



Exploration & Production

ENVIRONMENTAL PERFORMANCE REVIEW



2014



At Centrica we are committed to understanding, managing and reducing the environmental and ecological impacts of our activities through innovation, technology and cultural change

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Facility	Power Generation	Flare	Allowances																							
J6-A	~100,000	~100,000	~100,000																							
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Barrow Terminal	~300,000	~300,000	~300,000																							
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Total	~700,000	~700,000	~700,000																							
<p>£1.5b invested in our E&P operations in the next two years</p> <p>FOREWORD ON P.4</p>	<p>CE E&P operates in three business regions</p>	<p>Centrica Energy iQ Building, 15 Justice Mill Lane Aberdeen, AB11 6EQ</p> <p>T: +44 (0)1224 415000 W: www.centricaenergy.com</p>																								
<p>OUR OPERATIONS ON P.6</p>	<p>6.5% Fall in CO₂ emissions from the EU ETS terminals</p> <p>BARROW TERMINALS ON P.13</p>																									

1. FOREWORD

It has been another busy year in Centrica Energy's Exploration and Production business. Thanks to the hard work of teams across our operations in the UK, Netherlands, Norway and Canada, we increased production to 79.5 million barrels of oil equivalent last year.

We remain one of the top gas producers in the UK and Netherlands. In 2014 we brought three new wells on stream – the Kew field, as well as additional wells at York and Grove. Construction work also began on the Barrow Terminals Project, an £84 million investment which will link the South and North Morecambe Terminals together to increase efficiency of gas processing from Morecambe Bay and reduce emissions from the site. In Norway, we have boosted reserves on major assets like Statfjord and Kvitebjorn, while in North America we have hit record-high production.

We also have some exciting projects on the horizon, and will invest nearly £1.5 billion in our E&P operations in the next two years. In the UK, the



£1.5b

Will be invested in our E&P operations in the next two years



We remain one of the top gas producers in the UK and the Netherlands and in 2014 brought three new wells on stream



2. POLICY

GROUP ENVIRONMENT POLICY

At Centrica we are committed to understanding, managing and reducing the environmental and ecological impacts of our activities through innovation, technology and cultural change.

We are committed to:

- **Assessing**, understanding and managing our environmental risks and impacts, placing special emphasis on minimising major accident risks
 - **Enabling** and encouraging our employees to help us achieve our environmental goals
 - **Proactively** seeking ways to reduce our carbon emissions
 - **Reducing** waste and using resources efficiently
 - **Developing** renewable and low-carbon energy sources, products and services
 - **Encouraging** our customers to move towards a low-carbon future by helping them make informed decisions about the use of our products and services
 - **Working** with our suppliers and business partners to pursue responsible environmental practices
 - **Publishing** regular performance reports and openly discussing our environmental performance with internal and external stakeholders
- **Continually** improving and setting measurable objectives and targets to prevent pollution and reduce our environmental impacts
 - **Complying** with environmental legislation, regulations and other applicable requirements.

We will implement comprehensive environmental management systems that are routinely audited in all our businesses and attain certification to ISO14001 or equivalent in our exploration and production, power generation and servicing and installation operations. Our performance is reviewed regularly by the Centrica Executive Committee.



Iain Conn
Chief Executive
January 2015



installation campaign for the major Cygnus project started safely last year and will conclude this summer. In Norway, the Valemon field started production early in 2015 and work is also well underway on the Butch development, while our business in Canada continues to grow after we acquired additional processing facilities and natural gas assets in Alberta from Shell in 2014.

Environmental responsibility is hugely important to us, and in 2014 the international NGO Carbon Disclosure Project awarded Centrica the highest possible mark for disclosure and action on climate change. The safety of our people is also always at the front of our minds, and we cannot afford to be complacent. The current low price environment means the sector faces major challenges. Although the oil and gas industry is no stranger to peaks and troughs, our focus on environmental responsibility and safety can help us work more efficiently and keep our costs competitive. We must all play our part in making sure exploration and production remains a safe and sustainable business.

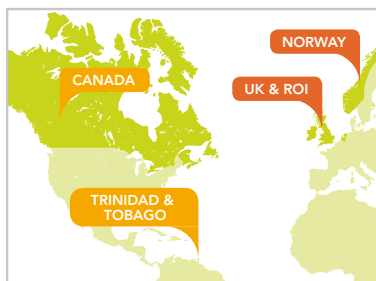
Ken Robertson
Senior Vice-President,
HSE and Technical

3. OUR OPERATIONS

Centrica Energy’s (CE) exploration & production business operates in three business regions – UK and the Netherlands (UKNL), Norway and Canada.

