



North Sea Region

2021 Annual Environmental Statement



2021

Introduction

This is the annual environmental statement for the bp entities which operated in the United Kingdom Continental Shelf (UKCS) in 2021 to fulfill the requirements of OSPAR Recommendation 2003/5 to promote the use and implementation of environmental management systems by the offshore industry. The statement covers offshore installations operated by bp entities and installations owned and operated by third parties while providing services to bp entities. It does not include information on our operated by others (OBO) portfolio.

Environmental impacts

One of our three HSSE goals is to cause **no damage to the environment**. The others are **no accidents** and **no harm to people**. While environmental challenges and opportunities differ depending upon the lifecycle stage of each operating installation, this goal remains the same.

The North Sea oil and gas sector is subject to strict environmental regulation, with which bp strives to comply. We work closely with regulators to keep under review what we do, how we do it, and how we can do it better. Our Operating Management System, which includes our environmental management system, is a set of integrated procedures and processes designed to drive continuous improvement in our operations, including regulatory compliance and environmental performance. Our system meets the requirements of the latest version of the international standard for environmental management ISO14001:2015.

Our HSSE goal: no damage to the environment

We aim to achieve our goal of no damage to the environment by:

- systematically identifying environmental impacts and seeking to avoid or minimise these;
- improving environmental performance, including reducing our carbon emissions;
- putting plans in place to reduce environmental risks associated with our projects and operations;
- working to understand developments in future environmental legislation and working to uphold our continued compliance.

bp in Scotland

bp has been operating in the North Sea for more than 50 years, providing a reliable source of energy to consumers around the world. We're working hard to make our North Sea business the safest in the region and even more efficient and sustainable, deploying some of the latest technologies to reduce operational emissions offshore.

We have developed a North Sea Carbon Plan, a framework for documenting our approach to the development and implementation of carbon management and abatement measures on bp-operated facilities. The plan sets out our objectives and targets, how we will monitor and report carbon emissions, as well as asset-specific carbon management and reduction plans.

In 2021, our North Sea operational GHG emissions reduced by 276,000 tonnes of CO₂ equivalent compared with 2020, 68,000 tonnes of which was through sustainable emissions reductions (SERs) projects. We reduced GHG emissions from flaring in our North Sea operations by 36% in 2021 (compared with 2020 levels). In line with the industry aim to meet the World Bank Zero Routine Flaring initiative, we have also developed plans to eliminate routine flaring on all bp North Sea operated production facilities by 2030 and will continue to adopt a flare reduction mindset.

Collaborating with fellow North Sea operators and industry bodies has allowed us to deploy technology to help drive down operational emissions offshore. For example, through a successful partnership with the Net Zero Technology Centre in 2020 and 2021, we deployed a drone equipped with methane sensors to our west of Shetland installations, to detect and quantify methane emissions and support the development of focused plans to reduce them. With other operators in the central North Sea, we are also exploring opportunities to electrify facilities, replacing gas turbines – the main source of power generation offshore – with cleaner forms of energy.

bp's ambition is to become a net zero company by 2050 or sooner and to help the world get to net zero. Our strategy will see us pivot from an international oil company to an integrated energy company, increasingly investing in low carbon solutions. This is already playing out here in the UK.

In partnership with EnBW, we are developing offshore wind projects in the Irish Sea and North Sea, which between them would generate almost six gigawatts of renewable power – enough energy to power more than six million UK homes every year.

At Teesside, we are planning to create two large-scale hydrogen production facilities which together aim to produce 1.5 gigawatts of hydrogen by 2030. We are also leading the Northern Endurance Partnership to serve the East Coast Cluster, which has been named as one of the UK's first carbon capture and storage projects, aiming to remove nearly 50% of all UK industrial cluster CO₂ emissions. Also at Teesside, we are leading Net Zero Teesside Power which could be the UK's first commercial scale gas-fired power station with carbon capture- with the potential to deliver enough low carbon, flexible electricity to power around 1.3 million homes.

Building enduring relationships with countries, regions, cities, and corporations around the world is an important area of focus as we help the world get to net zero.

We have partnered with Aberdeen City Council to support their ambition for Aberdeen to become a climate positive city and we're also in a joint venture with the local authority to deliver a scalable green hydrogen production, storage and distribution facility powered by renewable energy.

We're also collaborating with the Port of Aberdeen to support their decarbonisation goals and working with Future Woodlands Scotland to help create and restore native woodlands across the country.

Our North Sea oil and gas operations, growing low carbon businesses and community partnerships will see us build on and transform our long-standing position in Scotland's energy industry, supported by a talented workforce and supply chain, eager to help make the UK's net zero ambitions a reality.



Our **North Sea** portfolio

bp North Sea portfolio

The North Sea remains an important region for bp – we know the basin and the barrels well having been here from the very start.

We have a strong portfolio focused around the ETAP and Andrew hubs in the central North Sea and the Clair, Schiehallion and Foinaven areas west of Shetland.

Our portfolio today is smaller than it has been in the past, but more focused and stronger with less operating complexity. It has longevity built in with considerable remaining production opportunities across our existing facilities.

