

# **SUSTAINABILITY REPORT**

ROYAL DUTCH SHELL PLC SUSTAINABILITY REPORT 2011



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## KEY TO SYMBOLS

-  web or email address
-  telephone number

# ABOUT SHELL

**Shell is a global group of energy and petrochemical companies employing 90,000 people in more than 80 countries. Our aim is to help meet the energy needs of society in ways that are economically, environmentally and socially responsible.**

## Upstream

Upstream consists of two organisations, Upstream International and Upstream Americas. Upstream searches for and recovers oil and natural gas, extracts heavy oil from oil sands for conversion into synthetic crudes, liquefies natural gas and produces synthetic oil products using gas-to-liquids technology. It often works in joint ventures, including those with national oil companies. Upstream markets and trades natural gas and electricity in support of its business. Our wind power activities are part of Upstream. Upstream International co-ordinates sustainable development policies and social performance across Shell.

## Downstream

Downstream manufactures, supplies and markets oil products and chemicals worldwide. Our Manufacturing and Supply businesses include refineries, chemical plants and the supply and distribution of feedstocks and products. Marketing sells a range of products including fuels, lubricants, bitumen and liquefied petroleum gas for home, transport and industrial use. Chemicals markets petrochemicals for industrial customers. Downstream trades and ships crude oil, oil products and petrochemicals primarily to optimise feedstock for our manufacturing activities. Downstream also includes our activities in biofuels, and it co-ordinates CO<sub>2</sub> management activities across Shell.

## Projects & Technology

Projects & Technology manages the delivery of Shell's major projects and drives its research and technology development programme. Projects & Technology provides technical services and technology capability to the Upstream and Downstream organisations. It oversees safety and environmental performance and manages contracting and procurement across Shell.

 [www.shell.com/about](http://www.shell.com/about)

## VIDEO INTRODUCTION FROM THE CEO

Watch Peter Voser's introduction to this report online by typing the link below into a web browser. Or use a smartphone with a QR reader app to scan the symbol.

 [www.shell.com/sustainabilityreport](http://www.shell.com/sustainabilityreport)



## INTRODUCTION FROM THE CEO



**“WITH TOUGH ECONOMIC CONDITIONS PREVAILING, AND MOMENTOUS SOCIAL CHANGE TAKING PLACE IN SOME COUNTRIES, THE WORLD MUST NOT LOSE SIGHT OF LONGER-TERM CHALLENGES.”**

Welcome to the Shell Sustainability Report for 2011.

It was a year of continued economic turbulence that once again showed how placing sustainable development at the core of our business decisions is the right approach. This means putting consideration for safety, the environment and communities at the centre of the steps we take to design, build and operate major energy projects. The energy we provide must be produced and delivered in the right way.

Sustainability depends on our ability to build resilience into our plans and operations. We have to make sure Shell remains able to tackle future challenges so that we, in turn, can continue to make a positive contribution to society. We know that doing business responsibly helps us achieve this through greater productivity and by creating benefits for all. We can deliver our projects more effectively, increase production faster, supply our customers with products more efficiently, and create supply chains and jobs for local businesses. It is a situation where everyone wins.

### Global challenges

With tough economic conditions prevailing, and momentous social change taking place in some countries, the world must not lose sight of longer-term challenges.

There are now 7 billion people in the world, and we are on our way to 9 billion by 2050. In the decades to come, major economies will continue to consume energy to grow. In developing countries many people will become wealthier, buying their first television, refrigerator or car. In short, the world will need more energy.

Fossil fuels will still provide the bulk of this energy with, we believe, a greater role to play for cleaner-burning natural gas. Renewable energy, including low-carbon

biofuels for transport, will also increase steadily. But Shell believes we cannot view energy supply and demand in isolation. As the world becomes more crowded, the stresses between the essentials of life – water, food and energy – will become more critical. Energy production needs water, and providing enough water and food to sustain people needs energy. Climate change is likely to intensify the stresses.

These are huge, integrated challenges and there is no time to waste if the world is to tackle them effectively. Yet the relationship between government, business and civil society is struggling to work. To build a sustainable energy system, we need a new level of collaboration and leadership to develop workable policies and solutions. We need vision and action. Major companies like ours can help encourage the global co-operation needed across public and private sectors, and across industries.

At Shell we believe that responsibly delivering cleaner, more reliable and affordable energy is the best contribution we can make today to a more stable world where economies can thrive. To do this we work with others including communities, other companies, governments, consumers and non-governmental organisations. But we know there is much work to do to meet the challenges of building a sustainable energy future.

### Safety and principles

After the *BP Deepwater Horizon* tragedy in 2010, the energy industry rightly came under intense scrutiny. For Shell, safety remains our top priority. Our standards are rigorous. If things do not go as planned we respond swiftly and decisively, and we investigate all incidents to learn and improve our performance.

We prepare thoroughly to prevent incidents. In 2012, we intend to start exploration drilling in waters off Alaska.

We have worked closely with communities, coastguards and regulatory authorities to put the necessary safeguards in place. This collaborative effort has been invaluable.

We believe transparency in our operations helps build trust. In Nigeria, for example, the Shell Petroleum Development Company (SPDC) launched a website in 2011 that enables people to track details of oil spills at its facilities, whether from operations or due to sabotage or theft, and how it deals with them. Nigeria faces many challenges. The best way to address them is a multi-party approach by government, communities, industry and others. SPDC is ready to play a key role in such an approach.

Shell was a founding member of the UN Global Compact and we support its principles in human rights, labour, environment and anti-corruption. We are also a signatory to the Global Compact LEAD, which reinforces the commitment of business to these principles. In this report you can read about our progress in these areas.

Once again I would like to thank the members of the External Review Committee for their valued contributions in producing the Sustainability Report 2011.

I also invite you to send your comments on the report to:

 [sustainabilityreport@shell.com](mailto:sustainabilityreport@shell.com)

**Peter Voser**  
Chief Executive Officer

# OUR APPROACH

## BUILDING A SUSTAINABLE ENERGY FUTURE

**The global energy system is in the early stages of a transformation. Population growth, rising prosperity and rapid urbanisation will put increasing pressure on energy supplies over the next 40 years. More and cleaner energy will be needed from even more sources, against a backdrop of greater economic volatility and growing environmental pressures. During these uncertain times, Shell continues to invest in delivering more energy and helping to build a more sustainable energy future in which cleaner-burning natural gas increasingly replaces coal to generate power.**

The world's 7 billionth person was born in 2011. With five more people born every second, the planet is expected to be home to more than 9 billion by 2050. Asia's rapidly expanding cities will absorb much of this growth, with three in four people living in urban centres, up from two in four today. Many millions of people will rise out of energy poverty. With higher living standards comes rising energy use. Energy demand could double by the middle of the century from its level in 2000.

Supplying this vital extra energy will become increasingly difficult. Conventional energy sources will struggle to keep pace, even with technological advances. With strong government support, renewables could meet up to 30% of the world's energy demand by 2050, compared to 13% today, but getting to that level would require historically unprecedented growth rates for new forms of energy. Shell

analysis shows that fossil fuels and nuclear could meet at least 70% of global energy demand in 2050.

### Energy, water and food

The International Energy Agency (IEA) estimates that the world will need to invest some \$38 trillion in infrastructure to meet projected energy demand to 2035 alone. At the same time, climate change remains a global threat, while countries are facing mounting tensions over fresh-water supplies and food prices.

A path to a more sustainable energy future will need an integrated approach. In 2011, Shell brought together specialists from the energy, water and food industries along with experts from governments and non-governmental organisations. The aim was to better understand the connections between these three essentials to life in the knowledge that climate change will intensify the stresses. Two factors stood out as the strongest levers for tackling these stresses: greenhouse gas regulation and pricing, and more sustainable urban development. For example, designing smarter, energy-efficient cities could help reduce demand for energy and water. Such cities would integrate transport, energy, water and waste systems much more effectively than today's cities.

### What we are doing today

The IEA issued a stark warning in late 2011 that without a bold change of policy direction, the world could lock itself into an insecure, inefficient and high-carbon energy system as early as 2017. It called for governments to introduce stronger measures to drive investment in efficient and low-carbon technologies. Failure to do this would lead to "irreversible and



↑ In the future many more people will live in cities.

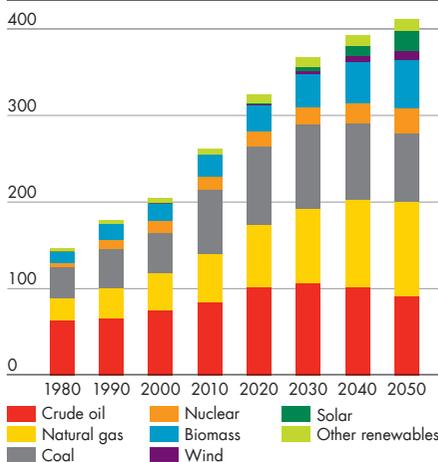
potentially catastrophic climate change", said the IEA.

Shell believes a realistic price on CO<sub>2</sub> emissions is essential to help spur greater energy efficiency and the development of cleaner technologies. But our response to the challenges of energy and climate change is not to wait for government policies or international coalitions to form. We are taking action today.

In all our major investments we consider the potential cost of a project's CO<sub>2</sub> emissions, which we set at \$40 a tonne. We are producing more natural gas, the cleanest-burning and abundant fossil fuel that emits around 50% less CO<sub>2</sub> than coal when used to generate electricity. We are helping to develop carbon capture and storage, which could be significant in reducing global greenhouse gases. Through the Raizen joint venture (Shell interest 50%) we are producing the lowest-carbon biofuel commercially available, ethanol from sugar cane in Brazil. We are also working to improve the energy efficiency of our own operations.

### PROJECTED GLOBAL ENERGY DEMAND TO 2050

million barrels of oil equivalent a day



Source: Shell analysis, January 2012

# SUSTAINABLE DEVELOPMENT AND OUR BUSINESS STRATEGY

**Shell is a global energy company that helps power and sustain people's lives. We work with partners, communities, governments and others to help meet energy demand in economically, environmentally and socially responsible ways. This approach underpins the business decisions we make.**

Sustainable development for Shell means balancing short- and long-term interests in a way that allows us to integrate economic, environmental and social considerations into the business decisions we make. It underpins how we develop and operate our projects and facilities, and the way we manage our supply chains. It helps us to improve the products we offer to customers. We share the benefits of our operations, including helping to develop local economies through supplier contracts and by creating jobs.

Our business strategy focuses on investing steadily to deliver more energy to our customers. We are growing our production for the future by finding and developing additional natural gas and oil resources. Sustainable development is a core part of this strategy. Governments, communities, customers, industry and non-governmental organisations each play a role in building a sustainable energy future. Building strong relationships with all is essential to the way we do business.

Our net capital investment will be around \$30 billion in 2012. Around 80% of this will go to our oil and gas exploration and production projects to bolster energy supplies. As new projects come on-stream over the next six to seven years, we expect our production to rise to 4 million barrels of oil equivalent a day, up 25% from 2011.

As we deliver growth, our business strategy supports our contribution to addressing global CO<sub>2</sub> emissions: supplying more natural gas for electricity generation, helping to develop carbon capture and storage, producing low-carbon biofuel for road transport, and working to improve energy efficiency in our operations (page 7).

The quickest, most affordable way to tackle the challenge of meeting rising energy demand with lower CO<sub>2</sub> emissions is to replace coal with natural gas in power generation. We expect natural gas to

account for more than half of our upstream production in 2012, and to continue to grow in the coming years.

## Technology and innovation

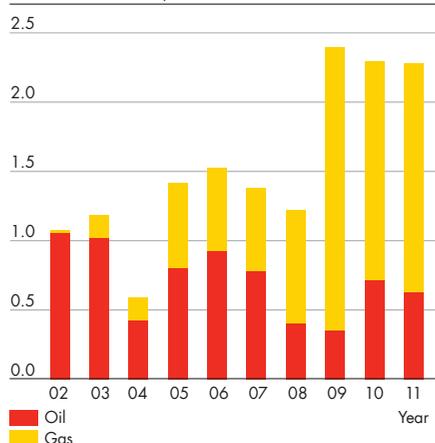
Investing in the research and development (R&D) of advanced technologies continues to be central to our strategy. As we move into more remote locations and develop increasingly challenging resources, innovative technologies will help us deliver energy to our customers. In 2011, we spent \$1.1 billion on R&D, more than any other international oil and gas company. Over the last five years we have spent \$2.3 billion on developing alternative energies, carbon capture and storage, and on other CO<sub>2</sub> R&D. We are also investing in the major Raízen joint venture, our first involvement in the production of low-carbon biofuels.

Our work with other companies and research institutions on advanced biofuels from non-food sources is part of our development of future energy technologies. We also continue to work on finding new ways to improve energy efficiency in our operations through advanced technologies.

[www.shell.com/strategy](http://www.shell.com/strategy)

## SHELL'S EXPLORATION RESOURCE ADDITIONS

billion barrels of oil equivalent



## OUR GOVERNANCE AND STANDARDS

All our employees and contractors, including those at joint ventures we operate, are required to act in accordance with the Shell Health, Safety, Security, Environment and Social Performance (HSSE & SP) Control Framework. This defines standards and accountabilities for HSSE & SP at every level in our organisation. We have comprehensive assurance processes in place to monitor compliance.

The people who manage our projects or facilities are accountable for running their operations responsibly. They do this by working with communities, non-governmental organisations, partners and others to better understand and address the impact of our operations. HSSE & SP specialists, who are located at facilities around the world, are responsible for working with business leaders to help improve our sustainability performance.

Overall accountability for sustainable development within Shell lies with the CEO and Executive Committee. They set priorities and standards in sustainable development that help shape our business activities. The CEO chairs the HSSE & SP Executive, which assesses how we manage our sustainability performance.

The Corporate and Social Responsibility Committee (CSRC) of the Board of Royal Dutch Shell plc reviews policies and performance with respect to the Shell General Business Principles, Code of Conduct, HSSE & SP standards and issues of public concern on behalf of the Board. In addition to regular meetings, members of the CSRC visit facilities to become more familiar with our operations and the views of local people. They also meet with the External Review Committee of the Shell Sustainability Report to hear its views on our approach to sustainability.

[www.shell.com/standards](http://www.shell.com/standards)

## SAFETY

**Safety is critical to our ability to deliver energy responsibly. We develop and operate our projects and facilities with the aim of preventing incidents that may harm our employees and contractors or nearby communities, or cause environmental impact. If incidents do occur, we put well-prepared plans into action immediately to deal with them.**

The public, regulators, our employees and our contractors expect us to deliver energy and products safely and responsibly. Safety remains our top priority, and a core value in the way we operate. Our goal is to have zero fatalities and no incidents that harm our employees, contractors or neighbours, or put our facilities at risk. We continue to improve the safety of the people who work for us (page 30) and our facilities. In 2011, however, we experienced several incidents that

reinforced the need to stay vigilant and to maintain our focus on the safety of our operations.

If an incident does occur, we act swiftly to minimise its impact. We also investigate such incidents to learn lessons that can help us improve our safety performance. In 2011, Shell Nigeria Exploration and Production Company (SNEPCo) experienced a major leak offshore during the loading of an oil tanker. There was also

a large fire at our Singapore refinery and a pipeline leak in the North Sea off the UK. In each case the rapid and effective response of staff, working with local authorities, prevented serious injury and limited impact on the environment (see box).

We manage safety through rigorous processes and by embedding a safety culture in our daily lives. We have a set of standards in place that all our operations must follow. They cover the areas of health, safety, security, environment and social performance (HSSE & SP). Our global standards define the operational controls and physical barriers that we require – for example, in a deep-water well – to prevent incidents. All Shell companies, Shell-operated joint ventures and our contractors must manage safety in line with the Shell Commitment and Policy on HSSE & SP, local laws and the terms of relevant permits and approvals.



↑ Safety drill on a North Sea platform, UK.

### PREVENTING INCIDENTS AND READINESS TO RESPOND

Preventing incidents and managing risks are critical to our business, and to the safety of the communities who live near our operations. We continue to learn from our experience to improve the way we operate our facilities.

Shell takes a twofold approach to potential incidents that could harm our employees and contractors, our neighbours or the environment. We identify and assess risks that could lead to an incident, and take the necessary steps to reduce or eliminate them. At the same time, we prepare for and are ready to respond to an incident in the event that one occurs. We have multiple recovery measures in place to minimise impact on people and the environment. Our staff prepare and practise emergency response actions to incidents such as an oil spill or a fire. To continually improve our approach, we work closely with local emergency response crews and government organisations to regularly test our response plans and procedures.

We responded rapidly and decisively to protect our neighbours and the environment following incidents that occurred in 2011. A major leak during the loading of an oil tanker at the Bonga field off Nigeria was stopped quickly. Almost all the oil evaporated or was dispersed using aircraft and vessels, with no lasting harm to the environment. In Singapore, we worked with local firefighters to extinguish a large fire at our refinery with minimal harm done to people or the environment. We thoroughly investigate all incidents to learn from their causes, and how we responded, to improve our safety performance.

Everyone working for us, and joint ventures we operate, must follow our safety rules, intervene in unsafe situations, and respect our neighbours and the environment. Our continuing safety awareness programmes reinforce this approach. On our annual global Safety Day, employees and contractors take part in activities to raise their understanding of safety risks and how to manage them. We also encourage companies we contract with and joint ventures we do not control to embed a safety culture in their workforce.

Our safety record has significantly improved since the introduction of our mandatory 12 Life-Saving Rules in 2009. These focus on the highest risk areas in our daily activities, including working safely at heights and not speeding while driving. All employees and contractors who work for us must follow them. Road safety (page 27) is one area where these rules have helped improve our performance.

We design, operate, inspect and maintain our equipment with safety as the top priority. The people who run our facilities are responsible for ensuring the safety and reliability of our operations. Shell has invested \$6 billion in a programme to improve the safety of our oil and gas production facilities since 2006. In 2011 alone we invested \$1 billion in the safety and reliability of our refineries, chemical plants and distribution facilities.

➤ [www.shell.com/safety](http://www.shell.com/safety)

## COMMUNITIES

**Our operations can create jobs in nearby communities and help develop local economies through supply chains. We recognise that our operations can also raise concerns. We work with our neighbours to address these concerns and share the benefits of our activities.**

We aim to have a positive effect in the communities where we operate. We do this by working closely with our neighbours to create jobs and business opportunities, and develop community programmes. We also work to incorporate local views more effectively into our projects and decision-making. The outcome of these efforts is what we call our social performance.

Shell has global operating standards and mandatory requirements for how we work with communities our operations might affect. They provide a framework for how we work to reduce our impacts. This includes helping to conserve the traditional way of life of indigenous peoples, and guidelines on how to avoid the involuntary resettlement of communities.

All our major projects and facilities are required to have a social performance plan to help assess and minimise impacts. When we develop new projects, or plan an expansion to an existing facility, we work closely with local communities to identify mutually beneficial approaches and respond to their needs and expectations. This improves the way we make decisions and how we operate.