The UKNL region is divided into three hubs, the Netherlands, the North Sea and Morecambe. This review covers our performance in the OSPAR regions of UKNL and Norway.

-  Non-operated
-  Operated
-  Operated onshore





NORTH CENTRAL NORTH SEA¹

Centrica Energy has created considerable value from its operated assets in the Central Northern Sea and they continue to be material contributors to our portfolio. Our key hubs in the region include Chestnut, which has been producing oil since 2008 via the cylindrical Hummingbird Spirit FPSO, while we also have interests in the Armada, Alba, Brae and Beryl assets.



SOUTHERN NORTH SEA²



The Southern North Sea plays a key role in Centrica Energy's portfolio. Three significant developments have achieved first gas in the past three years: Ensign (2012), Seven Seas (2012) and York (2013), while first gas at Cygnus – the largest gas discovery in the Southern North Sea in 25 years – is targeted for winter 2015/16. We have also recently drilled an exploration well at Pegasus West and further development well drilling was carried out at York and Grove.



- 1 Centrica North Sea Oil Ltd
- 2 Centrica North Sea Gas Ltd
- 3 Hydrocarbon Resources Ltd (HRL) and Calder and Millom NPAs for ConocoPhillips, operated by HRL
- 4 Centrica Production Nederland BV, Centrica Resources Ltd and Centrica North Sea Gas Ltd
- 5 Centrica Resources (Norge) AS

MORECAMBE HUB³



The combined fields of Morecambe Bay remain a cornerstone asset for Centrica Energy, offering unique flexibility, and the area continues to provide a significant portion of the UK's gas supply. Celebrating their 30th anniversary this year, the combined fields in the East Irish Sea have produced 6.5 trillion cubic feet of gas since production started in 1985.

Since 2009, Centrica Energy has embarked on an exploration and appraisal programme in Morecambe Bay to establish the remaining potential of the area.



NORWEGIAN REGION⁵



Since entering Norway in 2006, Centrica Energy has built an established business on the Norwegian Continental Shelf. We have had several years of successful growth through acquisitions, discoveries and a high number of licence awards and now have a portfolio of operated and non-operated assets. Centrica Energy has non-operated interests in major Norwegian fields such as Statfjord and Kvitebjørn, and also operates the Vale field with 50% equity. The drilling activity in 2014 at the Butch and Ivory locations was exploratory – we used a drillship for the first time within CE E&P at the Ivory location due to the deepwater nature of the site.



NETHERLANDS HUB⁴



Centrica Energy operates two key hubs in the Dutch North Sea, the Greater Markham Area (GMA) and F3-FA, from its Hoofddorp office in the Netherlands.

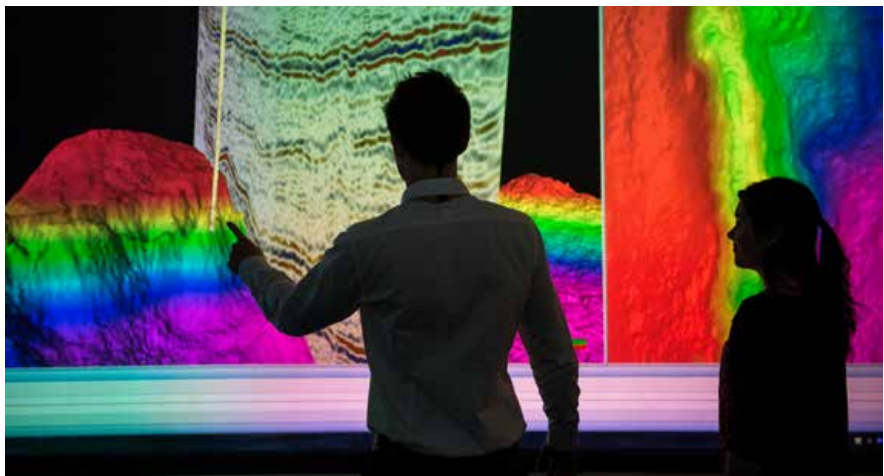


4. OUR EMS

Centrica Energy's environmental responsibilities are to understand, manage and reduce the environmental impact of our operations so as to protect the environment and its resources. The environmental management of operations in the oil and gas business, from exploration through to decommissioning, are integrated within the health and safety as well as the business management activities. This integration ensures the maximum embedding of environmental responsibility into business practices.

