Germany. Up until 2012 T-City Friedrichshafen will be a showcase for modern information and communication technology, demonstrating how it improves the quality of life and community in the city.

For the first time, citizens, companies, schools, scientists, the medical community and the city administration are collaborating on innovative applications for day-to-day use – in and for the city.

The experience of T-City suggests some valuable benefits for customers: the identification of energy guzzlers and the savings that could be achieved by getting rid of them, the possibility of actively controlling their own personal consumption behaviour, the reduction of energy consumption and costs by being more aware and optimizing energy use, and complete transparency of their personal contribution to climate protection.

A great potential of some 85 million metric tons for reductions in carbon emissions lies in the smart logistics sector. This includes ICT business concepts for helping to reduce emissions caused by traffic.

### **Smart Logistics**

A great potential of some 85 million metric tons for reduction in carbon emissions lies in the smart logistics sector. This includes ICT business concepts for helping to reduce emissions caused by traffic.

T-Systems developed a fleet management system for the Deutsche Telekom Technical Service (DTTS) that reduces the driven distance by 7–8%. All in all, the kilometres travelled are reduced by about 10 million, saving more than 1,300 tons of CO<sub>2</sub> per year.

## Company Profile:

**Business:** SKAI Group is one of the largest media groups in Greece

**International Presence:** SKAI's radio station is a member of the European Radio Network (EURANET)

**Turnover:** 40.9 million (2010)

**Employees:** 450



**Company Vision:** “To bring environmental issues in general and low-carbon information to the forefront of Greek news media and to actively engage the audience in campaigns and activism in addition to setting the topic on the agenda.”

## SKAI's climate goals are:

SKAI Media Group has made the most of its public reputation as “the leading, if not sole, Media Group (and private company) that actively cares about the environment and acts on the issue” (Public Issue Environmental Barometer 2008, 2009 and 2010), through three major forms of action:

- Setting the agenda for public concern about the environment by raising the issue repeatedly.
- Organising, coordinating and executing campaigns that foster environmental volunteerism and activism.
- Sustaining environmental issues on the agenda while providing in-depth analyses and information.

In tangible numbers, during the last four years alone, all of the above have resulted in:

- Planting of 1 million trees throughout Greece alongside campaigns on forest fire prevention and deforestation.
- A total of 29 reforestation campaigns (12 in 2011) with the participation of more than 200,000 volunteers all over the country.
- Recycling a total of 350 tonnes of electric appliances in two consecutive annual campaigns.

- Removing a total of 560 tonnes of waste from seashores and beaches through 15 projects.
- Distributing 50,000 power-saving light bulbs.
- A well planned and executed consistent year-round timetable of campaigns over the past 5 years (and planned for the next two years), including: river pollution within the Athens and Attica metropolitan areas (Kifissos and Asopos Rivers); information and activism observatories to recoup the disastrous forest fires in Parnitha and the greater Olympia region; energy conservation; and reducing water consumption.

## SKAI's progress so far:

As well as the concrete results and engagement of volunteers, SKAI has also influenced behaviour and audience perceptions of public information (SKAI's primary good and service). Between 2007 and 2009 there was a steady annual increase of 4% in the number of people who felt they had sufficient information on environmental issues and low carbon. The increase rose to 5% in this 2010.

SKAI has pursued an extensive in-house recycling programme and employed strong water and energy conservation policies.

### Low Carbon Project Examples:

#### A. Broadcasting information through environmental news

In April 2008, SKAI began broadcasting a daily TV news show called 'Eco News', which was the first green news show in Greece aiming to inform the public about environmental issues. In September 2009, it became a 15-minute feature of the prime-time news programme and has delivered over 140 hours of news and information on the environment and related issues.

#### B. Activism, volunteering and public engagement

SKAI's campaigns go back to the 1990s. One of their main interests is in engaging members of the public as volunteers in clean-up operations, for example, or reforestation activities. In 1994, thousands of volunteers were brought together to plant 50,000 trees after severe storms across Greece flooded areas in Athens and other major cities. In 2007, the Kifissos River, an ecosystem that had become heavily industrialised and polluted, was the subject of another campaign and with the participation of 1,500 volunteers. 1.5 tonnes of waste was collected in 2 weeks. Over 7,000 volunteers have participated in SKAI's clean-up operations on beaches and shores, while from 2008–2009, a total of nine reforestation programmes were

run involving 155,000 volunteers of all ages in planting over 255,000 trees in Attica and other areas of Greece.