We continue to build the skills of our staff who work directly with communities. In 2011, we issued a social performance handbook that provides practical tools and guidance to help our specialists. An exchange programme allows these specialists to learn from each others' experiences.

We share and discuss our business plans through community meetings and advisory panels consisting of local representatives. Our work towards the decommissioning of our Brent platforms in the North Sea, off the UK, is one example of this close collaboration (page 16). The steps we are taking to recycle water at our gas project in Groundbirch, Canada, is another (page 13).

### Sharing benefits

Being part of the communities in which we work means sharing benefits. We hire and buy services and products locally wherever possible. We spent around \$12 billion in 2011 on goods and services from companies in countries with lower incomes.

In addition to our 90,000 employees, more than 400,000 contractor staff around the

world work for our company. We recruit and train local people. While this can be a government requirement that allows us to operate, we also do so voluntarily. In 2011, more than 90% of our employees were nationals.

To help local suppliers compete for contracts, we provide training in our global tendering and contract management process. We introduce local suppliers to global suppliers, helping both parties develop new business opportunities. In 2011, for example, Shell sponsored a joint Nigeria-China supplier forum in Nigeria, and held similar events in China, India and Mexico.

### Investing in communities

We invest in community programmes in which our expertise can provide a positive, lasting impact. We focus our social investments on projects linked to road safety, local enterprise development, and securing safe and reliable access to energy for the communities around us. For example, we work hard to reduce road incidents through road safety awareness programmes (page 27). Programmes such as Shell LiveWIRE encourage the development of local enterprises by offering business advice to young entrepreneurs. Through our support for the Global Alliance for Clean Cookstoves – a coalition of public and private organisations including the independent charity Shell Foundation – we help provide access to a cleaner and safer way of cooking to communities in developing countries. Shell is contributing \$6 million over three years to the work of the Global Alliance.

We work with communities, local governments, development agencies and non-governmental organisations to create community projects that can thrive beyond our financial support. In many cases, we ask communities to help decide how to invest the funds, and they share the responsibility for developing and putting programmes into practice. At the Salym operation (Shell interest 50%) in Russia, an advisory panel of representatives from local community, government and business decides on the use of funds to improve education, health care and infrastructure in the area. Supplying a local hospital with essential equipment, making schools accessible to handicapped children and building a new nursery school are some examples of projects the panel has decided to develop.

↓ *Local business development through Shell LiveWIRE, Port Harcourt, Nigeria.*



## CLIMATE CHANGE

**With the global population growing rapidly, and wealth in developing countries rising, long-term demand for energy is increasing. At the same time, CO<sub>2</sub> emissions must be significantly reduced to avoid serious climate change. Shell is helping to meet this challenge by doing what we can today. We are producing more cleaner-burning natural gas, helping to develop technologies to capture and store CO<sub>2</sub>, producing low-carbon biofuel and working to improve our own energy efficiency. We also support moves towards a strong, global policy framework to manage CO<sub>2</sub> emissions.**

All energy sources will be needed to meet future demand. This includes nuclear power and renewables, such as wind and solar. But even with government support, it will take time for renewable energy technologies to become available on a large scale.

In 2050, fossil fuels could still meet at least 65% of energy demand, according to Shell analysis. The agreement to move towards a legally binding, global agreement on reducing CO<sub>2</sub> emissions at the UN climate change conference in Durban in 2011 was a step forward. But it will not take effect for some years to come, and the world needs action now from governments, industry and consumers.

Our approach to helping to tackle global CO<sub>2</sub> emissions focuses on four main areas: producing more natural gas, helping to develop carbon capture and storage, producing low-carbon biofuel and working to improve energy efficiency in our operations. We also have a comprehensive governance structure in place that oversees all our CO<sub>2</sub>-related activities, including the research and development of technologies that increase efficiency and help reduce CO<sub>2</sub> emissions.

### Natural gas

One-third of CO<sub>2</sub> emissions from the total energy system come from the generation of electricity. Replacing coal with cleaner-burning natural gas in a power plant can cut its CO<sub>2</sub> emissions by around half. For many countries, increasing the use of natural gas for electricity generation is the fastest and most affordable way to meet the challenge of delivering more energy with lower CO<sub>2</sub> emissions.

We supply natural gas to more countries than any other energy company and in 2012 we expect to produce more gas than oil (page 12).

### Carbon capture and storage

We are helping to advance carbon capture and storage (CCS) technologies through support for a number of projects around the world (page 7). Adding CCS to major industrial plants would significantly cut global CO<sub>2</sub> emissions.

### Biofuels

As global population grows, the number of cars on the road will continue to rise. All lower-carbon fuel options will be needed to meet demand, while limiting CO<sub>2</sub> emissions. Blending petrol and diesel with sustainable biofuels helps reduce CO<sub>2</sub> emissions from transport fuel.

In 2011, we launched the Raízen joint venture to produce the lowest-carbon biofuel commercially available, ethanol from sugar cane in Brazil. We are also working to make biofuels more sustainable and develop advanced biofuels from non-food sources (page 25).

### Energy efficiency

We are working to improve the energy efficiency of our operations. These include our oil and gas production projects, oil refineries and chemical plants (see box).

We also offer products and services to help our customers use less energy, including advanced fuels and lubricants (page 26).

### Putting a price on carbon

Government policies have an important role to play in how society responds to the threat of climate change. Governments and industry need to work together to develop these policies. We believe market-based mechanisms are the most effective approach and that governments need to create frameworks that put a price on CO<sub>2</sub>, such as cap-and-trade systems. This will encourage the use of all technologies to reduce CO<sub>2</sub>, starting with those that are the quickest and least costly to implement.



↑ CO<sub>2</sub> from the Scotford Upgrader in Alberta, Canada, will go to our proposed Quest CCS project.

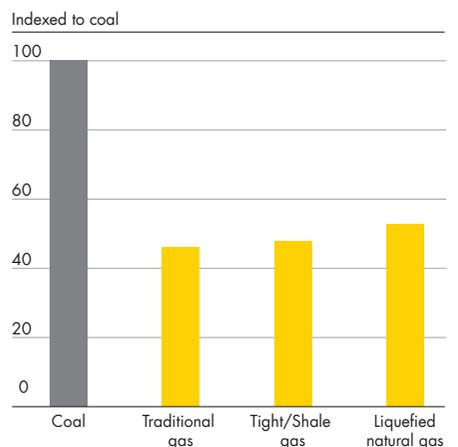
### Adaptation

In our own operations, we are working to understand the potential physical impacts of climate change in the future on facilities and new projects.

### Life-cycle emissions

As our business grows and production becomes more energy intensive, we expect the direct greenhouse gas (GHG) emissions from facilities we operate to rise in the coming years. But the lower-CO<sub>2</sub> impact of the increasing amounts of natural gas and low-carbon biofuel we expect to deliver can contribute to the global effort to tackle climate change, as the life-cycle emissions of these fuels are lower than their alternatives. From production through to use in generating electricity, natural gas produces significantly lower CO<sub>2</sub> emissions than coal. This applies across a range of production, processing and transport methods (see chart, below).

### GHG EMISSIONS FROM SOURCE TO POWER GENERATION



Source: U.S. Department of Energy, National Energy Technology Laboratory, October 2011



↑ Regular checks help maintain equipment at our Deer Park refinery in Texas, USA.

## ENERGY EFFICIENCY IN OUR OPERATIONS

We work continuously to improve the efficiency of our own operations, both to help reduce CO<sub>2</sub> emissions and to be more cost competitive. Since 2005, we have followed a multi-billion dollar programme to increase the energy efficiency of our existing operations. We design new projects from the start to use energy efficiently.

We continue to work on improving energy efficiency at our refineries and chemical plants through a CO<sub>2</sub> and energy management (CEM) programme. One of the programme's goals is to recover and reuse heat where possible. For instance, at a number of our refineries, such as Martinez in the USA, we have installed equipment that can recover heat that would otherwise be lost to the atmosphere.

Another goal of the CEM programme is to install more efficient equipment to improve process operations. For example, at our Rhineland refinery complex in Germany we made changes to furnaces to improve energy use and reduce emissions.

The CEM programme uses a sophisticated software tool that conveys real-time information to plant control rooms on how efficiently production units are operating. Plant operators can then make adjustments to optimise energy efficiency.

We also focus on improving the energy efficiency of our oil and gas production facilities. This includes making changes to operations at our older sites. At Waterton in Canada we invested nearly C\$2 million to improve the energy efficiency of our 50-year-old gas processing site. The processing units were not running efficiently due to a lack of gas from ageing fields to feed the plant. We arranged a supply of more gas from a third party, which significantly increased the flow of gas through the plant and helped improve energy efficiency by 30%.

## CARBON CAPTURE AND STORAGE

Given that much of the world's rising energy demand will continue to be met by fossil fuels, carbon capture and storage (CCS) could play a significant role in reducing CO<sub>2</sub> emissions. CCS can capture CO<sub>2</sub> emissions from power plants and industrial processes and store them deep underground. According to the International Energy Agency, CCS could reduce global CO<sub>2</sub> emissions by 19% by 2050 – as long as it moves rapidly from the demonstration phase to widespread use.

There are challenges to the progress of CCS. Plans to store carbon deep underground onshore have faced opposition from local communities. Efforts are under way to develop CCS projects offshore. But government funding is needed to move CCS from demonstration to wider use by industry because CCS projects generate no revenue for companies.

While the technologies needed for CCS have been used safely for many decades, further work is under way to combine and advance them for use on a commercial scale. We are involved in a number of projects including Gorgon (Shell interest 25%), a liquefied natural gas (LNG) venture off Western Australia that will include the largest CCS project in the world. Once Gorgon is in operation, it is expected to capture and store underground 3 to 4 million tonnes a year of CO<sub>2</sub>. In Canada, our Quest project, if it goes ahead, has the potential to store over 1 million tonnes of CO<sub>2</sub> a year (page 23).

In Norway, we are involved with partners in the largest planned demonstration facility to develop and test CO<sub>2</sub> capture technology. The centre in Mongstad is expected to start operating in 2012. We continue to consider new CCS demonstration projects. For example, we are involved in a possible project in the UK to store CO<sub>2</sub> in a depleted gas reservoir in the North Sea.

www.shell.com/ccs

## ENVIRONMENT

**We are working to minimise the environmental impact of our operations. Local communities and experts from leading environmental organisations help us better understand the challenges we face in developing major projects. This helps us improve the way we operate.**

Population growth and rising living standards are driving energy demand, contributing to increased environmental stresses. We are sharpening our efforts to reduce the potential impact of our operations on the environment. This approach becomes even more crucial as the search for oil and gas to meet demand takes us to more environmentally sensitive areas.

Our early project plans and decisions include measures to protect the environment. We work to manage CO<sub>2</sub> emissions, use less energy and water, prevent spills, flare less gas produced with oil, and conserve biodiversity.



**Josef  
Tumbrinck**

*Chairman of Naturschutzbund (NABU) NRW (Conservation Association North Rhine Westphalia), Düsseldorf, Germany*

/// The co-operation between Shell's Rhineland refinery and our organisation has been exemplary throughout an entire project to lay a pipeline. Openness and co-operation played a major role during the planning of the pipeline between the two refinery sites, from the beginning. Our questions and suggestions were always well received and we felt we were dealt with in an honest way. Our proposed changes were taken seriously. After discussions with us and other environmental associations, Shell modified its plans significantly in the interests of conserving biodiversity. At the same time, the project has strengthened the local economy. Together, we achieved a great deal. Such a level of co-operation should serve as a benchmark for other industrial projects in this region. ///

We are striving to improve our energy efficiency. We are also helping to develop a capability in capturing CO<sub>2</sub> emissions and storing them deep underground. We continue working to reduce continuous flaring in our operations. Flaring is sometimes needed to keep operations safe, especially when projects start production, but we are working to reduce this operational flaring.

Spills can harm the environment and put our employees and neighbouring communities at risk. We work to reduce spills through rigorous controls and standards, and by making sure our facilities are well designed, safely operated and regularly maintained.

As water resources become more constrained due to growing populations, the way major industries manage their use of fresh water is becoming more important. We use new technologies and recycling processes to reduce our dependence on fresh water. In water-scarce areas, our operations have water management plans that set out how we monitor and reduce water use.

Protecting the diversity of the natural world is crucial when we consider new projects or expansions to our existing facilities. We carry out biodiversity assessments when we plan projects to measure the potential impact of our operations. We work with local communities and environmental organisations to develop action plans to avoid this impact if possible, or to minimise it (see opinion, left). By the end of 2011, we had nine of these action plans in place and we are developing plans in Australia, Iraq, Nigeria and South Africa.

### Collaborating with others

We work closely with leading environmental organisations including the International Union for Conservation of Nature (IUCN), Wetlands International, The Nature Conservancy and Earthwatch. These partnerships help us identify and manage environmental challenges, as well as opportunities to make improvements, early



↑ Learning about biodiversity at the Earthwatch Business Skills for World Heritage Programme in Kenya.

in the design of projects by giving us access to expertise and practical advice.

In 2011, we worked on more than 35 projects with these organisations. For example, with Wetlands International we have developed a software tool that could help our engineers minimise impacts on sensitive wetlands. With IUCN, we are working on a joint-industry initiative to understand the cumulative effects of more development on the Arctic region and identify responsible ways to operate, with special focus on the welfare of local communities and the environment.

We continued to work with Earthwatch to develop the management skills at UNESCO World Heritage Site staff, who partner with mentors from Shell. With The Nature Conservancy, we researched techniques to install artificial oyster reefs in the Gulf of Mexico in the USA. These reefs encourage the growth of oysters, which serve as natural water filters and help control coastal erosion.

🖱 [www.shell.com/environment](http://www.shell.com/environment)

## LIVING BY OUR PRINCIPLES

**Our principles govern the way we run our business. They guide our policies and processes and how we work with others. We aim to be a good neighbour to the communities close to our projects and facilities.**

### Shell General Business Principles

Shell was one of the first companies to publish business principles, 35 years ago. They set the standards for how we should behave when conducting business. Today these principles include a commitment on sustainable development, which for Shell means how to do business in economically, socially and environmentally responsible ways. All Shell employees and contractors, and those at joint ventures we operate, are expected to comply with our business principles. In joint ventures we do not control, we encourage our partners to adopt and apply principles consistent with our own. Mechanisms are in place to make sure that employees are aware of the principles and act in accordance with them. There are confidential channels for reporting breaches.

Our Code of Conduct describes in detail how employees and contractors must behave in line with our business principles. It covers areas such as fighting corrupt practices, national and international trade, and safeguarding information and assets. All staff must complete training in our Code of Conduct.

Our people and their well-being are important to our ability to deliver energy to our customers. Shell aims to be a supportive and inclusive company, with a culture that embraces diversity.

[www.shell.com/values](http://www.shell.com/values)

↓ *Our people and their well-being are important to our ability to deliver energy responsibly.*



### Anti-bribery and corruption

Fighting bribery and corruption is an essential part of living by our core values. We have procedures and training in place that provide guidance on areas such as hiring third parties, working with government officials, political activity and payments, as well as insider dealing and money laundering. Anyone working for Shell who does not comply with anti-bribery laws faces disciplinary action, up to and including dismissal or termination of their contract.

### Antitrust

We expect our employees and contractors to comply with antitrust laws and compete fairly and ethically at all times. In 2011, we continued to train employees to be aware of the risks that can arise in this area. Anyone working for Shell who fails to comply with antitrust laws faces disciplinary action, up to and including dismissal or termination of their contract.

[www.shell.com/integrity](http://www.shell.com/integrity)

### Human rights

Our business principles require our employees and contractors to respect the human rights of other employees and the communities where we work. We reinforce our approach by incorporating human rights in our Code of Conduct. In 2011, we also drew up a series of principles for suppliers that include requirements to respect human rights (page 21).



*Executive Director of the Institute for Human Rights and Business, London, UK*

/// In 2011, the UN adopted by consensus the Guiding Principles on Business and Human Rights, putting into practice a framework of 'protect, respect, remedy'. This is a historic achievement and while governments retain the fundamental duty to protect rights, it is now clear that all companies are expected to make respecting human rights a reality in their day-to-day practice. Companies such as Shell should lead by example: undertaking the due diligence steps set out in the Guiding Principles to avoid negative human rights impacts and to seek effective remedies when grievances occur. ///

We are focusing on due diligence and access to remedy, which are concepts in the UN Guiding Principles on Business and Human Rights. We have been reviewing our existing processes and practices, and building on them with these principles in mind to provide our neighbours with a more effective way to lodge concerns about our operations.

In 2011, we started new community grievance pilot projects, based on the UN principles. What we learn from these pilots will guide our efforts to put new grievance mechanisms in place, or improve existing programmes, at our major projects and facilities in the future. This work builds on our experience of working with Professor John Ruggie, the former UN special representative on business and human rights, in piloting community grievance mechanisms at the Sakhalin 2 project in Russia.

We support the Voluntary Principles on Security and Human Rights (VPSHR), which cover how to keep employees, contractors and facilities safe in a way that respects human rights and the security of local communities. In 2011, we continued work to incorporate these principles into all our security contracts.

[www.shell.com/humanrights](http://www.shell.com/humanrights)

# OUR ACTIVITIES

## SUSTAINABLE DEVELOPMENT IN ACTION

**We carefully consider the views of our neighbours when planning and making business decisions. Incorporating these views helps us to develop projects responsibly and deliver the energy that economies need to thrive.**

Through experience we have learned that working with communities where we operate helps us to share greater benefits from our projects. It also makes good business sense. By incorporating the views of our neighbours early into project planning, we can design and deliver projects more effectively and avoid delays. Early engagement with communities helps us to prevent disruptions to livelihoods and commerce, and to reduce impact on local wildlife and biodiversity.

As well as communities, we work with governments, environmental experts and non-governmental organisations to design and deliver better projects. Adjusting pipeline routes or the timing of

seismic surveys to minimise disturbance to communities or wildlife are examples of how early engagement with our neighbours has improved our approach.

When we develop a new project, or an expansion to an existing facility, we follow a defined process that helps us to identify and address potential impacts on people and the environment. There are key decision points at which we determine whether to move forward, or not. At each of these points we assess the regulatory, environmental and social impacts, alongside commercial and technical considerations. The process includes conducting environment, social and health impact assessments to understand

and manage risks and opportunities. As we make investment decisions, we also consider the potential cost of a project's CO<sub>2</sub> emissions.

We thoroughly consider and adopt the recommendations from these impact assessments throughout the lifetime of the project. We often make these assessments public.

In particularly complex projects or operations, we have social and environmental specialists who integrate these aspects into development plans and decisions. Following the successful use of this approach in North America, we are increasingly employing these specialists worldwide.