Central to our management system is strong leadership, continuous enhancement and good performance baselines from which to measure and report improvements. We have been developing and embedding these principles across the business in our annual improvement plans. Delivery of these core principles is supported by processes integrated in our management system. Our environmental management activities have been certified to ISO14001⁶ and we carry out regular internal audits to gauge progress alongside the external audits required for the ISO14001 certification.

This report summarises the performance and initiatives of CE's exploration and production operations in 2014 and the planned improvements in 2015 as required by OSPAR⁷.



Central to our management system is strong leadership, continuous enhancement and good performance baselines



⁶ ISO 14001 is an internationally recognised standard for environmental management systems

⁷ OSPAR Recommendation 2003/5 to Promote the Use and Implementation of Environmental Management Systems by the Offshore Industry

5. OUR PERFORMANCE

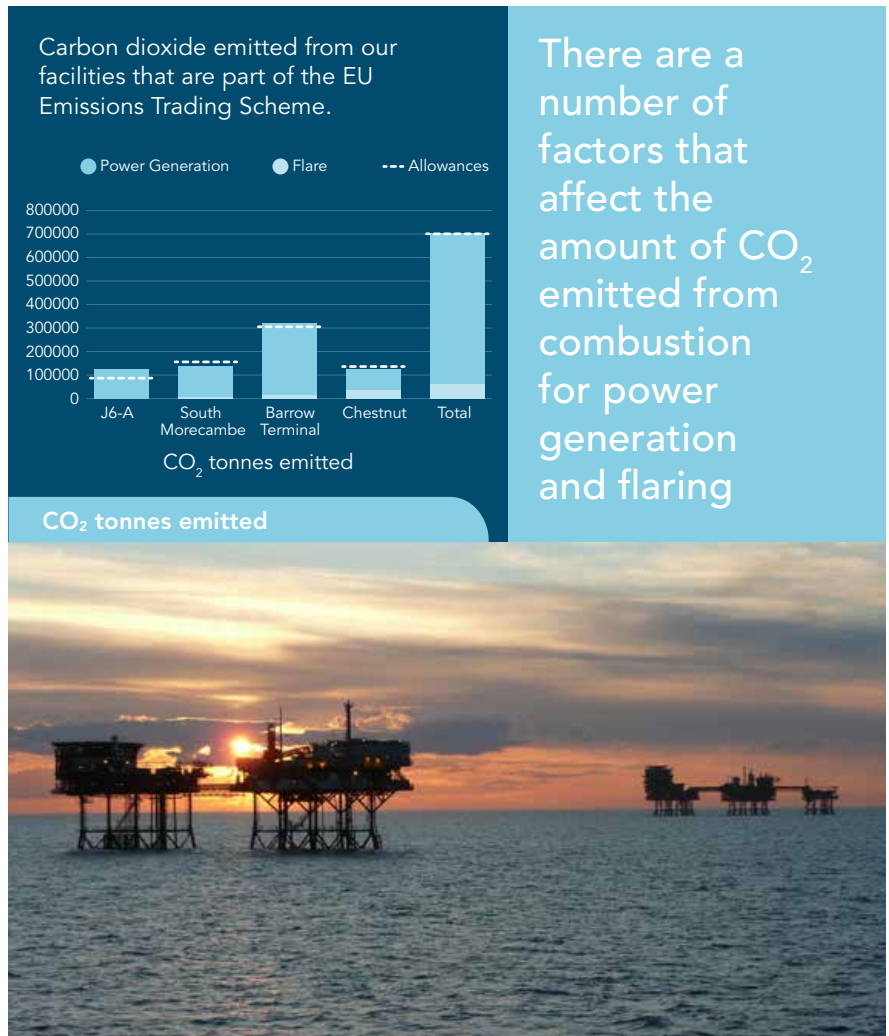
The environmental impacts of our operations are well regulated in the areas in which we operate. The environmental performance of our current activities⁸ is presented below in relation to regulatory compliance.

A. ATMOSPHERIC EMISSIONS

The majority of CO₂ emissions from our offshore operations originate from gas-fired turbines on the production installations. As part of our production optimisation activities, emissions reduction opportunities such as turbine operation efficiencies have also resulted in emission savings. The largest offshore emissions of CO₂ from CE offshore facilities was from the gas producing Morecambe facility, followed by J6-A in the Netherlands. The third largest CO₂ emitter in the portfolio is from the oil producing Chestnut reservoir. The EU Emissions Trading System (EU ETS) Directive applies to the Morecambe, J6-A and Chestnut facilities. The carbon dioxide emissions and the performance against the allowances for 2014 is shown in the table to the right for the three facilities.

There are a number of factors that affect the amount of CO₂ emitted from combustion for power generation and flaring such as maturity of the asset and the increased power required to extract the hydrocarbon, as well as in relation to increased production itself.