#### C. Low carbon campaigns and awareness-raising

SKAI has run a series of campaigns aimed at encouraging behaviour change in the public towards low-carbon ways of living. These focused on energy consumption, recycling and natural resource use. For example, 2008 was marked as a year of energy saving and alternative energy sources. SKAI distributed low-energy light bulbs as part of its information campaign, together with practical and tangible information regarding how much energy is actually saved and how this translates into carbon savings. A total of 50,000 bulbs were given out across 12 Greek cities. SKAI also ran a campaign on water conservation, 'Not a Single Drop Lost', to motivate citizens to save water, and to sign a commitment to do so. A competition to find the best slogan for SKAI's environmental campaigns attracted 25,000 entrants. Awards were given to the top five slogans, and the top 500 were printed in the *Kathimerini* newspaper. Further campaigns on energy conservation and recycling, run between October 2009 and January 2010, resulted in the collection of 32 tonnes of electrical waste



in just two days – a significant amount when considering Greece's general low-recycling status in Europe, with only 47,000 tonnes of electrical appliances being collected during the whole of 2008. This campaign built on the success of the 'Recycling Village' campaign in 2009, where 25,000 people were involved in the free distribution of 50,000 low-energy lightbulbs and the collection of 15,000 books for donation to a local non-governmental organisation. Follow-up research revealed that SKAI viewers scored higher than average in environmental awareness. In 2010, SKAI's campaigning focused on informing and lobbying for the use of alternative energies, as well as joining up with 25 other radio stations in Greece to run a campaign entitled 'We Are Cleaning Greece'.

#### D. Reducing the company footprint

SKAI has pursued an extensive in-house recycling programme and employed strong water and energy conservation policies. The Group also uses state-of-the-art tapeless technology and has an agreement underway with Werbund to provide low-carbon electric power for the station.

#### Project Outcomes:

SKAI, as a media organisation, has identified projects that maximise its potential to create change – through information. Having identified its audiences as the key agents of change, SKAI has focused its resources on leveraging the most impact in terms of creating behavioural shifts through its programmes and campaigns, while also not forgetting to make progress in reducing its own environmental footprint.

# Vodafone

## Company Profile:

**Business:** Vodafone is one of the world's leading mobile telecommunications companies

**International Presence:** Operational in Europe, the Middle East, Africa, Asia Pacific and the United States

**Turnover:** €50.3bn (March 2010)

**Employees:** 84,990 (March 2010)

**Company Vision:** "To deliver products and services to enable consumers and businesses to reduce their environmental impact, to reduce emissions from our operations and to partner with suppliers to develop more efficient network equipment and handsets, while encouraging them to reduce their own emissions."

## Vodafone's climate goals are:

- To reduce emissions from its own operations. Vodafone has an absolute reduction target to reduce CO<sub>2</sub> emissions from operating companies based in countries obligated under the Kyoto Protocol by 50% against a 2006–2007 baseline. Vodafone also plans to set a CO<sub>2</sub> intensity target for Vodafone operating companies based in countries not obligated under the Kyoto Protocol in the 2010–2011 financial year.
- To deliver products and services to enable consumers and businesses to reduce their environmental impact. Vodafone can help businesses and consumers make the transition towards a low-carbon way of life. Machine-to-machine (M2M) can offer significant efficiency improvement in logistics, manufacturing and efficient energy grids. Vodafone has set a target to provide 10 million carbon-reducing M2M connections by March 2013.
- To partner with suppliers to develop more efficient network equipment and handsets while encouraging them to reduce their own energy use and emissions, with a target of developing joint CO<sub>2</sub> reduction strategies covering 50% of Vodafone's

procurement spend, thereby driving carbon reduction throughout the value chain.