 [www.shell.com/sd](http://www.shell.com/sd)

### BEFORE A PROJECT

In Greenland, we are in the early stages of investigating the potential for oil exploration in Baffin Bay. We are working to integrate scientific expertise and local knowledge into the design of a possible exploration project. For example, we are collecting information on marine mammals with local observers to better understand the wildlife in the area to help us minimise

potential impact. We have begun consultations with the local community. In 2011, we held a series of public meetings and met with community leaders to discuss the benefits and impacts of the project. According to the U.S. Geological Survey, Baffin Bay holds an estimated 17 billion barrels of oil equivalent.

### DURING A PROJECT

Our existing operations stay safe and efficient through regular maintenance and improvements. For example, the Rhineland refinery complex in Germany needs to transfer products between two sites several kilometres apart and separated by the Rhine river. We are building a new pipeline beneath the river to connect the sites. This will improve the efficiency of operations,

including the movement of products from one site to another. We worked closely with community members, local authorities and non-governmental organisations to route the pipeline to avoid an area rich in biodiversity (see opinion, page 8). Construction is designed not to disrupt farming in the area and is expected to be completed in 2013.

### AS A PROJECT ENDS

Preparing for when oil revenues end involves working with communities to help provide new jobs and sources of income. For over 40 years, people in Gamba, 700 km from Gabon's capital Libreville, have come to depend on Shell operations for transport, employment and business opportunities. But as production declines, we are developing energy resources in another part of Gabon.

The Gabon government, development agency Deutsche Gesellschaft für Internationale Zusammenarbeit and Shell are working together to encourage enterprise to sustain Gamba's economy. In line with our agreement with the government, we have contracted the building of a much-needed road – the first to connect the area with the capital – to help the growth of new businesses.

# KEY PROJECTS



KEY PROJECTS – POST FINAL INVESTMENT DECISION							
Start-up	Project	Country	Shell interest (%)	Peak production 100% (kboe/d)[A]	LNG 100% capacity (mtpa)[B]	Category	Shell operated
2012–2013	Amal Steam	Oman	34	20		Heavy oil/EOR[C]	
	AOSP Debottlenecking	Canada	60	10		Heavy oil/EOR	●
	Bab Thamama G and Bab Habshan-2	United Arab Emirates	9.5	80		Traditional oil and gas	
	BC-10 Phase 2	Brazil	50	35		Deep water	●
	Eagle Ford	USA	100	45		Tight/shale oil and gas	●
	Gumusut-Kakap	Malaysia	33	135		Deep water	●
	Harweel	Oman	34	40		Heavy oil/EOR	
	Kashagan Phase 1	Kazakhstan	17	300		Traditional oil and gas	
	Majnoon FCP	Iraq	45	>30[D]		Traditional oil and gas	●
	North American Tight Gas	USA/Canada	Various	~125[E]		Tight/shale oil and gas	●
	North Rankin 2	Australia	21	280		Integrated gas	
	Port Arthur Refinery Expansion	USA	50			Refining/Chemicals	●
	SAS	United Arab Emirates	9.5	115		Traditional oil and gas	
2014–2015	Bonga North West	Nigeria	55	45		Deep water	●
	Cardamom	USA	100	50		Deep water	●
	Corrib	Ireland	45	45		Traditional oil and gas	●
	Gorgon LNG T1-3	Australia	25	440	15	Integrated gas	
	Mars B, W. Boreas & S. Deimos	USA	72	100		Deep water	●
	Sabah Gas Kebabangan (KBB)	Malaysia	30	130		Deep water	
2016+	Clair Phase 2	UK	28	120		Traditional oil and gas	
	Greater Western Flank Phase 1	Australia	21	110		Integrated gas	
	Prelude FLNG	Australia	67.5	110	3.6[F]	Integrated gas	●
	Schiehallion Redevelopment	UK	36	130		Traditional oil and gas	
	Wheatstone LNG	Australia	6.4	260	8.9	Integrated gas	

[A] Thousand barrels of oil equivalent a day.

[B] Million tonnes per annum.

[C] Enhanced oil recovery.

[D] Shell entitlement at \$80 per barrel of oil.

[E] Shell share (subject to investment pace).

[F] Not including 1.7 mtpa natural gas liquids.

## DELIVERING ENERGY RESPONSIBLY

**To meet growing long-term energy demand, Shell is producing more natural gas and accessing energy resources in increasingly challenging environments. The amount of liquefied natural gas we supply rose again in 2011. Innovative technologies are helping us explore for and produce oil and gas from deeper waters than ever before. We are also developing resources in locations with extreme conditions, such as subarctic regions.**

### NATURAL GAS

As energy demand rises in the coming decades, the International Energy Agency (IEA) predicts that supplies of natural gas – along with renewables such as wind and solar – will see the biggest growth. Shell believes more use of cleaner-burning natural gas, especially in power generation, will be vital to building a sustainable energy system. Advanced technology is helping us develop new sources of natural gas, including some once thought too remote or too costly to access.

Cleaner-burning natural gas is abundant, with available resources equal to 250 years at current production levels, according to the IEA. It is also the fastest and cheapest route for many countries to reduce CO<sub>2</sub> emissions in the power sector over the next 20 years and beyond. Natural gas emits around 50% less CO<sub>2</sub> than coal when used to generate electricity, and significantly fewer air pollutants. Gas-fired power plants cost less than half as much to build as coal-fired plants. They can also increase power supply

quickly to meet demand, making them ideal for combining with intermittent renewables such as wind or solar.

In 2012, for the first time, Shell expects to produce more gas than oil. Most of the gas Shell supplies is conventionally produced, but we are increasing production of natural gas that is trapped in densely packed rock deep underground, known as tight and shale gas. As our gas production grows, we are using advanced technologies and fresh approaches to develop resources and find ways to reduce our environmental impact.

The Shell-operated Corrib project in Ireland (Shell interest 45%) involves a conventional offshore gas field which could supply up to 60% of the country's gas when production starts. The project has been delayed in the past because of the need to better address community concerns. But we have been working closely with our neighbours and local planning authorities to design a new onshore pipeline route. Part of the pipeline will run almost 5 km beneath a bay, using tunnelling methods designed to minimise

impact on the environment. In 2011, we secured the necessary permits and began preparations for construction of the tunnel in which the pipeline will be laid. We are also conserving and storing the peat removed to lay the onshore section of the pipeline, for use in restoring the land once the project is complete.

### Tight gas

The ability to produce large quantities of natural gas trapped tightly in rock pores has revolutionised the energy picture in North America in recent years. Producing tight gas requires a technique called hydraulic fracturing, or fracking, to release the gas from the rock. This approach has been used over many decades, but new drilling techniques have recently enabled greater volumes of gas to be produced from a single drilling site, reducing our operational footprint.

The environmental impacts of producing tight and shale gas have caused concerns among some communities. These concerns include air emissions, the use of large



**John Hangar**

*Special Counsel, Eckert and Seamans Law Firm, and former Secretary of the Pennsylvania Department of Environmental Protection, Pittsburgh, USA*

### HAYNESVILLE: BEING A GOOD NEIGHBOUR

In north-west Louisiana, USA, Shell has been preparing to increase the production of gas tightly trapped in shale rock. The Haynesville field is a gas formation deep beneath the area's pine forests and red dirt farmland. Nearby, there is a small town of the same name. In 2006, the first discoveries of natural gas improved job prospects for people living there.

Almost everyone we employ at Haynesville is from the local area. We also support many local organisations that focus on education and developing job skills. We provided funds for the creation of the Center for Integrated Engineering Technologies at a local college and actively support other job programmes at schools in the area.

Along with opportunities, concerns exist over truck traffic, noise, land disturbance and water use. We work closely with the community to listen, learn and address these concerns. Since 2007, we have drilled around 200 wells in the area as we explored for gas. In 2012, we expect to increase production of tight gas. New techniques allow the drilling of many wells from a single location, reducing our footprint. Temporary pipelines delivering water to our sites have already reduced truck traffic. We also reuse water wherever possible. Excess water produced with the gas is transported for disposal in line with regulations.

Shell has exhibited in Pennsylvania a genuine commitment to shale development practices that exceed regulatory requirements in several areas, and meet higher standards to protect the environment and help develop local economies. Shell hires local people and reduces water usage through recycling the waste water from drilling activities. It does not discharge used water into Pennsylvania's streams and rivers. Most impressively, Shell adopted in 2011 strong environmental and community standards for shale development. The company has shown a willingness and openness in engaging with stakeholders, including non-governmental organisations, to find ways to develop shale gas responsibly in Pennsylvania.

amounts of water, contamination of local water supplies and the disposal of waste generated by production. Questions have also been raised over the possibility of methane escaping into the air during production, and tight gas development causing minor earth tremors.

In 2011, we published a set of global onshore operating principles to address concerns around the development of onshore tight gas, specifically relating to hydraulic fracturing. They also cover our approach to producing oil trapped in similar rock formations. These principles are based on our focus on safety, continuous improvement, collaboration with regulators, and

engagement with local residents in which we are transparent about how we operate and the impacts of our activities (see box, right).

Hydraulic fracturing uses large quantities of water, which is injected at high pressure into a reservoir to break open the rock deep underground and free the gas. The injection of water mixed with small amounts of chemicals has led to concerns that fracking might affect local water supplies or contaminate fresh-water aquifers below ground. Shell has long favoured public disclosure of fracturing fluid contents. We disclose all chemicals used in fracking to the extent allowed by our suppliers, and we support legislation requiring the release of this information.

We are currently producing tight gas in North America and China, and we are exploring for additional resources in other countries. In Australia, the joint venture Arrow Energy (Shell interest 50%) is producing gas from coal seams to convert to liquefied natural gas.

Our approach puts safety and the protection of the environment at the forefront of our operations. The tight gas reservoirs we access are typically more than 1,000 metres below fresh-water aquifers. Our wells are lined with multiple layers of steel casing and are cemented from the surface to far below the water table (see diagram, left).

We reduce our need for fresh water by recycling used water. At Groundbirch in western Canada, for example, we have invested around C\$10 million to build a waste-water treatment facility with the Dawson Creek city authorities. The plant, due to start operating in 2012, will reclaim 4,000 cubic metres of waste water each day and will supply our operations with all the water it will need. In the north-east USA, we recycle almost all of the water produced with gas during drilling at the Marcellus shale gas project, significantly reducing our fresh-water needs.

We have reduced our use of fresh water by around 50% at our Pinedale tight gas project in Wyoming, USA, by recycling water produced with the gas. The state's Department of Environmental Quality also recognised Shell in 2011 for the steps we take to prevent contamination from storm water running off our drill sites. These include raised banks around the drill sites and additional vegetation to control erosion. Catalytic converters fitted

## ONSHORE TIGHT OIL AND GAS OPERATING PRINCIPLES

If the benefits of natural gas for meeting global energy demand are to be fully realised, questions need to be answered on the environmental and social impacts of developing tight gas resources.

We believe that as Shell and other major companies continue to develop these resources, setting consistent and responsible industry standards will be vital. Having an open dialogue with those affected by natural gas development will also be essential.

In consultation with environmental regulators and non-governmental organisations, we developed and published our industry-leading five global onshore tight oil and gas operating principles. These set out how we aspire to operate as we develop natural gas resources.

Shell:

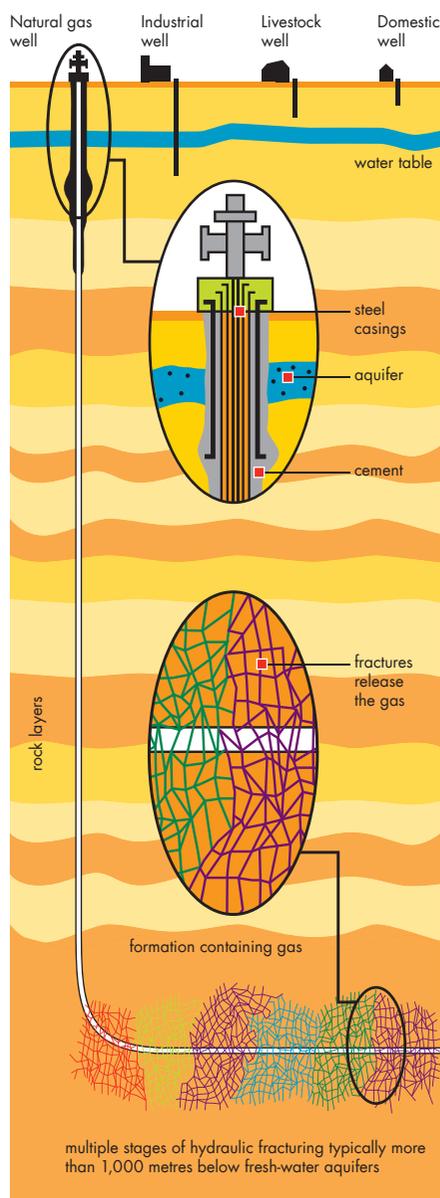
- designs, constructs and operates wells and facilities in a safe and responsible way;
- conducts its operations in a manner that protects groundwater and reduces potable water use, as reasonably practicable;
- conducts its operations in a manner that protects air quality and controls fugitive emissions;
- works to reduce its operational footprint; and
- engages with local communities regarding socio-economic impacts that may arise from its operations.

We continuously evaluate our operations. Since the launch of the principles, we have been working to close gaps in their application. We are also encouraging the joint ventures we do not control to adopt similar principles.

Our goal is to have these principles in place at all our operations around the world. As new challenges, technologies and regulatory requirements emerge, we will periodically review and update these principles.

[www.shell.us/naturalgas](http://www.shell.us/naturalgas)

### PRODUCING TIGHT GAS



to our Pinedale drilling rig engines reduce emissions by up to 90%.

Activities at drill sites and the impact of truck traffic can raise concerns among local people. At Pinedale and at our Haynesville operations in Louisiana, USA (see box, page 12), we are disturbing the land as little as possible by drilling multiple wells from single sites. At our Marcellus operations in Pennsylvania, USA, we have plans to transport water by rail, reducing the need for trucks.

### Liquefied natural gas

Shell was a pioneer of liquefied natural gas (LNG) more than 40 years ago. Since then, LNG has become an important means of supplying gas to people and industries located too far away from natural gas resources to make it practical to transport it by pipeline. By cooling the gas to -162°C we turn it into liquid and shrink its volume by 600 times, allowing us to ship it around the world. At its destination, the LNG is turned back into gas for our customers. Today, we are one of the largest LNG suppliers with facilities across the world. Around 30% of all LNG comes from joint ventures involving Shell.

In its first two years of production, the Sakhalin 2 LNG plant in Russia's far east

has provided around 5% a year of global LNG supplies. During both the construction and the operation of the plant, operator Sakhalin Energy (Shell interest 27.5%) has worked closely with indigenous communities including the Nivkh, the Ulta, the Evenk and the Nanai. In 2011, the launch of the second five-year Sakhalin Indigenous Minorities Development Plan continued to put in place programmes the communities themselves have chosen and developed. These programmes work to improve education and health-care facilities. They also underpin traditional culture by helping the preservation and study of languages, and supporting tribal enterprises and local communities.

The Gorgon LNG project (Shell interest 25%) at Barrow Island off Western Australia is expected to produce 15 million tonnes of LNG a year for over 40 years. It will include the development of the world's largest carbon capture and storage project, expected to capture 3 to 4 million tonnes a year of CO<sub>2</sub> that will be produced with the natural gas (page 7).

In Qatar, the Qatargas 4 LNG project (Shell interest 30%) started operations in early 2011, reaching full production of 7.8 million tonnes a year. Its first shipment of LNG went to India. The Qatargas 4 project opens up new markets for Qatari LNG in China and the United Arab Emirates. It produces gas from the world's largest single gas field, the North Field, which holds more than 900 trillion cubic feet of gas.

### Floating LNG

Work is under way to build a floating LNG (FLNG) facility that will combine production, processing and storage capacity without the need to build onshore plants or lay extensive pipelines on the seabed, significantly reducing environmental impact.

In 2011, we decided to move ahead with the construction of this FLNG facility to develop the Prelude gas field more than 200 km off the coast of Western Australia. It will be 488 metres long and built to withstand a Category 5 hurricane.

We are working with local organisations in the nearest onshore communities of the Kimberley region to help provide educational opportunities for children. We are also helping to record and preserve the traditional knowledge of the indigenous people, such as the Ngunnarru.

The Prelude project will contribute to the Australian economy through opportunities for local businesses. It will create around 350 jobs and provide billions of dollars in taxes and revenue. When the Prelude field reaches the end of its life after around 25 years, the floating facility can be moved to another location to develop new gas resources.

### LNG in transport

LNG has been used as a fuel in LNG ships for many years. From 2012, Shell is making LNG available as a transport fuel for specially adapted trucks using a busy route that runs from northern Alberta, Canada, to Vancouver. This will replace the diesel trucks previously used.

In 2013, we plan to start production at what will be Shell's first small-scale LNG facility at our existing natural gas plant, Jumping Pound, near the route's halfway point. Until this LNG is available, other suppliers will deliver the fuel to our truck stops along the route.

Shell is also investigating opportunities to substitute LNG for diesel and propane in other industrial sectors such as marine, rail and mining.

### Gas to liquids

In Qatar, our Pearl GTL (gas-to-liquids) plant started production of cleaner-burning synthetic oil products in 2011. Around 52,000 workers from around 60 countries built the plant. The project as a whole broke industry safety records during its onshore construction, achieving 77 million hours without an injury leading to time off work. One contractor company managed to achieve more than 87 million hours (see opinion, left).

[www.shell.com/naturalgas](http://www.shell.com/naturalgas)

### Wind power

Wind power is expected to continue to grow as part of the global energy mix. Shell has been developing wind power for more than a decade and is involved in wind projects in Europe and North America. Currently, Shell's share of the energy capacity from wind power amounts to 507 megawatts. Most of this comes from around 720 turbines at eight wind projects in the USA. We are assessing other potential projects, all in North America.

[www.shell.com/wind](http://www.shell.com/wind)



**Talal Mhanna**

*HSE Manager of the Consolidated Contractors Group, Ras Laffan Industrial City, Qatar*

At the Pearl GTL plant in Qatar, our contracting group worked more than 87 million hours without a lost time incident – a world record for a single sub-contractor. Leadership was key. We wanted this project to be remembered as the one where everyone went back safely to their families. No level of injury was acceptable. Those who broke Shell's Life-Saving Rules were asked to leave. Although I left Pearl GTL in November 2011, its spirit lives on in me. In fact, it changed me. I experienced a culture of care and concern where everyone felt valued and viewed safety as personal, relevant and important.

## THE ARCTIC

The US Geological Survey estimates the global Arctic holds as much as 30% of the world's undiscovered natural gas and about 13% of its yet-to-find oil. More than 80% of these resources are believed to lie offshore. As long-term global demand rises, the world will need this energy. But it must be produced responsibly, with the welfare of the environment and communities central to development plans.

Operating responsibly in the Arctic and subarctic is not new to us. We have been active in Alaska in the USA, onshore and offshore, and Canada for nearly 50 years. More recently we have been involved in developing major projects with partners in Norway and at Sakhalin and Salym in Russia. We intend to begin exploration in the Beaufort and Chukchi seas off Alaska's north coast in 2012 (see box, right).