The carbon dioxide emitted from the facilities not part of the EU ETS shown below is at least an order of magnitude below the emissions of the three highest emitters. The highest of the remaining emitters is F3-FA with 17,000t in 2014, a rise of just over 7000t from 2013 due to the requirement for gas compression.



⁸ The Greater Kittiwake area was sold to Enquest at the end of February. The data is shown in the appendix, and not included in this section.

B. OIL

The largest amount of oil discharged to sea from our operations is with the water that is extracted from the reservoir with the hydrocarbons and treated on the facilities prior to discharge to sea. These discharges of oil are controlled under OSPAR and national legislation to a concentration of 30 mg/l and a tonnage permit limit in the UK.

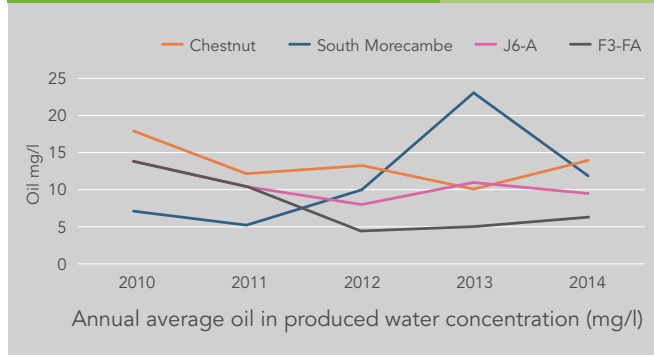
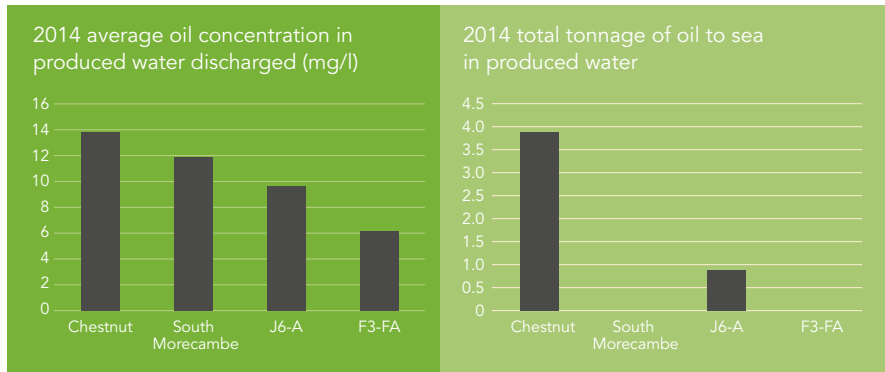
All produced water discharges in 2014 were carried out within the legal oil concentration limit of 30 mg/l, except one short term exceedance at South Morecambe. The process has been amended to ensure this permit breach does not recur.

The total oil discharged from Chestnut, South Morecambe, J6-A and F3-FA in 2014 was 4.9t, the highest total (for the same installations) since 2011. The increase in 2014 was due to the increased production from the Chestnut reservoir, coupled with injection problems with the produced water re-injection system on J6-A. As with previous years the greatest tonnage discharged was from the Chestnut oil asset with the gas assets discharging considerably less oil. Both Chestnut and South Morecambe discharged well below the tonnage oil to sea permit limits in 2014⁹.

⁹ Note – no tonnage limit in Netherlands



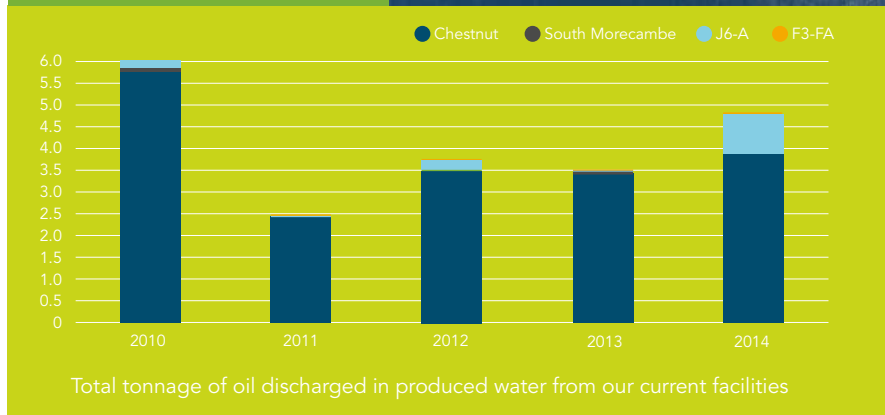
All produced water discharges in 2014 were carried out within the legal oil concentration limit of 30 mg/l



The annual average oil discharged to sea in 2014 was below the legal limit of 30 mg/l as in the previous five years for these facilities.