## Vodafone's progress so far:

- Vodafone has reduced absolute emissions across 'mature' operating companies based in countries obligated under the Kyoto Protocol by 9%, despite a growing business. This target has been achieved by improving energy efficiency, reducing energy usage, installing more efficient components in all new base stations, replacing less efficient equipment and investing in renewable energy.
- Vodafone has identified that the mobile telecoms industry has the potential to make Europe more sustainable through smart systems (grids, logistics, cities, etc) that reduce carbon emissions while improving lifestyles. The Carbon Connections report demonstrated the potential to save €43 billion a year in energy costs by 2020, as well as reducing CO<sub>2</sub> emissions by 110 tonnes a year across Europe.
- Vodafone now has 354 base stations powered by on-site renewables in 10 markets with 11 pilot sites in emerging markets as part of the Group's green

technology programme. This programme – introduced in October 2008 in cooperation with China Mobile, Vodacom and Indus Towers – aims to reduce diesel consumption in emerging markets and targets technologies that provide a return on investment of less than three years.

### **Low Carbon Project Examples:**

#### **A. Launching a global M2M service platform**

In 2009, Vodafone released the Carbon Connections report, a detailed analysis that quantifies elements of the mobile telecommunications industry's role in tackling climate change. The report identified 13 wireless telecommunications opportunities that together have the potential to reduce greenhouse gas emissions by 113 megatonnes per year, cutting associated energy costs by €43 billion across 25 EU member states in 2020 if fully implemented. To achieve these savings, one billion mobile connections are needed. The report estimates that approximately 85% of these will be M2M connections. M2M is a remote wireless connection that allows for two-way communication of data between machines. For example, M2M can monitor the load capacity of the electricity network, which helps to locate network losses and minimise energy shortages. Collaboration with device manufacturers and systems integrators to develop an integrated service is an important

aspect of efforts to build Vodafone's M2M business. In July 2009, Vodafone launched a global M2M service platform, which aims to meet the expected rise in demand for M2M services around the world as companies increasingly look to improve efficiency through, for example, smart metering, connected fleets and the remote monitoring of equipment. Vodafone has set a target to provide 10 million carbon-reducing M2M connections by March 2013.

#### **B. Business opportunities through smart systems (manufacturing, logistics, grids, cities)**

Vodafone now has several smart-metering and monitoring services projects in the early stages of implementation. For example, Vodafone UK has launched a partnership with British Gas to supply connections for household electricity meters. These will enable families to monitor the energy they use, helping them cut costs and related CO<sub>2</sub> emissions – typically a saving of 5–10%. The connections will allow British Gas to access energy data remotely, eliminating the need for meter readings. Other ongoing projects are aimed at helping business cut fuel costs and CO<sub>2</sub> emissions, reduce fleet size and save time. These projects include centralised and decentralised tracking, loading optimisation, and on-board telematics. Additional areas include traffic management, virtual office technology and e-commerce

Vodafone now has a number of smart-metering and monitoring services projects in the early stages of implementation. For example, Vodafone UK has launched a partnership with British Gas to supply connections for household electricity meters.

applications (e.g. healthcare applications – patient reminders, access to medicine, patient monitoring from home). Through these projects, Vodafone hopes to capitalise on the growing demand and need for its M2M business.

#### **C. Network sharing**

Network sharing also helps to reduce the environmental impacts of networks, as well as relieving pressure on planning authorities owing to fewer site reviews and reducing costs. Vodafone is now conducting network-sharing initiatives in all of its markets and has secured network-sharing agreements for over 75% of new base station sites deployed across the Group in 2009–2010. Most of these are 'passive' sharing agreements through which sites and infrastructure are shared with other operators but not network equipment. More significant energy savings can be achieved through 'active' sharing of network electronics and radio controllers, which was introduced by the company in Spain in 2009–2010.