Shell recognises that some public opposition exists to further development of Arctic energy resources. To operate safely and effectively across this region, we have plans based on rigorous assessment of the technical and environmental challenges. We work closely with local communities, including indigenous peoples, to listen to their views, to determine the best ways to share the benefits of our operations and to preserve their traditions. We also work with governments, scientists, academic institutions and non-governmental organisations to understand and consider their views on our projects.

### Understanding the environment

Since 2005, we have pursued an extensive programme of environmental studies in Arctic waters and onshore in Alaska. The traditional knowledge of indigenous peoples is invaluable to how we approach our work in the region. As we plan our activities, village elders and local expert hunters help us identify important species, sensitive habitats, archaeological sites and special areas such as caribou calving grounds and gathering points for migratory birds.

We have developed innovative technologies and conducted many scientific studies to enable us to work responsibly in this challenging offshore environment. This approach includes the use of unmanned aerial drones and marine acoustic recorders, and ecosystem studies combining traditional with scientific knowledge.



↑ The Nanuq, one of Shell's ice-class oil-spill response vessels.

## ALASKA

Our preparations to explore for oil in the Beaufort and Chukchi seas in 2012 follow a number of years of work to lay the foundations for the responsible development of the area's potential resources. Along the way we have faced challenges to our plans, and opposition remains. As we approach the start of exploratory drilling, we have been working closely with regulators, local communities and other organisations to develop robust safeguards. This has helped us refine our drilling plans.

We continue to engage with the Inupiat community and village elders throughout the North Slope Borough and Northwest Arctic Borough regions of Alaska to discuss plans for future drilling programmes. These discussions cover matters such as protecting marine mammals and subsistence hunting, reducing our emissions and discharge, and improving our capability in responding to oil spills.

The waters off Alaska's north coast are shallow and the oil fields beneath them are relatively low in pressure, a very different environment to the deep waters of the Gulf of Mexico. To prepare for drilling off Alaska, we have developed a thorough oil-spill response capability. It includes capping and containment equipment, and oil-spill response vessels. Our Arctic undersea containment system is designed to capture and recover oil at the source in the unlikely event of an incident. This method has proven effective in shallow waters.

Our drilling plans include two rigs, the *Noble Discoverer* and the *Kulluk*, which can serve as back-up for one another. We have also commissioned two specialised ice-class vessels to support our Alaska programme. Native marine observers will staff all vessels and onshore communications centres to help us co-ordinate our efforts and avoid affecting wildlife and subsistence hunters.

🖱 [www.shell.com/alaska](http://www.shell.com/alaska)

We foster and fund research to protect marine life, such as the computer-assisted identification of marine mammal calls, and the development of bubble-curtain technology to protect whales and other species from undersea rig and drilling noise.

Maintaining a respectful dialogue with local residents is critical to the success of any project. So is sharing tangible benefits. In subarctic Siberia, the Salym joint venture

(Shell interest 50%) with Gazpromneft started producing oil in 2005. The project's success is based on combining Shell's technological leadership with the experience and local knowledge of the Russian oil and gas industry. More than 80% of the equipment and supplies used are locally sourced and more than 95% of the staff are Russian, with most hired from the Salym area.

🖱 [www.shell.com/arctic](http://www.shell.com/arctic)

## DEEP WATER

In delivering new resources to help meet rising energy demand, we are operating in ever more challenging environments – such as deeper waters offshore. Advanced technologies and rigorous standards help us to do this safely. Our major projects in deep-water exploration and production help develop local economies through supply chains, and build job skills.

Shell has been at the forefront of deep-water exploration and production for more than 40 years, safely delivering more than 20 major deep-water projects around the world. We have developed many of the advanced technologies, processes and safety procedures that allow us to bring oil and gas up from water depths of almost 3 kilometres. Today we operate projects in deep waters off countries including Malaysia, Brazil and in the USA, with more being developed.

### Malaysia

The Gumusut-Kakap project (Shell interest 33%) off the coast of Malaysia will use a semi-submersible platform in more than 1,200 metres of water when it starts operations in the next two years. Nineteen



↑ Producing oil and gas in deep waters off the coast of Brazil.

undersea wells will feed oil to the platform for processing and piping to shore. To avoid flaring, the gas produced with the oil will be injected back into the formation to maintain reservoir pressure, which helps us recover more oil.

Gumusut-Kakap has a production capacity of 135,000 barrels of oil equivalent (boe) a day. Its semi-submersible platform will be the first to be used in Malaysia, and building its massive hull created a new industrial capability in a region which is likely to need more of these structures in the future. Shell has established a training programme for Malaysian engineers to learn best industry practices in the health, safety and environmental aspects of their work. We also fund a broad range of sustainable livelihood efforts, such as alternative and supplemental income development for indigenous women, clean water supplies and rural tourism initiatives.

### Brazil

Brazil is significantly increasing its energy production from deep waters. Our Parque das Conchas project in 1,800 metres of water has a production capacity of 100,000 boe a day using a floating production, storage and offloading vessel. Construction is under way on a second phase of the project that will deliver up to 35,000 boe a day.

Development of the country's service industries for such projects is important to Brazil. We work with the government, the national oil company Petrobras and organisations involved in building industrial capacity to help more local suppliers compete internationally. More than a third of project expenditure at Parque das Conchas was with Brazilian suppliers.

## WHEN A PLATFORM STOPS PRODUCTION

When an offshore platform comes to the end of its working life, it must be safely retired, or decommissioned. Removing thousands of tonnes of steel and concrete far offshore poses technical and environmental challenges. Listening to the concerns and views of others helps us to develop responsible solutions.

The Brent field, for example, was one of the first and largest oil and gas fields discovered in the North Sea. After 35 years, it is approaching the end of its life. We are now preparing for the safe decommissioning of its four platforms, a task expected to take more than 10 years to complete.

Due to the complexity of the project, we recognised that we needed to engage others to help us take the right approach. We have been engaging with more than 150 different organisations including government bodies, academic institutions, fishing groups and non-governmental organisations since 2007. We contracted The Environment Council, an independent charitable organisation, to facilitate meetings to discuss and challenge our decommissioning plans and options. By the end of 2011, we had hosted 12 of these meetings, with more taking place in 2012. A panel of independent scientific experts reviews our technical studies and works to ensure our plans reflect input from these meetings.

Our plans for retirement of the four remaining platforms reflect what we have learned from similar projects, including the decommissioning of Brent Spar in the late 1990s. In 2011, we removed from our Indefatigable field in the North Sea almost 13,000 tonnes of equipment and steel from six platforms and supporting structures. We shipped this material to the Wallsend Yard in Newcastle-upon-Tyne, UK, for reuse, recycling and safe disposal.

**USA**

Nearly 25% of oil produced in the USA is from the Gulf of Mexico (GoM). This supports a vibrant coastal economy and culture. Shell has been operating in the deep-water GoM for over 30 years. Our platforms, including six major deep-water facilities, produce more than 400,000 boe a day on average each year. Shell's share of this was over 180,000 boe a day in 2011.

We continue to grow our business responsibly in this region. The Shell-operated Perdido project (Shell interest 35%) set an industry record in 2011 by drilling a well in more than 2,900 metres of water. Perdido is expected to produce 100,000 boe a day when it reaches full production. It was designed with extra capacity to produce potential discoveries in the area without expanding our physical footprint.

We also took this approach with the Cardamom oil field in the GoM, which will be developed through our existing Auger deep-water platform. This is expected to add 50,000 boe a day to our production in the GoM by the end of 2014.

A new deep-water platform, Olympus (Shell interest 72%), is under construction for the Mars basin in the GoM and is expected to add another 100,000 boe-a-day capacity when it begins to produce in around 2015.

Our work in the region includes efforts to improve scientific knowledge of natural events that can have an impact on coastal communities dependent on the Gulf of Mexico for their livelihoods. We partner with the U.S. National Oceanic and Atmospheric Administration to provide information for hurricane research, forecasting and coastal management. Sensors mounted on some of our platforms help to chart the development of storms that could lead to coastal flooding.

**Operating safely**

The BP Deepwater Horizon tragedy in 2010 reinforced the need to maintain the safety and reliability of our deep-water operations worldwide. We have multiple safeguards in place to prevent a similar incident from occurring in our operations.

Prevention remains the priority, but the BP Deepwater Horizon accident taught our industry to improve its ability to respond to any incidents that may occur. Shell is

a founding member of the Marine Well Containment Company, a non-profit industry consortium set up to provide a containment response system for the Gulf of Mexico. In addition, Shell is operating the Subsea Well Response Project, an industry co-operative effort to enhance global well containment capabilities. Through this

co-operative, oil and gas companies are working together to improve the speed and effectiveness of the international industry response to well incidents.

[www.shell.com/deepwater](http://www.shell.com/deepwater)

**RECOVERING MORE OIL**

One way of helping to meet increasing energy demand is to produce more oil from existing fields. On average, only around a third of the oil in a reservoir can be recovered economically. As a field ages, the amount of oil produced declines and it becomes more costly to operate. But advanced technologies that help the oil flow more easily are allowing us to recover more from these fields.

Injecting chemicals, gases or steam to thin the oil or coax it out of a reservoir can raise production levels by 5 to 20%. The International Energy Agency estimates that enhanced oil recovery (EOR) techniques could unlock 300 billion barrels of oil that are currently left in the ground.

EOR can also help rejuvenate abandoned fields. Nederlandse Aardolie Maatschappij (NAM, Shell interest 50%) stopped operations at the Schoonebeek field in the Netherlands in 1996 and the area was restored to its natural state. After extensive consultations with the local community, we returned to Schoonebeek in early 2011 to restart operations. We are now recovering more oil by injecting steam, using water from a new waste-water treatment plant in the nearby town of Emmen.

Our Smart Fields® technology can increase the amount of oil recovered from a field by 10%, and gas by 5%. Sensors and fibre-optic cables relay real-time information on temperature, pressure and other field conditions, allowing engineers to make adjustments that can maximise production.

[www.shell.com/eor](http://www.shell.com/eor)

↓ Testing chemical compositions for injection into oil fields to boost recovery.



## NIGERIA



An open letter from Mutiu Sunmonu, Chairman of Shell Companies in Nigeria

### SHELL'S ECONOMIC CONTRIBUTION

The Shell Petroleum Development Company of Nigeria Ltd (SPDC) is the operator of a joint venture between the government-owned Nigerian National Petroleum Corporation (NNPC, 55%), Shell (30%), Total (10%), and Agip (5%). Partners fund the joint venture based on their ownership share. Since the government-owned NNPC owns 55%, the joint venture's activities depend on the government providing this share.

Shell Nigeria Exploration & Production Company (SNEPCo, 100% Shell-owned) operates and has a 55% interest in the offshore Bonga field, Nigeria's first deep-water project. Shell also has a 26% interest in Nigeria Liquefied Natural Gas (NLNG), which exports LNG around the world.

- \$38 billion: revenues from SPDC to Nigerian government from 2007 to 2011.
- \$6 billion: Shell share of royalties and taxes paid to the Nigerian government in 2011 (SPDC \$4 billion, SNEPCo \$2 billion).
- 95%: share of revenue after costs that goes to the Nigerian Government from each barrel of oil SPDC produces.
- \$1.4 billion: value of SPDC and SNEPCo contracts awarded to Nigerian companies in 2011.
- 6,000/35,000: estimated direct/indirect jobs created by SPDC and SNEPCo in Nigeria.
- 90%: proportion of employees who are Nigerian.
- \$164.1 million: SPDC and SNEPCo funds to the Niger Delta Development Commission in 2011 (Shell share \$59.9 million).
- \$76.3million: 2011 contribution from SPDC and SNEPCo to community development projects (Shell share \$23.6 million).

In 2011, Shell Petroleum Development Company (SPDC) continued our efforts to rebuild operations and provide more transparency around our activities.

A government amnesty for militants that began in 2010 has allowed SPDC engineers to reactivate dozens of wells and hundreds of kilometres of pipeline. These had been shut down under threat of violence or actual attacks during the upsurge in militancy in the years 2006 to 2009. There's more still to do, but we're getting there – repairing our infrastructure, and the morale of our employees.

SPDC production rose for the second year running, providing more revenue to the government – the majority owner – and our other joint-venture partners. Stable funding and better security paved the way for progress on important projects. In 2011, we installed new equipment to capture gas produced with oil that would otherwise be burned off, and we repaired or improved existing facilities to capture gas. This helped reduce the amount of flaring at SPDC facilities in 2011, even though we produced more oil than in 2010.

Our increased focus on the maintenance of pipelines and other equipment, thanks to better access to sites, led to the volume of onshore operational spills from SPDC facilities also falling in 2011. That is welcome as operational spills are caused by equipment failure or accidents. We experienced an increased number of operational spills, however, as we put more pipelines back into service. No spill is acceptable and we must continue to work to improve our performance.

Despite an end to militant attacks, urgent action is still needed to tackle the oil theft and illegal refining by criminal gangs which continue to cause the majority of spills. Although mostly occurring in a few areas, the environmental impact of these activities is severe. In one case, in the Imo River area, we chose to shut down our operations in 2011 because of the environmental and social damage these oil thieves were causing.

Regrettably, the Shell Nigeria Exploration & Production Company (SNEPCo) experienced an oil leak during loading operations at the Bonga field 120 km offshore. I'm sorry that this leak occurred, but pleased that the swift response efforts of SNEPCo staff in co-operation with the Nigerian government meant that most of the resulting spill evaporated or was rapidly dispersed at sea.

The UNEP report on oil contamination in the Niger Delta's Ogoniland region, released in August 2011, showed the complexity of some of the challenges we face. The findings were sobering, with some important lessons for us. SPDC welcomed the report, accepting its recommendations for the company. We're also taking action (page 20). It is not often that opportunities for real change arise in the Delta. I earnestly hope that this report proves to be a catalyst for co-operation among government, the industry and civil society.

SPDC has been making changes already. We're making it easier in a number of ways for others to check and follow our progress. In January 2011, we launched a new website which allows users to track how SPDC deals with each confirmed spill from its facilities. In December 2011, SPDC agreed with the International Union for Conservation of Nature to launch an independent scientific advisory panel to review SPDC practices in the clean-up and remediation of spill sites, and to recommend improvements. In early 2012, we contracted Bureau Veritas, an international verification organisation, to independently audit SPDC oil spill management practices.

Recent years have been challenging in Nigeria, but I am hopeful for the future. We want to continue to invest and produce oil and gas here, sharing the benefits of doing so responsibly and profitably with the Nigerian people.

Mutiu Sunmonu

### Boosting power supplies

Despite decades of oil production in the Niger Delta, many of the people who live there remain in poverty. This was at the root of the militant crisis that lasted three years to 2009. Finding ways to promote development, jobs and public services can help today's relative stability turn into tomorrow's prosperity. That is chiefly the responsibility of government, but SPDC has a role to play.

Major SPDC-operated projects continue to boost Nigeria's energy supplies and its economy. The Gbaran-Ubie oil and gas project in Bayelsa State reached full daily gas production of 1 billion standard cubic feet in early 2011, and will produce 70,000 barrels of oil a day at peak production. Some of the gas helps generate much-needed electricity, with the rest going for export. The Afam VI power plant in Rivers State continued to contribute from 14 to 24% of the electricity supplied by Nigeria's national grid.

### Communities

In 2011, SPDC launched a review of its community-led social investment model, the global memorandum of understanding (GMOU). This model puts community representatives at the heart of the process

that decides how to use the funds SPDC and its joint-venture partners provide for development projects. SPDC first introduced this approach in 2006. By the end of 2011, it had invested some \$78 million covering 314 communities with a total population of nearly 3 million. The review looked at what was working well and what was not. One key finding was that while some communities successfully managed their own decision-making and even raised further funds independently, others found it harder. As a result SPDC has strengthened efforts to help communities develop the skills they need to make full use of the opportunities that GMOUs offer.

### Oil spills

The volume of operational spills onshore from SPDC facilities fell by around 30% from 2010 to 0.5 thousand tonnes in 2011. The lower risk of threat from militants allowed SPDC to launch emergency spill response teams more quickly and gain greater access to spill sites. As a result, SPDC was able to put a stop to spills earlier and accelerate the clean-up of older oil spill sites. Of 401 sites in need of remediation at the start of 2011, SPDC had cleaned up more than 75% by the end of the year.



**Obianuju Chukwuji Joseph**

Shell LiveWIRE Award winner 2011, Delta State, Nigeria

Before now, I thought Shell was a selfish company that was exploiting our community. Then, when I was job hunting on the internet, I came across Shell LiveWIRE. After a very enlightening training, we were assigned mentors and given start-up capital to start our businesses. I now run an interior decorating business and house-keeping services, and employ people. Shell should create more awareness of its programmes so that more people can benefit.

The number of operational spills onshore from SPDC facilities, however, increased to 63 in 2011, from 32 in 2010, as more pipelines were put back into operation. Stopping spills under its direct control is a key priority for SPDC. In 2011, work to maintain and replace pipelines and other infrastructure continued. In the past three years, SPDC has replaced about 400 km of pipeline, and work continues to replace further pipelines.

Although militant attacks have declined, industrial-scale oil theft and illegal refining remain serious problems. They lead to spills that cause environmental damage. A report by the UN Office on Drugs and Crime in 2009 estimated as much as 150,000 barrels of oil a day were being stolen. The volume of spills caused by sabotage and theft from SPDC facilities fell in 2011 to 1.6 thousand tonnes, from 3.0 thousand tonnes in 2010. This fall reflected SPDC's improved ability to monitor infrastructure and increased access to spill sites as a result of the government amnesty.

The number of spills from sabotage and theft increased in 2011 as SPDC put more pipelines back into service. Although not caused by SPDC, such spills are a reality of operating in the Delta. SPDC cleans up all spills, whatever their cause, and recognises it must do what it can to help reduce them. In August 2011, it shut down production of around 25,000 barrels of oil a day from one field in the Imo River area after repeated attacks on pipelines. It also held



↑ Bringing health care to remote communities, Nigeria.

### HEALTH IN MOTION

Access to health care in the Niger Delta is limited. SPDC helps improve access in a number of ways. It supports and staffs a network of 27 health clinics across the Delta. It finances a small but growing number of community health insurance schemes as part of its GMOU social investment programme. It also sponsors campaigns to target illnesses such as malaria and HIV/AIDS. One of its longest-running efforts is the annual community outreach programme called Health in Motion. Teams of doctors, nurses, pharmacists and counsellors from SPDC's company health department visit remote areas to bring health care to communities. In 2011, the team reached more than 87,000 people, providing advice, treating ailments, performing minor operations and distributing mosquito nets and spectacles.



↑ *Illegal refining contributes to oil pollution in the Niger Delta.*

## REVENUE TRANSPARENCY

Our operations generate revenue through taxes and royalties for governments around the world. These funds can help support a country's economy and contribute to local development. We believe that greater transparency in such payments, and how they are used, is important for building trust between businesses such as ours and the communities we work alongside.