4.9t

The total oil discharged from our installations in 2014*



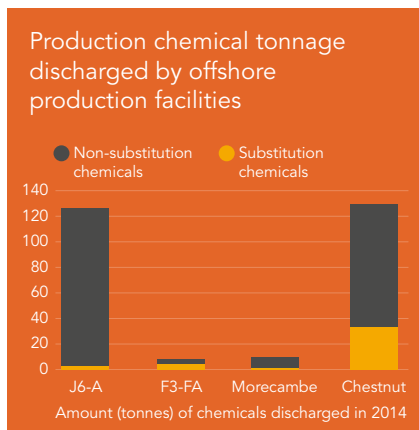
*excluding Kittiwake

C. CHEMICAL USE AND DISCHARGE

Chemicals are used for a variety of functions in the extraction of oil and gas such as corrosion inhibition, lubrication of the drill bit and biocides. Chemical use and discharge in OSPAR countries is controlled via recommendations and regulated by in country legislation to an equivalent standard. As part of the OSPAR recommendations we as operators are encouraged to replace any chemicals which pose a particular potential for harm to the marine environment (substitution chemicals in UKNL and black/red chemicals in Norway) with less potentially harmful chemicals.

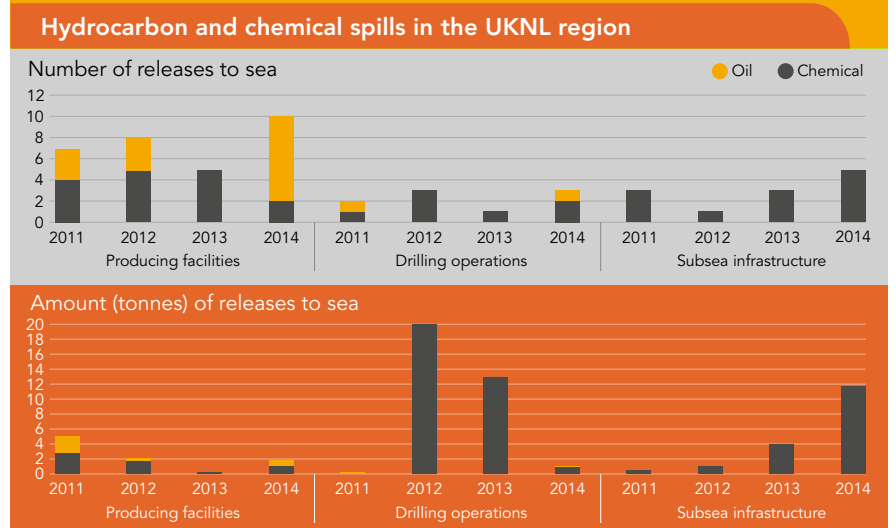
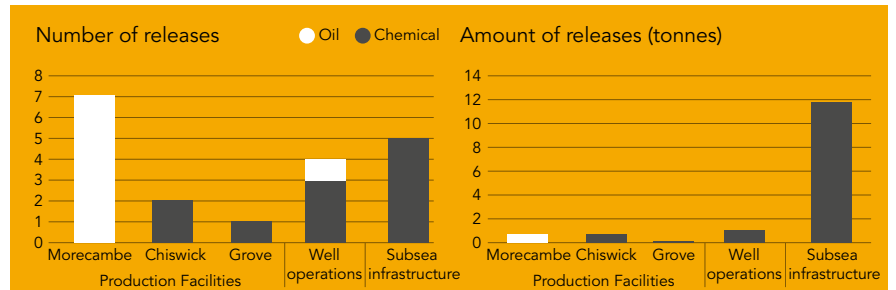
The number of and type of substitution chemicals required for drilling operations is dependent upon the rock type and design of the well. All of our substitution chemicals have technical justifications for their use and discharge. Of all the chemicals discharged during the drilling of the four wells drilled in the UKNL hub, only 9.6% of the chemicals discharged had a substitution warning.

Two permit breaches in relation to the Offshore Chemical Regulations happened in 2014 from our UKNL operations. Both batch discharges of a cement and Monoethyleneglycol were as a result of lack of awareness of the permit requirements. We have added a campaign of training and awareness to our 2015 improvement plans.