#### **D. Designing low-carbon base stations**

Building on the Group's green technology programme, in 2009–2010, Vodafone continued working with Huawei, Nokia

Siemens Networks and Alcatel-Lucent to design base stations with lower carbon emissions. In India, for example, Vodafone has partnered with Nokia Siemens Networks to launch two pilot sites that use wind as the primary energy source, with the aim of reducing diesel consumption by up to 80%. Alternating mode technology also helps reduce diesel use by using batteries managed by smart controllers as the main power source. This can reduce diesel consumption by up to 70%. For sites with higher power requirements, batteries can be supplemented with solar and wind power. Vodafone plans to deploy alternating mode technology at more than 500 sites across India in 2010–2011. Its low-energy, 'no-frills' base stations, developed with Huawei, also continue to provide coverage to rural communities in South Africa using solar energy.

#### **Project Outcomes:**

Vodafone's projects show how working in partnership with other stakeholders to identify and develop solutions for sustainability can demonstrate both reductions in its own operational footprint and business opportunities to help other industries to reduce their environmental impact.

# Appendix I

## EU CLG: Vision and Mission

### EU CLG Vision

**The vision of the EU CLG is that, by 2020, the European Union will have:**

- Demonstrated that tackling climate change is the pro-growth option.
- Fully met the targets committed to at the 2007 Spring Summit.
- Adopted and effectively implemented a package of policies to accelerate investment in the development, demonstration and deployment of low-carbon and energy-efficient technologies and practices.
- Adopted and will be effectively implementing policies to address and adapt to the impacts of climate change.
- Played a leadership role in securing and implementing a sufficiently ambitious and comprehensive international agreement to avoid dangerous climate change and to deploy international adaptation strategies.
- Adopted the necessary targets for emission reductions beyond 2020 to ensure Europe becomes a low-carbon economy within the timescale that science suggests is necessary to avoid dangerous climate change.

- Developed a comprehensive climate and energy strategy for delivering the post 2020 emission reduction targets.

### EU CLG Mission

**The mission of the EU CLG is:**

“To communicate the support of business for the EU to move to a low-carbon society and a low climate risk economy, and to work in partnership with the institutions of the EU to secure the policy interventions that are needed to make this a practical reality.”

# Appendix 2

## UK CLG: Vision and Mission

### UK CLG Vision

**The vision of the UK CLG is that, by 2020, the United Kingdom will have:**

- Demonstrated that tackling climate change is the pro-growth option.
- Demonstrated real change on the ground and be delivering the new projects and practices that are needed to create a low climate risk economy.
- Adopted and effectively implemented a package of policies to accelerate investment in the development, demonstration and deployment of low carbon and energy-efficient technologies and practices.
- Fully met its domestic carbon budgets and other greenhouse reduction targets, as adopted under the Climate Change Act 2008, the EU Climate and Energy Package and international treaties.
- Adopted and will be effectively implementing policies to address and adapt the economy, environment and infrastructure to cope with the impacts of climate change.

- Played a leadership role in ensuring the European Union has adopted and effectively implemented a package of policies to ensure it becomes a low climate risk economy within the timescale that science suggests is necessary to avoid dangerous climate change.
- Played a leadership role in securing and implementing a sufficiently ambitious and comprehensive international agreement to avoid dangerous climate change and to deploy international adaptation strategies.
- Developed a comprehensive UK climate and energy strategy for delivering the post 2020 emission reduction targets.

### UK CLG Mission

**The mission of the UK CLG is:**

“To trigger the step change in policy and action needed both to meet the scale of the threat posed by climate change and to grasp the business opportunities created by moving to a low climate risk economy.”

## **About The University of Cambridge Programme for Sustainability Leadership (CPSL):**

CPSL works with business, government and civil society to build the capacity of leaders to address critical global challenges, both environmental and social. Over the past 20 years, CPSL's core work has been in building its now international reputation for running seminars and leadership programmes for those who make or influence decisions with the aim of transforming policies and practices in the public and private sectors and engendering a greater understanding of our interdependence on each other and the natural world.

In recent years, CPSL has expanded its activities to include a focus on policy and business strategy groups for leaders aspiring to drive system change at national and international levels. The Prince of Wales's Corporate Leaders Groups on Climate Change is one of several such well-known business initiatives managed by CPSL, alongside the ClimateWise Insurance Initiative, the P8 Pensions Initiative and the Ecosystems & Natural Capital Leaders Group.

**For more information please see: [www.cpsl.cam.ac.uk](http://www.cpsl.cam.ac.uk)**



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