We work openly with governments on matters of taxes and royalties. We are a founder and board member of the Extractive Industries Transparency Initiative (EITI). This initiative requires both governments and companies to disclose revenues received from oil and mineral activities. In 2011, we continued to work with governments, industry peers and non-governmental organisations to implement the EITI in Cameroon, Gabon, Iraq, Kazakhstan, Nigeria and Norway.

In 2011, Shell paid globally \$22.6 billion in corporate taxes, and \$4.4 billion in royalties. We collected \$88.1 billion in excise duties and sales taxes on our fuel and other products on behalf of governments.

[www.shell.com/payments](http://www.shell.com/payments)

meetings with community leaders, regulatory authorities and social organisations to discuss these issues and SPDC oil spill management practices. Breaking the entrenched cycle of the oil-spill economy – where people see oil spills, theft and illegal refining as their only viable source of income – will be the key to making progress.

In December 2011, an oil leak occurred during a routine operation at SNEPCo's Bonga field, 120 km off the coast of Nigeria. The leak happened during a transfer of oil from Bonga's floating production, storage and offloading vessel to an oil tanker. SNEPCo estimates that some 35,000 barrels of oil, or 4.8 thousand tonnes, were lost. SNEPCo staff worked with international oil-spill experts and Nigerian government agencies to tackle the spill using aircraft and vessels. As a result of this rapid response, almost no oil from Bonga reached shore.

### Flaring

Flaring from SPDC facilities fell by around 20% in 2011 from the previous year, to 1.9 million tonnes of gas. Flaring per tonne of production fell to the lowest level SPDC has recorded. SPDC is currently implementing a \$2 billion programme to install new gas-gathering equipment, in addition to \$3 billion previously spent on reducing flaring. Further progress towards its goal of ending continuous flaring will depend on continued stable funding, government approvals for individual contracts to install the equipment needed, and reliable security. SPDC is determined to continue to make progress in the reduction of flaring.

### UNEP report

The UN Environment Programme (UNEP) conducted a two-year study into the impact of oil contamination in Ogoniland, an area in the Niger Delta from which SPDC withdrew in 1993 following years of attacks on staff and facilities. In August 2011, the UNEP report made wide-ranging recommendations for the federal and state governments, the oil industry and communities to address the problem of oil pollution. Following publication, SPDC immediately supported the Rivers State government in supplying fresh drinking water to affected communities, one of UNEP's urgent recommendations. It also contributed to the work of a Presidential Commission set up to consider longer-term action.

The report questioned SPDC's clean-up and remediation technique and performance, and recommended improvements. As a result, SPDC conducted a review of its practices. It is confident that remediating oil spill sites using a process that allows natural microbes to break down the hydrocarbons remains a proven and internationally recognised method. It is widely used in many countries.

However, the review showed that in some cases in Ogoniland, SPDC did not go physically deep enough when assessing spills, making remediation less effective. Based on this finding, SPDC is revisiting a number of other sites in the Delta to confirm that remediation has been carried out properly, and will remediate further if needed.

SPDC is responding positively to the findings of the UNEP report. But there are multiple parties involved in Ogoniland, and achieving solutions will require co-ordinated action by federal and state governments, industry, non-governmental organisations and local communities.

[www.shell.com/nigeria](http://www.shell.com/nigeria)

## WORKING WITH OUR SUPPLIERS

Shell buys goods and services from 120,000 suppliers across the world. We are working to make sure these suppliers and our contractors operate in environmentally and socially responsible ways.

In 2011, we developed the Shell Supplier Principles. These set out what we expect from our suppliers and contractors in the areas of business integrity, HSSE & SP, and labour and human rights. For example, we require our suppliers to use energy and natural resources efficiently, and to continuously look for ways to minimise waste. We are also asking our suppliers to have a mechanism in place to log grievances.

We are working with our existing suppliers to implement the Shell Supplier Principles. Beyond what we consider minimum requirements, we will conduct due diligence checks starting in 2012 to identify the level of compliance of our suppliers and contractors with the principles.



**Colin Maund**

*Chairman of Achilles Group,  
Abingdon, UK*

/// Achilles has been managing the process of assessing suppliers for Shell for over 20 years, and we have been helping to launch a new global online system for all Shell suppliers. Shell is taking a more active role in managing suppliers to ensure that its business principles are followed throughout the supply chain. Shell's thinking has evolved from looking mainly at health, safety, environment and quality to being increasingly focused on areas such as sustainability and ethical behaviour. There is now a stronger willingness to build local supplier capability, ensuring work and value is being put back into the communities in which Shell operates. Shell has included these requirements in its new supplier principles and is using the new system to embed these new requirements in its supply chains across the globe. ///

Before the award of a new contract, we will assess each supplier to check its ability to comply with the principles (see opinion, bottom left). During the course of the contract, we will assess the way the supplier is performing in the areas covered by the principles.

As a result of these assessments, we may identify further steps needed to meet the standards set out in our principles.

🖱 [www.shell.com/suppliers](http://www.shell.com/suppliers)

## SHELL FOUNDATION

Shell Foundation is an independent charity that applies business thinking to global development challenges such as sustainable mobility, access to energy and job creation through small enterprises. It focuses on developing self-sustaining solutions that can achieve sizeable impact in multiple countries.

EMBARQ is an international network of transport specialists, founded by Shell Foundation and the World Resources Institute in 2002, that helps reduce traffic congestion and pollution in megacities. Their solutions range from bus rapid transit systems to cycling routes and more efficient urban planning. In 2011, EMBARQ reached 1.2 million more people in Brazil, India, Mexico, Peru and Turkey. In India, for example, EMBARQ helped implement projects including the 27-km expansion of a dedicated lane for extended buses in Ahmedabad that now carry more than 100,000 passengers a day. In total, nearly 2 billion passenger journeys have been made on EMBARQ systems since its creation.

Harmful smoke from cooking on open fires and traditional stoves kills almost 2 million people a year. Since 2007, Shell Foundation and its partner Envirofit, a not-for-profit organisation, have worked to tackle this problem. They created a business together which produces and distributes affordable cookstoves in Africa and Asia that significantly reduce emissions, fuel use and cooking time. In 2010, Shell joined Shell Foundation, the UN Foundation and other public and private enterprises to form the Global Alliance for Clean Cookstoves. The alliance aims to make 100 million cleaner-burning cookstoves available by 2020. New members committed \$78 million to this initiative in 2011.

Shell Foundation was set up in 2000 with Shell providing a \$250 million endowment and further contributions of \$160 million.

🖱 [www.shellfoundation.org](http://www.shellfoundation.org)

↓ *Dedicated bus lanes help reduce traffic congestion in Ahmedabad, India.*



## IRAQ

Iraq is slowly rebuilding, but after years of conflict the country faces tough challenges. Many of its people still lack access to the reliable energy that would help provide basic comforts and a way to improve their lives. Jobs are scarce. But with the country steadily restoring output from its oil and gas fields, there are signs that the economic future looks brighter.

In 2011, Shell continued to help improve Iraq's energy supplies, build skills among local people and contribute revenues to the government that can help to rebuild the country. We also continued to forge stronger relationships with communities close to our operations.

In a significant step forward for the country's energy future, Iraq's Ministry of Oil approved a final agreement in late 2011 for Shell and partners to set up a joint venture, the Basrah Gas Company, to capture gas produced with oil from some fields in the south. Much of this gas is currently flared. When the new venture starts operations, the gas will be used to generate electricity for the national grid, adding to the vital energy supplies Iraq needs if its economy is to prosper. In the future, some gas may be exported to earn further revenue for the government. Shell has a 44% interest in this joint venture, Iraq's South Gas Company has 51%, and Mitsubishi the remaining 5%.

Work continues to repair the country's energy infrastructure, but homes and

businesses are still suffering frequent power cuts. Shell is involved in plans to build a 50 megawatt plant that will generate electricity using gas captured by the Basrah Gas Company. This electricity supply will allow Khor Al Zubair – one of the country's largest gas processing plants – to operate independently of the national grid, freeing up electricity for other uses.

### Job skills, health and road safety

In 2011, we continued to work with local communities to help them share the benefits of energy production. By the end of the year, people from nearby towns filled around 900 of the 1,300 jobs created at Majnoon, a major oil field Shell operates in a joint venture. We help local people gain the skills they need for jobs. For example, young Iraqis from the area attended a construction course at a vocational training centre in Basra, with funding from Shell.

We also helped launch a programme to train Iraqi women volunteers in health education. The volunteers then visited local families to raise awareness of how to avoid disease and improve general health (see opinion).

As energy production rises, so will the activities that support it, such as trucks driving through villages on their way to and from oil fields. We launched a road safety awareness campaign during the year for around 5,000 children in primary and secondary schools in the Al Dayr and Al Nashwa communities, communicating the messages through training programmes and theatre.

↓ *Community engagement during Majnoon project development, Al Nashwa, Iraq.*



*Country Director of the AMAR International Charitable Foundation, Iraq*

Shell's partnership with the AMAR International Charitable Foundation started in 2010. In this short time, the partnership has begun to make a tangible difference in the delivery of basic health support to the communities of Basra, by training local medical services staff and providing advanced diagnostic equipment to a local clinic. Shell also funds fuel and a mechanic to maintain the clinic's generator. This provides a reliable power supply so that vaccines and medicines are in good condition, ready for use. Shell has also helped to launch the AMAR Women Health Volunteer programme. This is helping to improve health services to communities by recruiting and training volunteers. As a result of these improved services we are seeing more patients coming to the local clinic for diagnosis and treatment.

In 2011, we also helped to re-open the Shatt el Arab waterway to commercial traffic for the first time in more than 30 years by dredging parts of the river and building a jetty. This is helping to develop the local economy and allows us to ship heavy equipment close to Majnoon, avoiding many road journeys.

Production at Majnoon is in its first phase with the aim of reaching around 175,000 boe a day. We have been the operator of Majnoon since 2010 and have a 45% interest, with Petronas (30%) and Iraq's Missan Oil Company (25%) holding the rest. Shell also has a 15% interest in the West Qurna 1 field.

Flaring from Majnoon in 2011 accounted for less than 1% of the global direct greenhouse gas emissions from facilities Shell operates. We expect this flaring to rise as production grows in line with our contract with the Iraqi government. With our partners we are working to find ways to capture this gas, possibly for use in power generation.

## OIL SANDS

In the decades to come, energy from all sources will be needed to meet rising global demand. Canada's oil sands are one of the most significant energy resources remaining. They can play an important role in the energy mix, but they must be developed responsibly.

Oil sands consist of bitumen – a heavy oil – mixed with sand, water and clay. Some of the oil sands lie close to the surface, where they can be mined. The rest lie too deep for mining and the bitumen is produced through conventional wells, often using steam injected into the reservoir to ease its flow.

The Athabasca Oil Sands Project (AOSP, Shell interest 60%) uses giant trucks and mechanical shovels to extract the oil sands mixture at its Muskeg River and Jackpine mines. Once separated, the bitumen is diluted with solvent for piping to the Scotford Upgrader where it is converted into synthetic crude oil.

In 2011, the AOSP produced around 197,000 barrels of oil equivalent (boe) a day. Production from deeper-lying, or in situ, oil sands operations was around 17,000 boe a day (Shell share 100%). Production from oil sands accounted for 4.2% of Shell's global oil and gas production in 2011.

Some opposition exists to the development of oil sands resources. Producing and processing them is energy and water intensive. Mining also involves disturbing land. For the oil sands industry to grow in the right way, reducing environmental impacts is vital. We are working to improve our ability to manage greenhouse gas emissions, and to use land and water more effectively. In early 2012, Shell helped launch a consortium of energy companies that will share knowledge and develop innovative technologies together to improve environmental performance across the oil sands industry.

Our use of local suppliers creates jobs and supports economic development. We are seeking to increase the number of aboriginal people in our workforce through apprenticeships and other programmes. Shell has spent over C\$1 billion on contracts with aboriginal companies since 2005.

### Greenhouse gas emissions

Overall CO<sub>2</sub> emissions from oil sands, from mining to processing to use as a



↑ Development of the oil sands helps create jobs in Alberta, Canada.

transport fuel, are around 5 to 15% higher than conventional crude oil, according to Cambridge Energy Research Associates. We already produce fuels at the lower end of this spectrum. Carbon capture and storage (CCS) technology would further close this gap. Shell is developing plans for large-scale CCS at our oil sands operations. If our proposed Quest project goes ahead, it will potentially capture and store deep underground more than 1 million tonnes of CO<sub>2</sub> a year from our upgrader (page 7).

The total direct emissions from our oil sands operations in 2011 – including mining, in situ and upgrading – were 4.9 million tonnes of CO<sub>2</sub> equivalent. This was an increase over 2010 emissions, reflecting a full year of operations at our new Jackpine Mine and the expansion of production at the Scotford Upgrader in 2011. It represents around 6.6% of Shell's global direct greenhouse gas emissions in 2011 from facilities we operate.

We are continuing to work to improve energy efficiency. For example, at our Muskeg River mine we use less hot water to separate the bitumen from the oil sands mixture than in the traditional process. We are also investigating the use of cleaner fuels, such as liquefied natural gas, to power the trucks and shovels in our mining operations.

### Water

Shell uses two to three barrels of water from the Athabasca River to extract one barrel of bitumen from our mining operations. While Shell has permits to withdraw 0.6% of the Athabasca River's average annual flow, we used less than 0.12% in 2011. Water used to extract bitumen is recycled. In 2011, around 78% of water used in the bitumen extraction process was recycled at our two mines. We continue to explore opportunities

to increase the amount of water recycled at our operations and use more groundwater from the site to reduce our use of river water.

### Tailings and reclamation

Tailings are the mix of water, sand, clay and residual hydrocarbons that remains after the bitumen is separated. They contain concentrated naturally occurring chemicals that are toxic and are held in ponds or mined pits until they can be dried for use in land reclamation. The area covered by these tailings ponds at the Muskeg River and Jackpine mines reduced to 23 km<sup>2</sup> by the end of 2011, from 24 km<sup>2</sup> the previous year.

Once the tailings have settled and dried, we use them to restore the natural contour of the land before laying topsoil and planting suitable vegetation. Regulations require that all land disturbed by operations must be returned to a natural state that can support local plants and animals.

Reclamation work takes several decades to complete, but we continue to work to improve tailings technology to speed up the process. Since 2005, we have invested nearly C\$200 million in tailings research, including setting up an advanced test facility at Muskeg River Mine. Shell and other companies have agreed to set aside intellectual property rights to research into more advanced tailings management.

We are also working with aboriginal neighbours to incorporate traditional knowledge into our management of land and reclamation efforts. Aboriginal elders have helped us understand the roles land, vegetation and wildlife each play in their culture.

➤ [www.shell.com/oilsands](http://www.shell.com/oilsands)

## DELIVERING MORE SUSTAINABLE PRODUCTS

**In 2011, we moved for the first time into the production of low-carbon biofuel. We also develop innovative products that help our customers use less energy, reducing impact on the environment. Efficient energy use will be increasingly important as demand continues to rise.**

### BIOFUELS

Global demand for transport is growing, along with the carbon dioxide (CO<sub>2</sub>) emissions it produces. With the number of cars on the road expected to triple and the amount of freight carried by trucks likely to double by 2050, the world will need all the sustainable transport fuel options available.

Electric and hydrogen fuel cell vehicles will be important in the longer term. Natural gas is expected to become a bigger part of the mix. But in the coming decades most vehicles will continue to run on petrol and diesel. We believe that blending sustainable biofuels with petrol and diesel offers the most commercially viable way to reduce CO<sub>2</sub> emissions from road transport fuels over the next 20 years.

Biofuels are expected to play an increasing role in helping to meet demand for transport fuel. Shell predicts that their share of the global transport fuel mix will increase from 3% today to 9% by 2030. We are already one of the world's largest biofuels distributors, blending around 7.4 billion litres of biofuels in our petrol and diesel in 2011.

We moved into the production of low-carbon biofuels in 2011 for the first time. With Cosan, we set up Raízen (Shell interest 50%), a joint venture that produces the lowest-carbon biofuel commercially available, ethanol from sugar cane in Brazil. This biofuel reduces CO<sub>2</sub> emissions by around 70% compared to petrol, from cultivation of the sugar cane to using the ethanol as fuel. Raízen's efforts to improve the efficiency of its production process include burning plant waste for electricity.

### Sustainability challenges

The environmental impacts of biofuels vary according to how and where they are produced. Some offer potential CO<sub>2</sub> savings, depending on the raw materials used – whether palm oil, corn or sugar cane. Production and distribution methods can also make a difference. In some regions, high annual rainfall provides

natural irrigation to the plants that are processed into biofuel, although water is still needed in the processing phase.

Another potential challenge is competition with food crops for land. Biofuel crops can compete directly with food crops or displace them into areas with rich biodiversity. Disputes can arise over land ownership, as well as concerns related to labour rights and child labour. All these challenges must be carefully managed.

Increasing global biofuel production raises further challenges in managing land, including the need to conserve biodiversity. In sourcing biofuels we work to protect ecosystems, and the livelihoods they support. Our long-term collaboration with the International Union for Conservation of Nature (IUCN) helps us better understand how to do this.

In 2011, we joined with industry partners and non-governmental organisations, including IUCN, to commission an

independent study into how European Union (EU) policy could address the potential for biofuels crops to displace other crops into sensitive areas. The study found that the most effective way to reduce this impact would be to provide incentives, including carbon credits, that encourage sustainable practices in biofuels production. These include developing advanced biofuels from crop waste, raising crop yields on existing land, using by-products for animal feed, and producing crops on abandoned land. The consortium has shared the findings with the EU to help inform future policies.

Our approach to the responsible management of land can be seen in our work through Raízen and in our efforts with social and environmental organisations to improve supply-chain practices.

### Standards and certification

The supply chain for biofuels can be complex. Many different parties are involved, from growing and harvesting crops to processing them into fuel. International voluntary standards and those we have developed independently require producers to trace biofuel components to make sure they have been produced in a responsible way.

Since 2007, Shell has followed a policy that governs the way we work with our

↓ *Harvesting sugar cane to make ethanol in Brazil.*



suppliers on sustainability. Under this policy, we work closely with suppliers to develop more sustainable supply chains and review their progress on a regular basis. We require suppliers to meet existing regulations, such as the EU's requirement that imported raw material for biofuels must meet minimum standards related to land-use change, emissions and supply chains.

One way we do this is through international certification schemes such as Bonsucro for biofuel from sugar cane, which is recognised by the EU. Where possible we source biofuels certified under such schemes, which are becoming more widespread. Where we are not able to buy certified products, we introduce our own long-established sustainability clauses into our supply contracts. These clauses are designed to prevent the sourcing of biofuels from suppliers who may not abide by human rights guidelines, or who may have cleared land rich in biodiversity.