D. SPILLS TO SEA

There were seven oil spills to sea in 2014 at the Morecambe hub, with the majority of the oil (0.51t) leaking in one event from a single pump. The other oil spills were small amounts from topsides equipment. The actions of either maintenance of equipment or changes to processes or procedures have been carried out to prevent a recurrence of these events. The oil spill from the well activities was due to the release of a small volume of condensate in the flare equipment and the procedures have been amended to prevent a recurrence. The other reported spill to sea was from an observed sheen of unknown source which dissipated prior to sampling.



*Norwegian second OBM spill excluded due to graphical reasons

Five hydraulic fluid chemical releases to sea occurred from subsea infrastructure totalling a maximum of 11.8t. All subsea releases were due to hose and/or connection failures. The two Chiswick methanol spills were due to the same piece of unsuitable equipment which has now been replaced. The Grove spill was due to fluid released from a leaking valve which has been rectified.

At CE we have an event recording system which allows us to highlight if any of the incidents we have could result in a major environmental incident and none of the environmental

incidents in 2014 had this potential. The environmental impact from all of the incidents in 2014 is expected to be short term and localised at the point of discharge.

Review of the trending of incident type and investigation results allows us to identify the root causes of the events and address these within our improvement planning. We have therefore included awareness and training of chemical management on all our assets as well as making environmental integrity a focus area for our assets in 2015.

Hydrocarbon and chemical spills in Norway

There were no hydrocarbon spills from the three drilling activities in the Norwegian region, however there were two chemical spills, one at the Butch well location and the other at the Ivory well location.

50 litres of Oil Based Mud (OBM) was spilled to sea at the Butch location due to movement of a hose during draining. The equipment has been changed to avoid a recurrence of this incident.

OBM was spilled due to rapid/ sudden movement of the West Navigator drill ship which activated an emergency disconnect of the Lower Marine Riser Package. The contents of the riser were discharged to sea

(230m³). Environmental surveys have been carried out which show the area of seabed impacted is localised to the well site. The incident has been investigated and followed up with relevant authorities.

E. WASTE GENERATION AND DISPOSAL

Waste production is minimised through the design of the operations, however it is expected that the offshore operations will produce some waste requiring onshore transportation and management. Reuse and recycling is maximised through waste segregation both on and offshore depending on the facilities minimising the waste sent to landfill. The proportion available for reuse or recycling is dependent,

however on the composition of the waste which in turn is dependent on the nature of the operations undertaken on the facilities. The percentage of waste recycled within the UKNL and Norwegian regions in 2014 is shown below.

F. OTHER REGULATORY NON-COMPLIANCES

CE submitted seven late chemical or oil to sea reporting returns in Morecambe, and two late oil to sea reporting returns plus two late notifications in the Netherlands. These events were investigated and additional resource and focus has been assigned in these hubs.

CASE STUDY – LOWERING WASTE TO LANDFILL

The amount and type of waste varies significantly at our oil and gas production sites depending on the status of operation, and we strive to control and limit the amount of waste generated at all times.

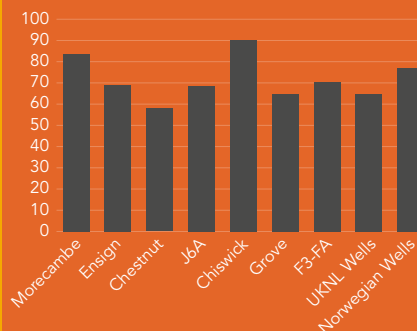
At our offshore gas and oil platforms in the Netherlands for example, our Environmental Improvement Plan for 2014–2020, goes beyond legal waste compliance by committing us to a 10% waste reduction target. This is a big commitment because as the platforms age, more waste is generated from maintenance work undertaken. There are a number of activities underway to ensure the target is met such as raising awareness of waste reduction and segregation with our people as well as decreasing packaging taken offshore.

We also create Waste Management Plans for our Norwegian exploration drilling well operations. The plan presents an overview of the four

different kinds of waste; industrial waste (e.g. paper and glass), hazardous waste (e.g. paint and oil rags), wet bulk waste and cuttings (e.g. water based mud contaminated with oil), alongside the responsible parties at each of the different stages of drilling to ensure all waste types are reduced and handled effectively. The plan is communicated to the well operator, our people and suppliers onshore as well as in safety meetings offshore. Key Performance Indicators are set with the various companies and performance is assessed monthly and fed back to the offshore staff. These activities led to 72 and 83% recycling (excluding drill cuttings) for the two wells drilled in 2014.