The North Sea is part of bp's resilient hydrocarbons strategy – oil and gas that is lower cost to produce with lower operational emissions and maximising existing infrastructure.

Schiehallion Area

The Schiehallion Area incorporates the Schiehallion, Loyal and Alligin fields located around 175 kilometres west of the Shetland Islands. The fields are developed through the Glen Lyon floating production, storage and offloading (FPSO) vessel. Production from the Schiehallion Area was shut-in between 2013 and 2017 to allow for the Quad 204 project – a multi-billion-pound investment by bp and partners to completely redevelop the hub and maximise production from the fields.

Quad 204 saw the removal of the old FPSO, construction and installation of the Glen Lyon FPSO and renewal of much of the subsea infrastructure network. The Quad 204 project by bp and partners was designed to develop an estimated 450 million barrels of resources, extending the life of the fields out to 2035 and beyond.





Clair Phase One

With an estimated seven to eight billion barrels of oil in place, the Clair field is the largest oilfield on the UK Continental Shelf. The field, located 75 kilometres west of the Shetland Islands, was discovered in 1977, but challenging reservoir characteristics and the technological limits of the time meant it was the mid-1990s before the field saw extensive drilling and 2001 before bp and partners approved a development plan.

Production from the Clair field began in 2005 through the Clair Phase One platform which was the first fixed platform west of Shetland.



Clair Ridge

The physical size of the Clair field dictates development via a phased approach. Clair Ridge is the second phase of development. The bridge-linked platforms, which delivered first oil in November 2018, are designed to recover an estimated 640 million barrels of oil and ramp up to 120,000 barrels of oil per day at peak production. The new facilities, which are designed for 40 years of production, required capital investment in excess of £4.5 billion. bp and partners are now considering options to unlock future potential from the massive Clair field.

Andrew Area

The Andrew area includes the Andrew, Arundel, Cyrus, Farragon and Kinnoull fields which all produce through the Andrew platform. The field started production in 1994.

Andrew, Cyrus and Farragon were shut in in mid-2011 to allow for the Andrew Area Development (AAD), a major brownfield project enabling the Kinnoull field, located 28 kilometres to the north, to be developed through the existing facilities.

The ADD also included extensive new subsea infrastructure, a new 750-tonne process module and structural strengthening of the platform. In 2017, the Arundel field came on stream - only 18 months after project sanction. As the Andrew platform approaches cessation of production, bp is operating the facility under a late life business model which seeks to ensure safe and reliable operations through the facility's final years.



Eastern Trough Area Project (ETAP)

ETAP ranks as one of the largest and most commercially complex North Sea oil and gas developments of the past 20 years; multiple fields with varying ownership sharing a central processing facility (CPF). bp operates all of the ETAP fields; Machar, Madoes, Mirren, Monan, Marnock and Mungo. A normally unmanned installation (NUI) over Mungo stands around 20 kilometres to the east of the ETAP CPF. Apart from Mungo, which has surface wellheads on the NUI, all other ETAP fields are connected to the CPF via subsea infrastructure.

The non-operated Seagull field (bp ownership share 50%) is in development in 2022 and scheduled to start producing through the ETAP CPF in 2023. bp is also pursuing other subsea tieback developments to the CPF including the Murlach and Kate fields.