Since internationally recognised certification schemes are becoming more common, we have increasingly applied their standards in place of, or as well as, our own. The proportion of biofuel components we bought that were either certified under these schemes or covered by our own sustainability clauses was 96% by the end of 2011.

We play a leading role in several roundtable organisations that drive the development of sustainable biofuels from specific crops. They include Bonsucro, the Roundtable on Sustainable Palm Oil and the Roundtable on Responsible Soy. In these organisations we work with other energy companies and environmental non-governmental organisations, including IUCN.

**Raízen**

Launched in 2011, Raízen produces and sells over 2 billion litres a year of the lowest-carbon biofuel commercially available, ethanol from sugar cane in Brazil.

Sugar cane needs little artificial irrigation to grow in Brazil thanks to the high annual rainfall. Raízen recycles around 90% of the water supply it uses to convert sugar cane into ethanol in 23 of its 24 mills. It plans to be recycling water in the remaining mill by the end of 2012.

Our Raízen joint-venture agreement includes a set of principles to help improve

**FUTURE FUELS**

For the future, Shell is developing advanced biofuels from inedible plants and crop waste. The conversion processes involved can potentially produce more efficient, low-carbon biofuels for blending at higher concentrations with petrol and diesel. Our biofuels research teams in India, the Netherlands, the UK and the USA work with leading biotechnology companies and academic institutions. Taking advanced biofuels from the laboratory to commercial scale takes time, however, and poses considerable technical challenges. Not every process we help develop will become commercially available.

With Canadian firm Iogen Energy, we are developing technology that uses enzymes to break down the cellulose in, for example, wheat and barley straw. The cellulose is converted to sugars which are then fermented and distilled into ethanol. Iogen Energy has a demonstration plant in Ottawa and continues to look into potential sites for a commercial plant in Canada.

Through Raízen, our research programme with Codexis in the USA is developing natural enzymes into super-enzymes that speed up the conversion of biomass to ethanol.

Shell has a joint-technology development programme with US company Virent to convert plant sugars and inedible biomass directly into a range of fuels. A Virent demonstration plant that opened in Wisconsin, USA, in 2010 is the world's first facility to convert plant sugars directly into a petrol-like biofuel. Virent is also researching the production of diesel and jet fuel made this way.

Electric cars will be increasingly common in the decades to come, but their CO<sub>2</sub> benefits depend on how the energy is produced and delivered – for example, whether the electricity comes from a CO<sub>2</sub>-intensive, coal-fired plant or a cleaner-burning gas-fired plant.

Hydrogen fuel cells have potential for the longer-term transport energy mix. Shell had six hydrogen refuelling stations open at the end of 2011 in China, Germany, Japan and the USA. One station in the USA uses on-site electrolysis that makes hydrogen from water.

sustainable production. These require Raízen to assess the potential direct and indirect impacts of cultivating new land for biofuel crops, and to avoid land rich in biodiversity. Raízen also works with its suppliers, contractors and landowners to make sure that they follow sound water management, labour and land practices.

Land used to grow sugar cane for Raízen lies hundreds of kilometres from the Amazon rainforest. Raízen supports the work of the Brazilian government to implement effective land use policies and address concerns over sugar-cane production displacing other crops to areas with rich biodiversity. Raízen also supports government efforts to protect the land rights of indigenous peoples.

As manual harvesting is being phased out in São Paulo state, Raízen is training some manual cane cutters for new roles, including operating and maintaining machines for sowing and harvesting. It

has also launched a training programme for workers to gain other trade skills, for example as electricians or mechanics.

Raízen is a member of Bonsucro, which has developed industry standards for the certification of biofuels from sugar cane. Bonsucro separately certifies the mills where the sugar cane is converted, and the ethanol produced. Bonsucro certified four Raízen mills in 2011, including the first mill to be certified under the initiative. Raízen aims to have all its mills certified in the coming years. It also aims to achieve certification for all ethanol produced from its own sugar cane, and ethanol produced from its suppliers' sugar cane.

With interests in biofuels technology firms Iogen Energy and Codexis (see box), Raízen has the potential to accelerate the commercial production of advanced biofuels.

 [www.shell.com/biofuels](http://www.shell.com/biofuels)

## FUELS AND PRODUCTS

As the number of cars grows in coming decades, the challenge will be how to manage the environmental impact. Around 17% of global CO<sub>2</sub> emissions from fossil fuels come from road transport. Shell develops advanced fuels and lubricants that can help drivers save fuel.

Our most efficient fuels to date, Shell FuelSave petrol and diesel, are designed to help motorists save fuel by reducing energy loss in the engine. In 2011, we

started selling them in five more countries: the Czech Republic, Greece, Hungary, the Philippines and Slovakia. This brought to 15 the number of countries where these fuels were available at the end of the year.

Our efforts to make transport more sustainable extend beyond the road. We have developed a new marine lubricant called Alexia S4 which can help improve fuel efficiency. Using this lubricant allows ships to travel slowly for longer periods without causing excessive wear on their engines.

We also produce petrochemicals that manufacturers use to make everyday products that help consumers use less energy. These products include highly efficient building insulation, warm-water washing detergents and lightweight plastics for cars.

### Sulphur

We are developing innovative uses for sulphur, a naturally occurring by-product of oil and gas production. Shell Thiogro™ is a sulphur-enhanced fertiliser which, trials have shown, can increase crop yields and quality in some types of soils. We license Shell Thiogro™ in Australia, India and the USA.

Another sulphur-based product, Shell Thiopave™, can reduce the amount of energy used in road making and strengthen road surfaces. It uses less energy as the asphalt can be mixed at lower temperatures. Shell Thiopave™ has been tested in Asia, Europe, the Middle East and North America.

### Catalysts

A Shell company, CRI Catalyst, has developed a technology that can reduce emissions of nitrous oxide (N<sub>2</sub>O), a powerful greenhouse gas, at large industrial plants. This technology efficiently converts N<sub>2</sub>O into naturally occurring nitrogen (N<sub>2</sub>) and oxygen (O<sub>2</sub>), which do not contribute to climate change. In 2011, CRI Catalyst installed three systems using this technology in chemical plants for customers. These systems are expected to



↑ Students compete to go further using less energy at the Shell Eco-marathon in Malaysia.

### SHELL ECO-MARATHON

The Shell Eco-marathon encourages students to develop innovative, fuel-efficient vehicles. Student teams from around the world compete to design and build vehicles using a range of lightweight and often recyclable materials. They can run on biofuels, solar energy or hydrogen, as well as petrol or diesel. The winners are the teams in each fuel category that go the furthest distance using the least amount of energy. In 2011, a total of 342 teams took part in the competition in three events in Germany, Singapore and the USA.

We have further developed the competition to bring the challenge of sustainable mobility to a wider audience. In 2011, competitors in the USA drove on the streets of Houston, Texas, for the second year running instead of a racetrack, testing their vehicles in real driving conditions.

The Shell Eco-marathon Europe also moves from the racetrack to the city in 2012. It will take place in the centre of Rotterdam in the Netherlands, along with public debates and other events to promote awareness of sustainable transport.

[www.shell.com/ecomarathon](http://www.shell.com/ecomarathon)



**Sunil V. Shah**

General Manager of Wellmac Plastics Pvt. Ltd., Mumbai, India

For 10 years, we have been a supplier of plastic containers for Shell Lubricants. In this time, they have demonstrated an effective blend of business operations and a comprehensive system for the management of health, safety and environment. Their programme has encouraged us to implement a similar programme in Wellmac, as well as earn our ISO 14000 certification. Implementing this programme has resulted in our customers having more confidence in our business and has, in turn, helped our business grow.

reduce emissions at these plants in total by more than 1 million tonnes of CO<sub>2</sub> equivalent a year. Shell does not operate the kind of plant that produces major amounts of N<sub>2</sub>O.

**Working with partners**

We take a collaborative approach to improving fuel efficiency by working side by side with a range of manufacturers to develop fuels and lubricants for engines and other equipment.

Our relationship with Daimler allows us to develop advanced lubricants that match advanced engine technology. One example is Shell Rimula R6 LME, a synthetic lubricant that protects heavy-duty engines and helps reduce fuel use. In 2011, Daimler chose Shell Rimula R6 LME and Shell FuelSave Diesel for testing the fuel efficiency of its newest truck series. Driving in normal traffic conditions over 10,000 km, the trucks set a new standard in fuel efficiency for road transport.

We also work with a number of other manufacturers to develop more efficient fuels and lubricants, including Audi, Chrysler, Ducati, Ferrari and Volkswagen.

**Working with consumers**

We continue to work with consumers to help them to save energy. Through face-to-face training, driving simulators and online tutorials, we have helped more than 200,000 drivers learn how to use less fuel since 2009. We set a new Guinness World Record in 2011 for the “largest fuel efficiency lesson”. At this event more than 3,200 people in 10 cities across Europe and Asia took part in simultaneous training sessions. They learned how a few simple changes to their driving habits could help them save fuel and reduce motoring costs.

We are saving energy at Shell-owned service stations by fitting them with more energy-efficient equipment for lighting, refrigeration and temperature control. Energy use has gone down by an average

of 22% at each site. By the end of 2011 we had modified 2,280 service stations in Austria, Canada, Denmark, France, Germany, Luxembourg, Norway, the Philippines and the UK. Work is under way to improve energy efficiency at our sites in other countries.

Shell joined Canadian Geographic magazine to encourage customers to learn more about energy efficiency at home and on the road. As part of the initiative, six households from across Canada competed in the Energy Diet Challenge in 2011 to see who could shrink their carbon footprint the most. The winning household made simple changes such as shortening the time spent showering, and fully switching off their televisions, that made a noticeable difference in their energy consumption. The next phase aims to increase awareness of energy use among students across Canada in 2012.

[www.shell.com/fuelsave](http://www.shell.com/fuelsave)

**ROAD SAFETY**

Our staff and contractors drive around 1.1 billion km each year, or around 75 times around the world every day, to deliver products to our customers and to keep our operations running. We improve the safety of our drivers by enforcing our global road safety standards, minimising journeys and through training. In 2011, we continued to improve in road safety, recording a 41% reduction in incidents from 2010.

Human factors are a main cause of road accidents. We train our drivers to improve their skills, but also to help them manage other factors that may affect their driving. In India in 2011, for example, our distribution business launched a training programme that showed drivers how to deal with stress or other distractions that could affect their driving performance.

Our global training includes defensive driving, coping with fatigue, better management of journeys and how to prevent a truck from rolling over. In-vehicle monitoring systems help us to improve driving behaviour by providing details of a driver’s performance. As a result we can recognise and encourage good driving, and improve fuel economy. Since 2005, we have installed more than 31,000 of these devices.

Our mandatory 12 Life-Saving Rules include requirements to wear seat belts, plan journeys, not speed and not use mobile phones while driving. In 2011, we saw a 17% fall from the previous year in the number of violations of these road-safety rules.

We share our road safety experience with others to help reduce the number of road traffic incidents globally. We are a sponsor of the UN’s Decade of Action for Road Safety. We also partner with local organisations to host awareness programmes in many countries (see opinion, right), especially those where the risk is high, such as Malaysia. We work with governments, communities, partnerships and other companies to help set industry standards, improve road infrastructure and influence governments on road safety policies.

[www.shell.com/roadsafety](http://www.shell.com/roadsafety)



**Ir. Linda S. van der Eijck**

*Director of Veilig Verkeer Nederland, Amersfoort, the Netherlands*

// Traffic safety education is about learning by doing. The Dutch Traffic Safety Association helps children from the ages of six to nine learn the rules of the road and how to cope with traffic situations. Our programme has been developed over many years and is already used in many elementary schools in the Netherlands. Educating children in road safety has to be practical. It’s most effective when the children practise in safe surroundings. In 2011, we developed with our partner, Shell, the Mobile Safety Track. We based the track on our existing safety education programme. The track allows children to drive go-karts along a specially designed route and practise how to manage road hazards in an interactive and fun way. Since its launch, 10,000 children have had the chance to learn from this experience and increase their awareness of road safety basics. //

# OUR PERFORMANCE

## 2011 IN REVIEW

**In 2011, Shell delivered major projects which will secure more energy supplies for our customers for years to come. We continued to work to improve our environmental performance in areas such as emissions, energy and water use, flaring and spills. Our safety performance remained strong, and we continued to develop and implement measures to improve our social performance.**

### ECONOMIC

Our income in 2011 was \$30.9 billion and we announced dividends of more than \$10 billion for our shareholders. Our capital investment of over \$31 billion will help to build and sustain our business for the future. We also spent \$1.1 billion on our research and development programme.

We continued to focus our efforts on those markets where we see the best potential for growth. A number of major projects started production in 2011: the Pearl GTL (gas-to-liquids) plant (Shell interest 100%) in Qatar that can produce 140,000 barrels of oil equivalent (boe) a day of synthetic oil products and 120,000 boe a day of condensates, liquid petroleum gas and ethane; the 7.8 million tonnes-a-year Qatargas 4 LNG facility (Shell interest 30%) also in Qatar; the final phase of the 100,000 boe-a-day Athabasca Oil Sands Project expansion (Shell interest 60%) in Canada; and enhanced oil recovery

projects at Qarn Alam (Shell interest 34%) in Oman and Schoonebeek (Shell interest 30%) in the Netherlands. We also launched Raízen (Shell interest 50%) that produces the lowest-CO<sub>2</sub> biofuel commercially available today, ethanol from sugar cane in Brazil.

In 2011, Shell's oil and gas production was 3.2 million boe a day, slightly down from 2010. We increased our sales of liquefied natural gas (LNG) by 12% to 19 million tonnes. We had seven notable oil and gas discoveries, and we replaced 99% of our production with additions to our proved reserves.

### Shell scorecard

In 2011, sustainable development continued to account for 20% of the company scorecard, which helps determine the annual bonus levels for all our employees, including members of the Shell Executive Committee (EC). For the EC in 2011, sustainable development measures were split evenly between Shell's

safety performance and targeted measures covering operational spills, energy efficiency and use of fresh water.

### ENVIRONMENTAL

#### Greenhouse gas emissions

The direct greenhouse gas (GHG) emissions from facilities we operate were 74 million tonnes on a CO<sub>2</sub>-equivalent basis in 2011, a decrease of around 3% from 2010.

The main reasons for this slight drop were divestments in our Downstream business and reduced flaring in Nigeria. These were partly offset by the start of production at the Pearl GTL plant in Qatar and the Athabasca Oil Sands Project expansion in Canada.

Around 55% of our GHG emissions came from the refineries and chemical plants in our Downstream business. The production of oil and gas in our Upstream business accounted for around 40% of our GHG emissions, and our shipping activities for the remaining 5%. We continue to work on improving operational performance and energy efficiency to reduce GHG emissions.

The indirect GHG emissions from the energy we purchased (electricity, heat and steam) were 10 million tonnes on a CO<sub>2</sub>-equivalent basis in 2011, the same as in 2010. We estimate that the CO<sub>2</sub> emissions from the use of our products were around 570 million tonnes in 2011.

PRODUCED **2%**  
OF THE WORLD'S OIL

PRODUCED **3%**  
OF THE WORLD'S GAS

**3.2** MILLION  
BARRELS OF OIL EQUIVALENT  
PRODUCED A DAY

OVER **48%**  
OF PRODUCTION WAS NATURAL GAS

DELIVERED LNG IN **49** VESSELS,  
THE WORLD'S LARGEST LNG FLEET

SOLD **7.7%**  
OF THE WORLD'S LNG

**\$30.9** BILLION  
INCOME

**\$31** BILLION  
CAPITAL INVESTMENT

**\$1.1** BILLION  
SPENT ON R&D

## Flaring

In 2011, the flaring of natural gas in our Upstream business decreased by around 4% compared to 2010, to 10.0 million tonnes of CO<sub>2</sub> equivalent. We made progress in reducing flaring in Nigeria in 2011. Although onshore oil production in Nigeria rose by around 4%, flaring emissions were down almost 20%, to 6.1 million tonnes of CO<sub>2</sub> equivalent. This was because more gas-gathering equipment was brought on-stream and more controls were applied to sites with higher levels of gas associated with oil production. The decrease in Nigeria was partly offset by increased flaring during the start-up of production at the Pearl GTL plant in Qatar. Overall, flaring made up around 15% of the total direct GHG emissions in 2011.

Operational flaring for safety reasons, or during the start-up of Upstream facilities, accounted for around 35% of flaring emissions. We aim to minimise this operational flaring.

Continuous flaring, due to a lack of equipment to capture the gas produced with oil, accounted for the remaining 65% of flaring emissions. Around 80% of this continuous flaring took place in Nigeria, where the security situation and lack of government funding has previously slowed progress on projects to capture the gas (pages 18, 20). Around 15% of the continuous flaring came from the Majnoon

field in Iraq where we are now the operator. We expect that flaring in Iraq will rise in future years as production increases and before equipment to gather the associated gas can be installed (page 22). When we acquire or become the operator of an existing facility that is already flaring or venting (releasing gas to the atmosphere), it takes time before these activities can be stopped.

Outside Nigeria and Iraq, the few facilities that continuously flare accounted for less than 1% of our total direct GHG emissions in 2011. Some of these facilities are at ageing oil fields where the associated gas pressure is too low to power the compressors used to gather the gas and avoid flaring.

Our HSSE & SP Control Framework requires our new facilities to be designed so as not to flare or vent continuously.

## Energy efficiency

One of the ways we can manage our direct GHG emissions is to improve the energy efficiency of the facilities we operate.

In 2011, the overall energy efficiency for the production of oil and gas in our Upstream business worsened slightly compared to 2010, but was around the same level as in earlier years. All our major facilities have energy management plans in place that include making the best

use of those facilities and using improved techniques in field management. We expect that maintaining the energy efficiency levels of recent years will be difficult in the future as existing fields age and production comes from more energy-intensive sources.

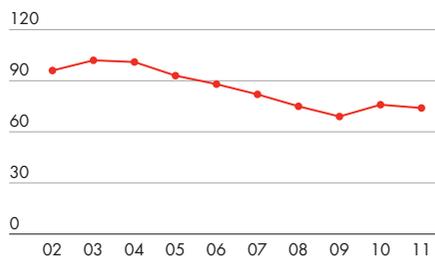
In our oil sands operations, energy intensity in 2011 worsened slightly compared to 2010, as efforts to improve the energy efficiency of our operations were offset by the start of production at the Jackpine Mine and Scotford Upgrader expansion (page 23).

In 2011, the overall energy efficiency for the manufacture of oil products at our refineries improved compared to 2010, helped by continued progress with our CO<sub>2</sub> and energy management programme and increased use of refinery capacity. Although improved over the past two years, the energy intensity of our refineries remained high compared to earlier years as a result of continued reduced demand for oil products. Reduced output leads to higher energy intensity as the energy needed to run refineries does not decrease significantly at lower production levels.

The overall energy efficiency of our chemical plants worsened in 2011, compared to 2010. Our chemical plants experienced unplanned maintenance and lower demand for products, leading to the plants running at reduced output.