Percentage recycled in 2014



6. BARROW GAS TERMINALS

ONSHORE PROCESSING

Hydrocarbons from the Morecambe Bay assets are processed at the South and North Morecambe Terminals. The terminals operate under an Environmental Permit, regulated by the Environment Agency and an annual report is submitted for the performance at the terminals. All emissions and discharges are monitored and managed within the limits specified in the permit. Any deviation from these limits is investigated to prevent a reoccurrence.

There were three breaches of the Environment Permit limits and one small leak of effluent on site recorded in 2014. All of the four incidents were regarded as minor by the Environment Agency and were promptly addressed on site.

The terminals EU ETS CO₂ emissions fell by 6.5% in 2014 to 321,438.

Work on the £84 million Barrow Terminals Project, which will link

Work on the £84m Barrow Terminals Project, which will link the South and North Morecambe Terminals together, started in 2014



6.5%

Fall in CO₂ emissions from the EU ETS terminals



together the South and North Morecambe Terminals started in 2014. This will allow all of the gas from the South Morecambe field to be processed through the North Morecambe Terminal, and will improve the efficiency of the gas processing on site. The environmental benefits will be significant reductions of CO₂, NO_x and Carbon Monoxide

emissions from combustion activities on site. The project will also eliminate the need for the use of halocarbons on site which are ozone depleting substances and subject to phase out under the Montreal Protocol. The project is due to be completed in winter 2015.

7. 2014 ENVIRONMENTAL IMPROVEMENT PLAN PERFORMANCE

In 2014, CE delivered against the targets and initiatives in the regional and hub improvement plans across the business to improve environmental performance, both as a result of our operations and in support of the wider communities. The table below shows the status of only some of the initiatives that have taken place in 2014 across our E&P operations.

	INITIATIVE	STATUS
Risk Management and controls	Develop a standard for the identification and management of Environmentally Critical Elements on our facilities. Identify a phased implementation plan for the standard within CE.	<ul style="list-style-type: none"> Focus for this project in 2014 was on the management in relation to the potential for major environmental incidents in relation to Major Accident Hazards in line with the Offshore Safety Directive requirements. Prevention and reduction of hydrocarbon releases on our producing installations in UKNL was investigated using the 'Step Change in Safety HCR Reduction Toolkit'.
Performance Reporting	<ul style="list-style-type: none"> Ensure that the new HSE reporting system (to be launched in 2015) incorporates best practice environmental reporting requirements and allows an holistic review of our environmental management. Investigation of energy efficiency across the producing assets in UKNL. Focus on waste management planning and KPI setting in Norway well operations and Netherlands hub. 	<ul style="list-style-type: none"> Enhancements detailed for the electronic reporting system to facilitate transparency and consistency for impacts. Development of the E&P carbon and energy management plans for 2015. Performance indicators were agreed with the drilling contractor for the Maersk Giant on the Butch well. These included waste recycling, unplanned discharges and management visits.
Management system	Incorporate an Environmental Management System review into the Business Management System review, with the objective of moving ultimately from three ISO 14001 certificates to one ISO 14001 certificate for the whole exploration and production business.	The documentation across UKNL and Norwegian regions was reviewed to identify efficiencies.
Leadership and culture	Development of a common and critical rule framework across E&P that includes operational good practice.	Embedded in the UKNL operations.
Operational Planning Process	Capital Projects.	<p>Capital project planning process enhanced with preparations for decommissioning with the development of the Comparative Assessment Guidelines.</p> <p>Submission of our first UKNL asset decommissioning programme with supporting Environmental Impact Assessment.</p>

8. 2015 ENVIRONMENTAL IMPROVEMENT PLAN

Our annual planning cycle includes the identification of areas for improvements from business plans, audits (internal and external) and long term strategies for business development including HSE.

This planning process encourages continual improvement in environmental management and performance and embeds this in the health and safety and also business plans. The objectives can be facility or operation specific and will be included in these improvement plans, or they can be across the whole of the E&P business and will be in the wider improvement plans. Some of the 2015 objectives are detailed above and the status will be reported to the business on a monthly basis.

	INITIATIVE
Risk Management – Environmental Integrity	<ul style="list-style-type: none"> Continued cross-regional focus on the management of process safety to reduce the potential for Major Accident Hazards (including compliance with the EU Offshore Safety Directive requirements in the UKNL region). Development of the management process for environmentally important elements across UKNL producing facilities.
Carbon/Energy Management	Development of carbon and energy management plans for the offshore producing installations.
Performance	Roll out and embed the new reporting system across the E&P business and review all performance metrics.
Awareness and Training	Develop common format and requirements for environmental awareness training across UKNL



This planning process encourages continual improvement in environmental management and performance



9. CASE STUDIES



Centrica joined with other local businesses to support a summer camp for 45 year six pupils

BUILDING FOR THE FUTURE

HSES Graduate Scheme Award

The Centrica HSES Graduate scheme won the Association of Graduate Recruiters' Best Graduate Induction Experience Award and overall Graduate Development Award, beating over 700 major graduate employers and universities. This significant achievement demonstrates our commitment both to the development of our future staff but also to the importance of environmental responsibility to Centrica.

Experimental summer camp for school pupils

Centrica joined with other local businesses to support a summer camp for 45 year six pupils. The aim of the camp at Furness College was to raise aspirations, confidence and help improve literacy and numeracy skills. The group took part in everything from canoeing to animation, treasure hunts, and science and literacy challenges.



CLEAN-UP IN ACTION

In line with the OSPAR initiative on marine litter, Centrica Energy staff gave up their time to safeguard the environment in the 'Big Clean' beach clean-up.

As a result, we were able to restore the natural beauty of areas around our oil and gas sites in Barrow and Morecambe Bay, helping to support the local community.



We were able to restore the natural beauty of areas around our oil and gas sites in Barrow and Morecambe



10. APPENDIX PERFORMANCE DATA

KEY INDICATOR	UKNL REGION						
	Morecambe Hub	UK North Sea Hub					
	South Morecambe	A Fields*	Ensign*	Kittiwake	York*	Chestnut	Trees**
Annual average oil in produced water mg/l	10.1			18.93		13.9	
Tonnage of oil in produced water to sea	0.013			1.62		3.87	
CO ₂ from combustion for power generation (t)	135661***	133	150	12954	235	124173***	
CO ₂ from flaring (t)	3899.65***			2114		38606	
Number of sub/black/red chemicals remaining in use	1	0	0	2		3	0
Amount of permitted chemicals discharged (t)	10.75			37440		129.02	
Percentage of permitted chemicals discharged with a SUB warning (%)	4%			0.04		25.8	
% of total waste recycled	84.3		61.6	48.3		58.0	

KEY INDICATOR	UKNL REGION						NORWAY REGION	
	Netherlands Hub					Drilling		Drilling
	J6-A	ST-1**	Chiswick*	Grove*	F3-FA	4 wells	Vale**	3 wells
Annual average oil in produced water mg/l	9.6				6.2			
Tonnage of oil in produced water to sea	0.91				0.01			
CO ₂ from combustion for power generation (t)	127309***	421	9055	17.4	17500			
CO ₂ from flaring (t)						52407		
Number of sub/black/red chemicals remaining in use	1				0	12	1	2
Amount of permitted chemicals discharged (t)	125.86				8.67	6254	639	3090,4
Percentage of permitted chemicals discharged with a SUB warning (%)	2.4				60	9.55	6%	
% of total waste recycled	37.1	100	90.4	65	70.3	65.6		77.45

10 Two months of Kittiwake data only as sold to Enquest with the divestment closing on 28th February, 2014.

APPENDIX PERFORMANCE DATA

UNPLANNED EVENTS

	UKNL REGION									
	Morecambe Hub				UK North Sea Hub					
	South Morecambe	North Morecambe	Calder*	Millom West*	A Fields*	Ensign*	Kittiwake	York*	Chestnut	Trees**
Number and total tonnage of oil spilled	6 (0.75)	1 (<0.001)	0	0	0	0	0	0	0	0
Number and total tonnage of chemicals spilled	0 (N/A)	0	0	0	2 (0.22)	0	0	0	0	3 (11.6)
Number of environmental permit non-conformances	5	1	1	1	0	0	0	0	0	0

	UKNL REGION						NORWAY REGION	
	Netherlands Hub					Drilling	Vale**	Drilling
	J6-A	ST-1**	Chiswick*	Grove*	F3-FA			
Number and total tonnage of oil spilled	0	0	0	0	0	2 (<0.05)	0	0
Number and total tonnage of chemicals spilled	0	0	1 (0.8)	1 (0.002)	0	0	0	Butch 1 (0.06) Ivory 1 (322)
Number of environmental permit non-conformances	N/A	0	0	1	N/A	2	N/A	N/A

* NPAI

** Subsea infrastructure chemicals used on host installations

*** EU ETS data verified

The NPAs have no discharge of produced water to sea and the power generation on the facilities is diesel driven below 20MW and produces limited emissions.

Our fields are produced back to the following facilities:

- A-fields back to Conoco-Phillips LOGGs platform
- Trees fields to the Marathon Brae Alpha platform.
- Vale field to the Statoil Heimdahl platform



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