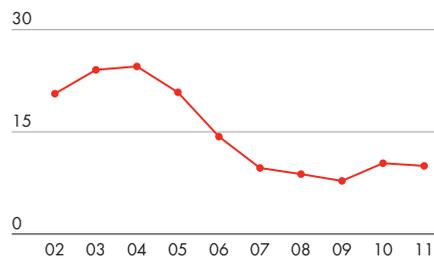
### DIRECT GREENHOUSE GAS EMISSIONS

Million tonnes CO<sub>2</sub> equivalent



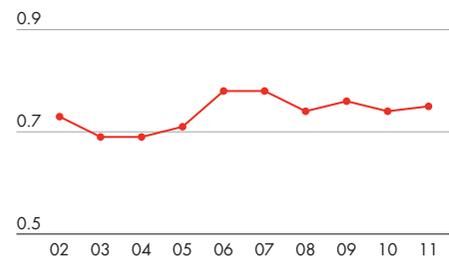
### FLARING – UPSTREAM

Million tonnes CO<sub>2</sub> equivalent



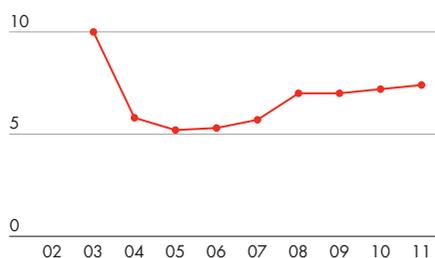
### ENERGY INTENSITY – UPSTREAM (EXCL. OIL SANDS AND GTL)

Gigajoules/tonne production



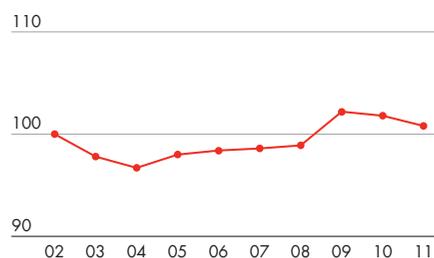
### ENERGY INTENSITY – OIL SANDS

Gigajoules/tonne production [A]



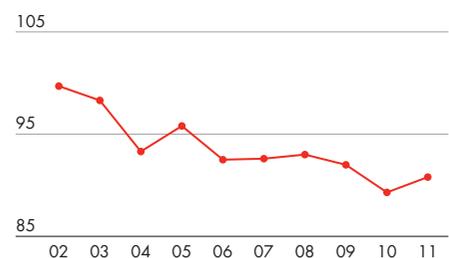
### ENERGY INTENSITY – REFINERIES

Refinery Energy Index [B]



### ENERGY INTENSITY – CHEMICAL PLANTS

Chemicals Energy Index



[A] Includes mining and upgrading operations

[B] Indexed to 2002; based on 2006 Solomon EII™ methodology

Our refineries and chemical plants continue to implement the CO<sub>2</sub> and energy management programme (page 7) to improve their energy efficiency performance.

**Spills**

Shell has clear requirements and procedures to prevent operational spills, and multi-billion dollar programmes in place to maintain and improve our facilities and pipelines. However, spills still occur for reasons such as operational failure, accidents or corrosion.

In 2011, our operational spills of oil and oil products totalled 6.0 thousand tonnes, up from 2.9 thousand tonnes in 2010. Around 80% of the volume in 2011 was from a single spill of 4.8 thousand tonnes at the Bonga field off the coast of Nigeria (pages 18, 20). We continue to investigate and learn from all spills to improve our performance.

The number of operational spills increased slightly to 208 in 2011, from 195 in 2010, as equipment in Nigeria was put back into service. We are working to extend the significant improvements made in previous years in the number of operational spills through our continued investment in improving the reliability and maintenance of our facilities.

In 2011, sabotage and theft in Nigeria remained a significant cause of spills, totalling 1.6 thousand tonnes. This was a decrease in volume from 2010 and is the lowest level recorded since 2005.

However, the number of these spills increased slightly to 118 in 2011, from 112 the previous year.

As of the end of March 2012, there were two spills under investigation in Nigeria that may result in adjustments to the 2011 data. See pages 18 and 20 for more information on spills in Nigeria.

**Water**

The way we manage our use of fresh water is especially important in areas of the world that are water constrained due to limited supplies or extensive use. We assess the availability of water where we operate, and design and run our facilities in ways that help reduce their water use.

In 2011, our use of fresh water increased to 209 million cubic metres, from 202 million cubic metres in 2010. This was primarily due to increased water consumption following the start of production at the Athabasca Oil Sands Project expansion in Canada. Our Downstream business accounted for around 75% of our fresh-water use for the manufacture of oil products and chemicals; our Upstream operations used around 25%. In water-scarce areas, we have water management plans that outline how our operations will reduce, recycle and monitor water use.

We maintained our lowest-ever level of injuries per million working hours, the total recordable case frequency (TRCF). We also maintained our lowest-ever level of injuries that led to time off work in 2011, the lost-time injury frequency (LTIF).

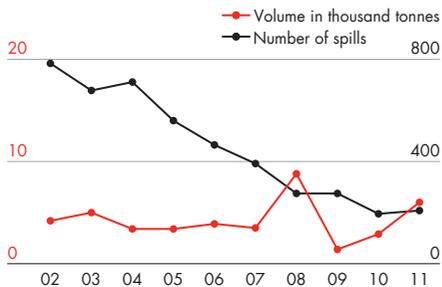
Sadly, however, six people working for Shell lost their lives in 2011. This was six fewer than in 2010. Three were industrial accidents during construction, two were drowning incidents and one was a road transport accident. Our fatal accident rate (FAR) – the number of fatalities per 100 million hours worked – continued to decrease. In 2011, we achieved the lowest FAR that Shell has recorded, around 40% below the rate in 2010.

Maintaining safety requires continuous vigilance. For example, in 2011 the Port Dickson refinery (Shell interest 51%) in Malaysia achieved 10 years without a lost-time injury.

**Social investment**

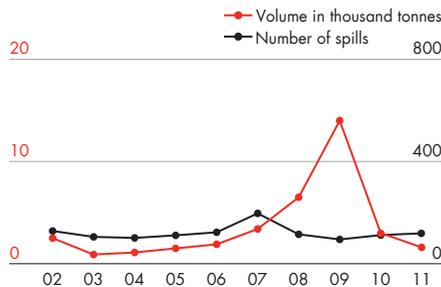
We aim to make our social investment projects beneficial to society in measurable ways and to be sustainable beyond Shell's involvement. In 2011, we spent around \$125 million on voluntary social investments worldwide, compared to \$121 million in 2010. We estimate that \$45 million of our spend in 2011, compared to \$61 million in 2010, was in countries that according to the UNDP Human Development Index 2010 have a gross domestic product of less than \$15,000 a year per person. In 2011, our social investment increased significantly

**SPILLS – OPERATIONAL [A]**



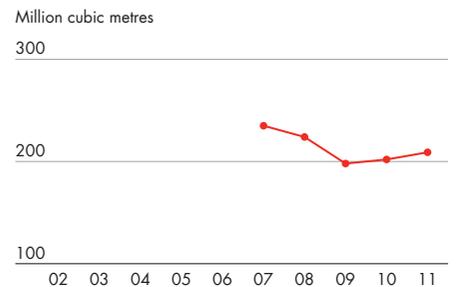
[A] Over 100 kilograms

**SPILLS – SABOTAGE [B]**



[B] Over 100 kilograms

**FRESH WATER WITHDRAWN**



**\$2.3** BILLION SPENT ON ALTERNATIVE ENERGY, CCS, AND CO<sub>2</sub> R&D IN THE LAST 5 YEARS

SOLD **160** BILLION LITRES OF FUEL

DISTRIBUTED **7.4** BILLION LITRES OF BIOFUEL

in countries such as Iraq, Japan and the Netherlands. Our figures do not include investments that are part of contractual agreements with host governments. We also provide significant support through donations of equipment and voluntary work by Shell employees.

**Social performance**

We continued to implement our company-wide standards for social performance in 2011. They include requirements for the way we engage with neighbours at our major projects and facilities. We have also invested heavily in building the competencies of staff. In 2011, we trained 220 additional social performance specialists in our new requirements. We review annually the extent to which our operations, as well as contractors and suppliers, have processes in place to prevent cases of child or forced labour. We have employee representation in our operations via staff councils or recognised trade unions, in line with local practice.

**Local procurement**

Wherever possible, we buy goods and services from local businesses. In 2011, we spent a total of over \$60 billion on contracting and procurement worldwide. About half of this was spent in Canada, the Netherlands, UK and USA. We estimate almost \$12 billion was spent in countries that, according to the UNDP Human Development Index 2010, have a gross domestic product of less than \$15,000 a year per person. In these countries, Shell companies spent over 90% of this \$12 billion with local companies. We check

that our suppliers are complying with key sustainability criteria, including working conditions. In 2011, we conducted 33 rigorous assessments of suppliers in Africa and the Middle East, 120 in the Americas, 268 in Asia-Pacific and 43 in Europe, to assess their compliance in areas such as human rights, labour practices and business integrity.

**External voluntary codes**

The Shell General Business Principles and Code of Conduct guide the business activities of Shell companies. But we also support a number of external voluntary codes. These include the UN Declaration on Human Rights, the Organisation for Economic Co-operation and Development Guidelines for Multinational Enterprises, and the International Labour Organization Declaration on Fundamental Principles and Rights at Work. In early 2011, Shell joined the new UN Global Compact LEAD programme which strengthens our leadership in the Global Compact and our commitment to its principles.

**Diversity and inclusion**

Our ability to deliver our business strategy while meeting environmental and social challenges depends on the quality and diversity of our people. We aim to create an inclusive work environment with equal opportunities. We measure diversity and inclusion in part by the representation of women and local nationals in senior leadership positions. By the end of 2011, the proportion of women in senior leadership positions at Shell was 16.6%, up 1.3% from 2010 and up 2.6% from 2009.

In 34% of countries where we operate, local nationals filled more than half the senior leadership positions – down 2% from 2010, and down 3% from 2009. In 2011, more than 90% of our employees worldwide were nationals.

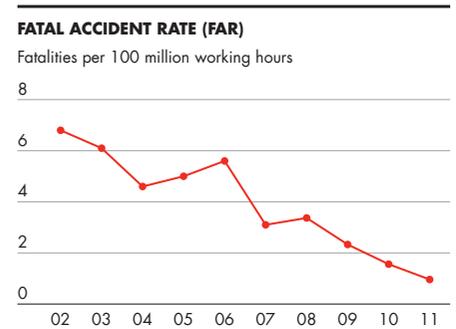
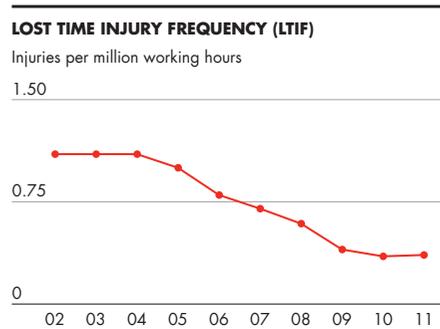
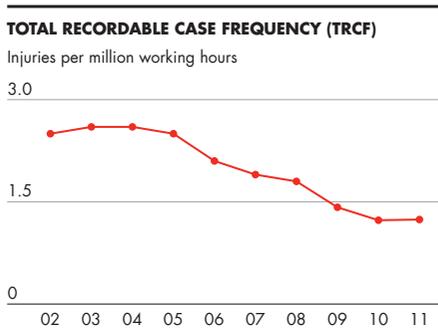
Our annual Shell People Survey measures employees' views of the inclusivity of their workplace. In 2011, 68% felt positive about this, up 2% from 2010 and down 1% from 2009; 12% felt negatively about inclusion in the workplace, down 1% from 2010 and up 1% from 2009.

**Training**

We continue to invest in the training and development of our employees and joint-venture staff. Our focus is on building technical capability and safety-critical competencies and skills. In 2011, we provided more than 770,000 training days for employees and some of our joint-venture partners. This included training more than 6,000 people in leadership skills. More than 215 senior project engineers completed our externally accredited Project Academy programme that helps to improve the delivery of our major oil and gas projects.

**Code of Conduct violations**

Shell employees, and contractors working for Shell, must abide by our Code of Conduct. In 2011, 226 violations of the Code of Conduct were reported (205 in 2010; 165 in 2009). As a result, we ended our relationship with 78 employees and contractors (77 in 2010; 126 in 2009).



**EMPLOYED 90,000 PEOPLE**

**OPERATED IN 80+ COUNTRIES**

**\$12 BILLION SPENT IN LOWER-INCOME COUNTRIES**

## ENVIRONMENTAL AND SOCIAL DATA

ENVIRONMENTAL DATA	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002
<b>Greenhouse gas emissions (GHGs)</b>										
Direct total GHGs (million tonnes CO <sub>2</sub> equivalent) [A]	74	76	69	75	82	88	93	101	102	96
Carbon dioxide (CO <sub>2</sub> ) (million tonnes)	71	72	66	72	79	85	89	96	97	92
Methane (CH <sub>4</sub> ) (thousand tonnes)	133	128	127	126	119	124	173	192	187	196
Nitrous oxide (N <sub>2</sub> O) (thousand tonnes)	1	2	2	2	2	2	2	2	3	4
Hydrofluorocarbons (HFCs) (tonnes)	22	23	25	23	28	24	20	13	9	11
Indirect total GHGs (million tonnes CO <sub>2</sub> equivalent)	10	10	9	n/c						
<b>Flaring [B]</b>										
Flaring (Upstream) (million tonnes CO <sub>2</sub> equivalent)	10.0	10.4	7.8	8.8	9.7	14.3	20.8	24.6	24.1	20.6
Flaring (Upstream) (million tonnes hydrocarbon flared)	3.4	3.6	2.6	2.8	3.4	4.8	7.0	8.1	8.1	6.8
Nigeria [C]	2.0	2.4	1.9	2.3	2.5	3.7	5.8	6.6	6.4	5.2
Rest of world [D]	1.4	1.2	0.7	0.5	0.9	1.1	1.2	1.5	1.7	1.6
<b>Energy intensity</b>										
Upstream excl. Oil Sands and GTL (gigajoules per tonne production) [E]	0.75	0.74	0.76	0.74	0.78	0.78	0.71	0.69	0.69	0.73
Oil Sands (gigajoules per tonne production) [F]	7.4	7.2	7.0	7.0	5.7	5.3	5.2	5.8	10.0	n/c
Refineries: Refinery Energy Index [G]	100.8	101.8	102.2	98.9	98.6	98.4	98.0	96.7	97.8	100.0
Chemical plants: Chemicals Energy Index	90.8	89.3	92.0	93.0	92.6	92.5	95.8	93.3	98.3	99.7
<b>Acid gases and VOCs</b>										
Sulphur oxides (SO <sub>x</sub> ) (thousand tonnes SO <sub>2</sub> )	136	139	141	175	212	233	226	247	257	240
Nitrogen oxides (NO <sub>x</sub> ) (thousand tonnes NO <sub>2</sub> )	146	159	142	150	145	154	157	172	193	195
Volatile organic compounds (VOCs) (thousand tonnes)	111	133	126	130	148	185	199	213	226	324
<b>Ozone-depleting emissions</b>										
CFCs/halons/trichloroethane (tonnes)	0.0	0.0	0.4	1.4	0.6	0.3	0.8	2.3	3.0	7.7
Hydrochlorofluorocarbons (HCFCs) (tonnes) [H]	11	21	24	26	27	35	35	42	44	57
<b>Spills and discharges [I] [J]</b>										
Sabotage spills – volume (thousand tonnes) [K]	1.6	3.0	14.0	6.5	3.4	1.9	1.5	1.1	0.9	2.5
Sabotage spills – number [K]	118	112	95	115	197	123	111	101	105	128
Operational spills – volume (thousand tonnes) [L]	6.0	2.9	1.4	8.8	3.5	3.9	3.4	3.4	5.0	4.2
Nigeria	5.3	0.7	0.3	7.1	1.6	1.4	0.1	0.0	0.4	0.2
Rest of world	0.7	2.2	1.1	1.7	1.9	2.5	3.3	3.4	4.6	4.0
Operational spills – number [M]	208	195	275	275	392	465	560	711	678	784
Nigeria [N]	64	32	37	42	52	41	63	48	48	66
Rest of world	144	163	238	233	340	424	497	663	630	718
Hurricane spills – volume (thousand tonnes)	0.0	0.0	0.0	0.0	0.0	0.0	2.9	1.0	0.0	0.0
Oil in effluents to surface environment (thousand tonnes)	1.3	1.6	1.5	1.7	1.6	1.8	2.3	2.1	2.3	2.4
<b>Water</b>										
Fresh water withdrawn (million cubic metres)	209	202	198	224	235	n/c	n/c	n/c	n/c	n/c
<b>Waste disposal</b>										
Hazardous (thousand tonnes)	740	921	962	688	907	716	631	714	675	781
Non-hazardous (thousand tonnes) [O]	1,737	1,079	1,139	996	1,899	1,154	632	421	443	480
Total waste (thousand tonnes)	2,477	2,000	2,101	1,684	2,806	1,870	1,263	1,135	1,118	1,261

[A] Oil and gas industry guidelines (IPIECA/API/OGP) indicate that there are a number of sources of uncertainty that can contribute to the overall uncertainty of a corporate emissions inventory. CO<sub>2</sub> equivalent is a term used to express the total emissions of the major greenhouse gases, including CO<sub>2</sub>, methane, nitrous oxide and hydrofluorocarbons. We have updated our 2010 figures following recalculation of the data.

[B] We have updated our 2010 figures following recalculation of the data.

[C] Nigeria includes SPDC onshore operations (1.9 million tonnes flared in 2011) and SNEPCo offshore operations (0.1 million tonnes flared in 2011).

[D] Flaring from the start-up of the Pearl GTL plant in Qatar amounted to 0.4 million tonnes of hydrocarbon in 2011. Flaring in Iraq amounted to 0.3 million tonnes of hydrocarbon in 2011.

[E] Data reported in accordance with IPIECA/API/OGP guidelines. We have updated our figures following recalculation of the data.

[F] The data includes mining and upgrading operations. It does not include in situ production. We have updated our figures following recalculation of the data.

[G] Indexed to 2002; based on Solomon Associates Energy Intensity Index 2006 methodology.

[H] We have updated our 2010 figure following review of the data.

[I] All spill volumes and numbers are for spills over 100 kilograms.

[J] As of the end of March 2012, there were two spills under investigation in Nigeria that may result in adjustments to the 2011 data.

[K] All sabotage and theft related spills have occurred in Nigeria except in 2007 (0.7 thousand tonnes outside Nigeria) and 2006 (0.6 thousand tonnes outside Nigeria).

[L] A single spill at the Bonga field offshore Nigeria amounted to 4.8 thousand tonnes in 2011. Nigeria includes SPDC onshore operations and SNEPCo offshore operations.

[M] We have updated our 2010 figure following review of the data. The number of operational spills reported for 2004 and 2005 also contain a small number of hurricane spills.

[N] Nigeria includes SPDC onshore operations (63 operational spills in 2011) and SNEPCo offshore operations (1 operational spill in 2011).

[O] The increase in 2011 is due to disposal of water containing low levels of selenium in Canada.

n/c Not calculated.

See page 37 for more information about our data.

SOCIAL DATA										
	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002
<b>Fatalities</b>										
Total number	6	12	20	26	21	37	34	31	45	51
Employees	1	0	1	2	1	2	3	2	5	8
Contractors	5	12	19	24	20	35	31	29	40	43
Fatal accident rate (FAR)	0.96	1.56	2.3	3.4	3.1	5.6	5.0	4.6	6.1	6.8
Fatalities per 100 million working hours (employees and contractors)										
<b>Injuries</b>										
Total recordable case frequency (TRCF)	1.24	1.23	1.4	1.8	1.9	2.1	2.5	2.6	2.6	2.5
Injuries per million working hours (employees and contractors)										
Lost time injury frequency (LTIF)	0.36	0.35	0.4	0.6	0.7	0.8	1.0	1.1	1.1	1.1
Lost time injuries per million working hours (employees and contractors)										
<b>Illnesses</b>										
Total recordable occupational illness frequency (TROIF)	0.66	0.76	0.6	1.2	1.5	1.8	2.0	2.1	2.0	2.0
Illnesses per million working hours (employees only)										
<b>Security</b>										
Using armed security (% of countries)	14	9	17	17	16	15	19	18	22	16
Using armed company security (% of countries)	1	1	1	1	2	2	2	2	2	1
Using armed contractor security (% of countries)	9	6	10	9	12	9	11	11	22	12
<b>Gender diversity [P]</b>										
In supervisory/professional positions (% women)	27.3	26.3	26.4	24.7	24.6	23.2	21.8	20.7	19.5	18.9
In management positions (% women)	17.6	17.0	16.1	15.3	17.7	16.2	12.9	12.2	11.3	9.2
In senior leadership positions (% women)	16.6	15.3	14.0	13.6	12.9	11.6	9.9	9.6	9.6	8.8
<b>Regional diversity [P]</b>										
% countries with majority of local nationals in senior leadership positions	34	36	37	32	33	25	36	n/c	n/c	n/c
<b>Staff forums and grievance procedures</b>										
% countries with staff access to staff forum, grievance procedure or other support system	99	100	99	100	100	99	100	100	100	100
<b>Child labour (% countries with specific procedures in place)</b>										
Own operations	100	99	98	100	99	95	88	83	78	86
Contractors	97	96	97	99	98	89	69	61	57	56
Suppliers					96	82	62	63	50	42
<b>Forced labour (% countries with specific procedures in place)</b>										
Own operations	100	99	98	n/c						
Contractors and suppliers	97	95	89	n/c						
<b>Integrity</b>										
Code of Conduct violations [Q]	226	205	165	204	361	n/c	n/c	n/c	n/c	n/c
Contracts cancelled due to incompatibility with Business Principles	11	40	24	49	35	41	63	64	49	54
Joint ventures divested due to incompatibility with Business Principles	0	0	0	0	0	0	0	0	1	0
<b>Contracting and procurement</b>										
Estimated expenditure on goods and services from locally owned companies in lower-income countries (\$ billion) [R]	12	13	12	12	13	10	9	6	5	n/c
<b>Social investment [S]</b>										
Estimated voluntary social investment (equity share) (\$ million)	125	121	132	148	170	140	127	106	102	96
Estimated social investment spend (equity share) in lower-income countries (\$ million) [T]	45	61	54	61	65	n/c	n/c	n/c	n/c	n/c

[P] Diversity data gathered by our human resources system.

[Q] Code of Conduct violations gathered by our global helpline and through internal channels.

[R] Estimated expenditure in countries where gross domestic product amounts to less than \$15,000 a year per person (source: UNDP Human Development Index 2010).

[S] Social investment spending varies from year to year depending on business climate, locations and type of activities under way. This is voluntary social investment and does not include social investments made through contractual agreements with host governments, donation of equipment, and voluntary work by Shell employees.

[T] Estimated voluntary social investment spend in countries where gross domestic product amounts to less than \$15,000 a year per person (source: UNDP Human Development Index 2010).

[3] Social investment and contracting and procurement data collected via our financial system since 2007.

[5] Data obtained from an internal survey completed by the senior Shell representative in each country.

n/c Not calculated.



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## EXTERNAL REVIEW COMMITTEE

**Shell, for the seventh successive year, has invited an External Review Committee to assess the content of its sustainability report. This letter provides our assessment of Shell's 2011 Sustainability Report. We express our views as individuals, not on behalf of our organisations.**

### Engagement process

As last year, the External Review Committee (ERC) was engaged early during Shell's content selection process. The ERC also had two opportunities to engage with members of Shell's top management and the reporting team during face-to-face meetings in The Hague, as well as via telephone conference calls and email.

We reviewed and commented on successive drafts of the Report. This process was comprehensive and extremely helpful to the ERC, and it informs this letter. In addition, the ERC will meet with Shell's Executive Committee in mid-2012 to discuss our view of Shell's performance in sustainable development.

The Committee commends Shell for creating such a unique and thorough engagement process.

### Overall report quality

The ERC believes the Report speaks to the material sustainability issues most relevant to Shell and its stakeholders, and finds them to be presented in an objective and accessible manner. The ERC endorses the overall layout and organization of the Report, which gives a good overview of Shell's activities that support sustainable development. The Report gives Shell's perspectives as well as the opinions of some external stakeholders.

Overall, the ERC has a positive view of the Report. However, the ERC notes tensions between Shell's business strategy and actions, as described in the Report, and the emerging environmental and social stresses of the external landscape. For example, even when Shell operates in a responsible manner, it remains a fossil fuel company, and this has consequences for climate change. Therefore, the ERC considers that the Report should play a greater role in explaining more fully Shell's long-term sustainability strategy to address climate change. The ERC comments in more detail below on the Report's strengths as well as areas that the ERC would like to see improved.

### Climate change

Drawing on Shell projections, the Report indicates that fossil fuels and nuclear energy could meet at least 70% of global energy demand in 2050. The Report also refers to the International Energy Agency (IEA) as saying that without a bold change of policy direction, the world could lock itself into an insecure, inefficient and high-carbon energy system as early as 2017. Shell's projections for 2050, coupled with the energy sector's contribution to the accumulation of greenhouse gas emissions, suggests that the IEA's prediction will be fulfilled.

The Report states that Shell is not waiting for national or international policies to address the situation, but instead taking action in four areas: producing more natural gas, helping develop carbon capture and storage (CCS), producing low-carbon biofuel, and improving energy efficiency in its operations. These actions were covered in Shell's 2009 and 2010 Reports. The 2011 Report indicates that Shell is making progress in some, but not all, of these areas. The ERC would have liked the Report to describe the internal workstreams that support these four areas, and how they are being effectively managed across the organisation.

The Report would also have been strengthened by a clearer account of the challenges that are preventing greater progress on CCS projects, as well as more information about Shell's energy efficiency performance. While the ERC notes that energy efficiency has been given a higher profile in this year's report, the 2011 performance was not as strong as expected. Although Shell has been one of the more vocal oil and gas companies to advocate strongly for market mechanisms and a price on carbon, the ERC would have liked the Report to include a description of further actions planned by Shell to address the challenges of climate change.

### Operations in sensitive locations

The Report describes operations in politically sensitive locations, such as Iraq and Nigeria. The situation in Nigeria is given more detailed treatment in the 2011 Report than last year, which the Committee welcomes, in particular the open acknowledgement of the difficulties that exist. The Report also describes the environmental and social concerns that current or planned Shell operations could pose through activities in the Arctic, deep water, fracking, oil sands and biofuels. The Committee notes the introduction of the Onshore Tight Oil and Gas Operating Principles as an example of an area where Shell is taking steps to differentiate itself from the industry.

The ERC wonders whether the Report sufficiently describes the potential environmental and social impacts of some of these sensitive operations, and the ability of Shell to manage these issues well at both at the outset and throughout the project life. If more space had been available in the Report, the Committee would have liked to have seen more comprehensive discussions on operations in sensitive locations, including their context, the opposing views and faces of the stakeholders behind any opposition, a more tangible sense of the difficulties faced by Shell's personnel and management, and finally, a clearer indication of Shell's awareness of future risks in these areas and readiness to face them.

### Social performance and investment

The ERC letter in Shell's 2010 Report looked forward to the development of a more comprehensive social performance strategy against which key metrics would be identified, enabling Shell to strengthen this aspect of reporting. The Committee also suggested that future reports need more information around Shell's social investment and its impacts. The 2011 Report illustrates good progress made in terms of the development of internal social performance manuals and training of specialists on social performance. Several pilot projects that test grievance mechanisms are described, underscoring Shell's commitment to respect human rights.

The ERC understands new social performance metrics were developed in 2011 and have been implemented in 2012, and will be reported on in next year's report. The ERC appreciates these step-wise changes, and looks forward to

seeing Shell's complete social performance strategy and the additional metrics in the 2012 Report. We also look forward to information that provides a stronger sense of the strategic approach to Shell's social and community investments.

### Conclusion

The year 2011 saw strong financial performance by Shell, illustrating the company's successful management of its complex operations in the midst of global economic turmoil. Strong financial performance enables Shell to create shareholder returns, benefit employees, contractors and suppliers, pay taxes to governments, and make investments for the future.

In the areas of social and environmental performance, Shell made further organisational changes in 2011, to achieve greater clarity and move accountability closer to operations. Shell is hoping to use its impressive track record in the area of safety as a model for other aspects of sustainable development. ERC discussions with Shell's management indicate that internal discussions on Shell's strategy are ongoing, to respond to the evolving external landscape and societal expectations. The Committee was encouraged by these internal developments that support Shell's overall performance in sustainable development.

While Shell is making good progress, challenges and dilemmas remain, particularly in the area of climate change. The Committee commends good progress made so far, and encourages Shell to aim for long-term sustainability performance that is robust across the financial, social and environmental domains.

 [www.shell.com/erc](http://www.shell.com/erc)

### ERC OVERVIEW

The Committee met in person twice in The Hague, the Netherlands, and on other occasions by teleconference. We held meetings with key Shell senior management and other personnel to discuss in detail Shell's approach to sustainable development and its sustainability reporting.

In reviewing the sustainability report, the Committee concentrated on three main questions:

- Has Shell selected the most important topics for the report?
- How well has the report dealt with these topics and responded to stakeholder interest?
- Did Shell provide sufficient information and access for us to do our job effectively?

Our review did not include verification of performance data underlying the report, or the information on which the case studies in the report were based. In addition to our comments on the company's reporting, we separately provided Shell with our observations on the company's strategy and sustainability performance. In recognition of our time and expertise, an honorarium was offered, payable either to us individually, to our organisation, or to a charity of our choosing. We were also offered reimbursement for the expense of our travel and accommodation.

## ABOUT OUR REPORTING

We began reporting voluntarily on our environmental and social performance with the first Shell Report that covered 1997. Our reporting focuses on the environmental and social challenges that most affect business performance and matter most to our key stakeholders. These include local communities, non-governmental organisations, shareholders, investors, customers, partners, governments, employees, media, academics, contractors and suppliers. We use a thorough process to select content for our reporting (see diagram).

Throughout the year we also provide information to organisations that help investors understand the economic, environmental and social performance of companies, including the Carbon Disclosure Project.

Internal controls such as audit trails and statistical checks help assure the accuracy of the Shell Sustainability Report. An

External Review Committee of independent experts helps make sure our reporting is balanced, relevant and responsive to stakeholders' interests. Lloyd's Register Quality Assurance Ltd has provided limited assurance of our direct and indirect greenhouse gas emissions data for 2011.

We report in accordance with the Global Reporting Initiative (GRI) and in line with oil and gas industry guidelines developed by the International Petroleum Industry Environmental Conservation Association (IPIECA), the American Petroleum Institute (API) and the International Association of Oil & Gas Producers (OGP). GRI confirmed our A+ reporting level for the information in the Royal Dutch Shell plc Sustainability Report for 2011, Annual Report and Form 20-F for 2011, and on our corporate website.

[www.shell.com/gri](http://www.shell.com/gri)  
[www.shell.com/ipieca](http://www.shell.com/ipieca)

Shell supports the UN Global Compact and its 10 principles covering human rights, labour, environment and anti-corruption. Sections of this Sustainability Report cover Shell's progress in these areas in 2011.

Learn more about our contribution to the UN Global Compact at:

[www.shell.com/globalcompact](http://www.shell.com/globalcompact)

You can find more information on our sustainability reporting at:

[www.shell.com/sdreporting](http://www.shell.com/sdreporting)

Find out more about Shell and sustainable development at:

[www.shell.com/sustainability](http://www.shell.com/sustainability)



CARBON DISCLOSURE PROJECT

### CONTENT SELECTION PROCESS

Our reporting focuses on the environmental and social challenges that matter most to our key stakeholders. We use a thorough process to select content for our reporting based on information from external and internal sources. This process includes:

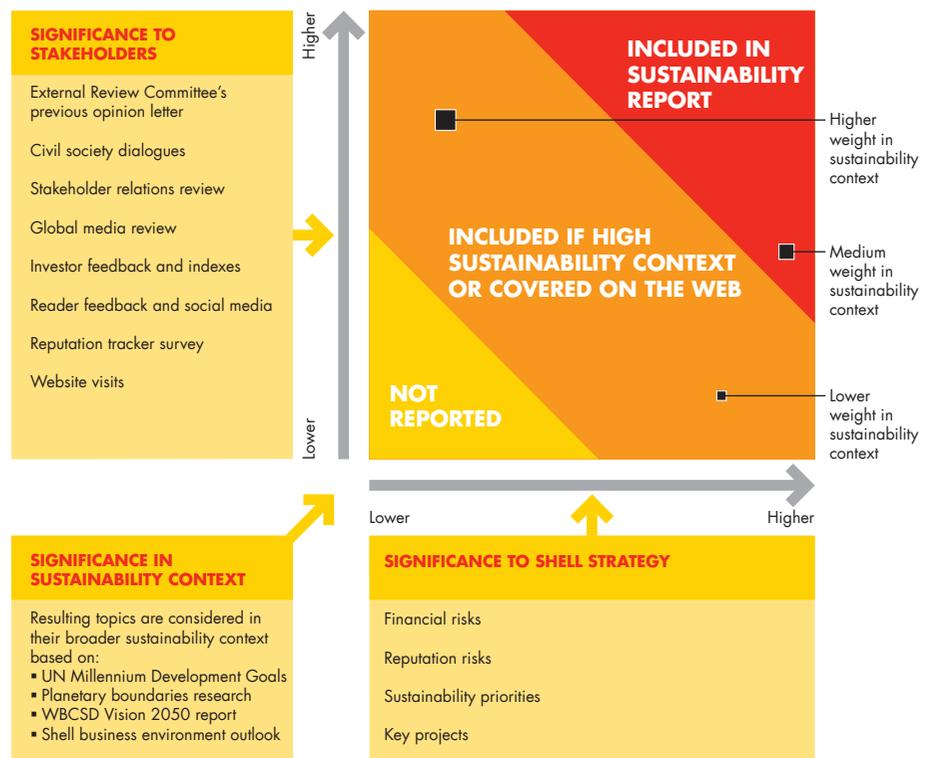
**STEP 1:** Identify and understand topics of significance to our stakeholders through a range of stakeholder engagements and reviews.

**STEP 2:** Identify topics of significance to Shell's business strategy through our established internal processes.

**STEP 3:** Combine the results into a matrix and assess each topic in terms of its wider economic, environmental and social impact. Each topic is then assigned a weighting according to its significance in "sustainability context". To determine "sustainability context" we review authoritative research and forecasts on environmental and social topics published by public institutions and governmental organisations.

**STEP 4:** We include all the highest priority topics in our report. Those at the next level of importance are included if they have a higher weight in "sustainability context", otherwise they are covered on the Shell corporate website.

**STEP 5:** Our External Review Committee reviews the content selection to ensure that coverage is complete, relevant and balanced.



## ABOUT OUR DATA

There are inherent limitations to the accuracy of environmental and social data. We recognise that our environmental and social data will be affected by these limitations and continue to improve the integrity of our data by strengthening our internal controls.

All non-financial data in this report are reported on a 100% basis for companies and joint ventures where we are the operator. Environmental data are for our direct emissions unless otherwise stated. We report in this way, in line with industry practice, because these are the data we can directly manage and affect through operational improvements.

Operations acquired or disposed of during the year are included only for the period we had ownership. Other data are collected from external sources, staff surveys and other internal sources as indicated.

We only include data in this report that have been confirmed by the end of March 2012. If incidents are reclassified or confirmed, or if significant data changes occur after

### Cautionary note

The companies in which Royal Dutch Shell plc directly and indirectly owns investments are separate entities. In this publication "Shell", "Shell group" and "Royal Dutch Shell" are sometimes used for convenience where references are made to Royal Dutch Shell plc and its subsidiaries in general. Likewise, the words "we", "us" and "our" are also used to refer to subsidiaries in general or to those who work for them. These expressions are also used where no useful purpose is served by identifying the particular company or companies. "Subsidiaries", "Shell subsidiaries" and "Shell companies" as used in this publication refer to companies in which Royal Dutch Shell either directly or indirectly has control, by having either a majority of the voting rights or the right to exercise a controlling influence. The companies in which Shell has significant influence but not control are referred to as "associated companies" or "associates" and companies in which Shell has joint control are referred to as "jointly controlled entities". In this publication, associates and jointly controlled entities are also referred to as "equity-accounted investments". The term "Shell interest" is used for convenience to indicate the direct and/or indirect (for example, through our 23% shareholding in Woodside Petroleum Ltd.) ownership interest held by Shell in a venture, partnership or company, after exclusion of all third-party interest. This publication contains forward-looking statements concerning the financial condition, results of operations and businesses of Royal Dutch Shell. All statements other than statements of historical fact are, or may be deemed to be, forward-looking statements. Forward-looking statements are statements of future

preparation of this report, they will be updated in the following year's publication. Data marked in the social data table come from an internal survey completed by the senior Shell representative in each country. The accuracy of environmental and social data may be lower than that of data obtained through our financial systems.

Data provided are subject to internal controls. Lloyd's Register Quality Assurance Ltd has provided limited assurance of our direct and indirect greenhouse gas (GHG) emissions data for 2011. Limited assurance means nothing has come to the auditor's attention that would indicate that the data are not correct. For GHG emissions we provide more detailed data on our website.

[www.shell.com/ghg](http://www.shell.com/ghg)

Conversions into US dollars are based on the average exchange rates for 2011.

### Share your opinion

If you have any views on issues raised in this report, or on the report itself, please email:

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