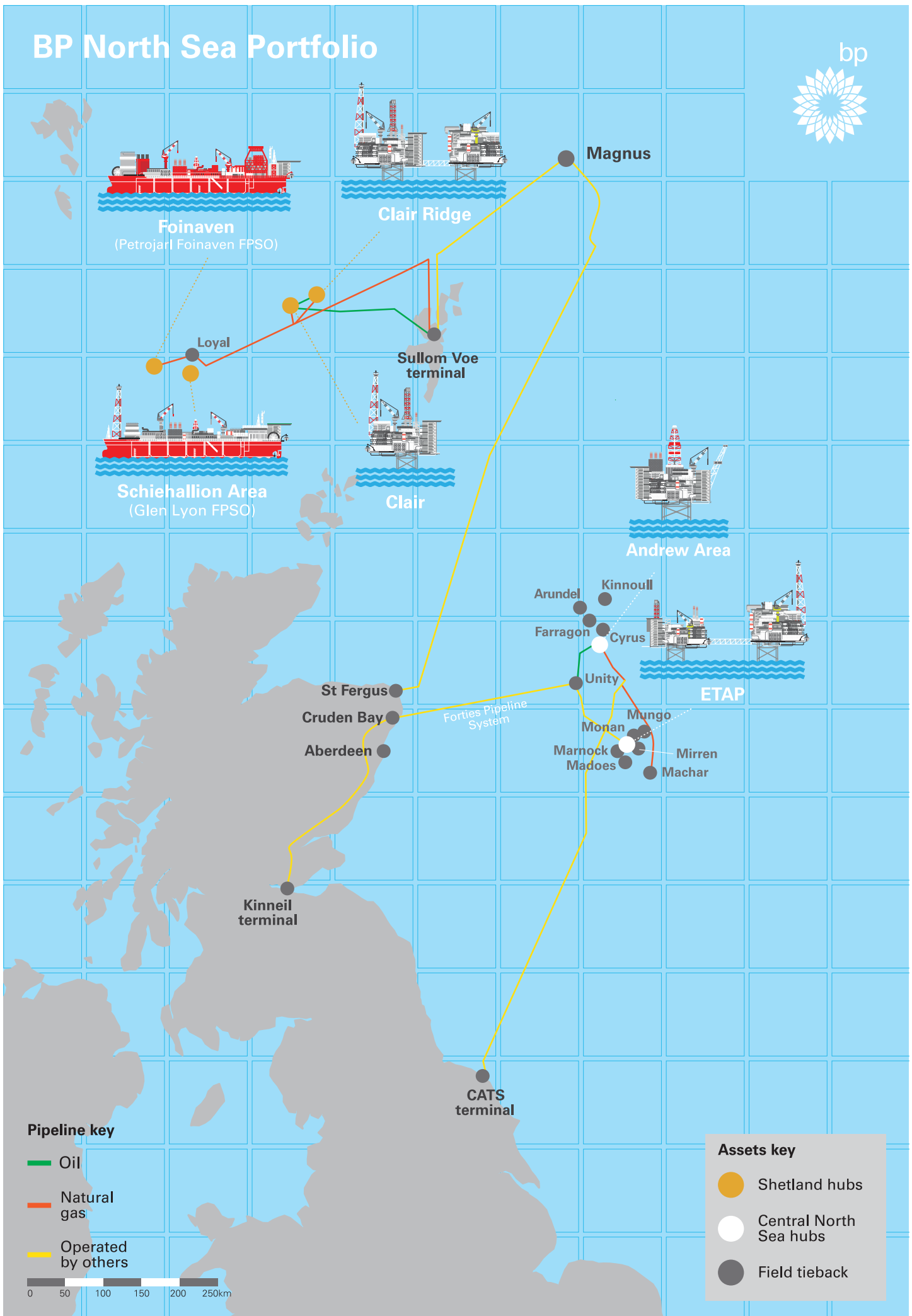


Foinaven

The Foinaven field is located 190 kilometres west of Shetland in water depths of up to 500 metres. The field was discovered in 1990 and sanctioned for development in 1994. It was the first deepwater development on the UKCS and the first west of Shetland. First oil from the field was in November 1997. The pioneering fast-track development was based on a network of subsea wells linked via a subsea network of pipelines, control umbilicals and risers to the Petrojarl Foinaven FPSO.

In April 2021, bp announced it would be retiring the Petrojarl Foinaven from operations as the FPSO approaches the end of its design life. Alongside field partners, bp is looking at options to develop the estimated remaining resources from the area.

BP North Sea Portfolio



1. Releases to the Environment

bp seeks to avoid unpermitted releases to the environment. However, whilst conducting operations, hydrocarbons and chemicals can be accidentally released. We monitor the number and volume of such releases closely and investigate the causes, with the intention to prevent similar events in the future.

In 2021, we had 27 unpermitted releases from offshore installations to the regulator, a 50% reduction when compared to 2020 (Figure 1).

Number of releases of hydrocarbons and chemicals

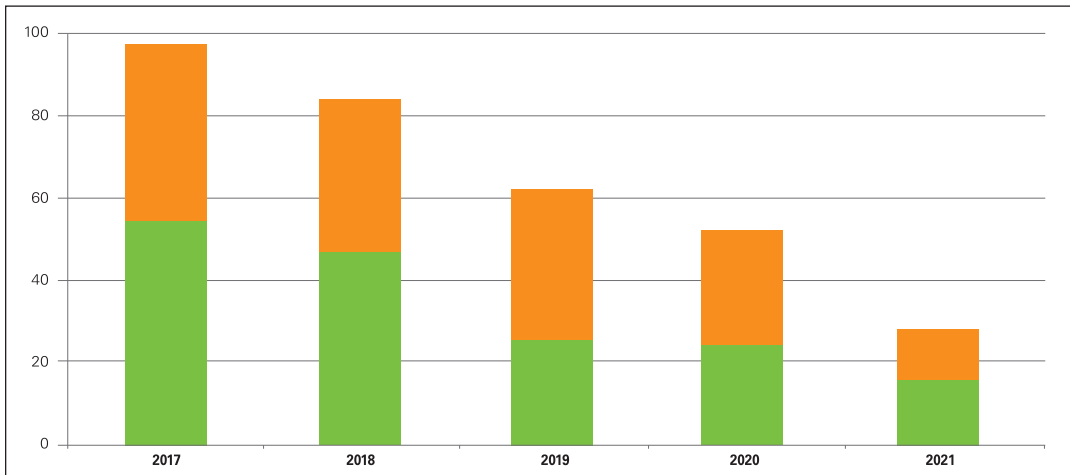


Figure 1: Total number of releases of hydrocarbons and chemicals between 2017 and 2021

There were 12 chemical and 15 hydrocarbon releases reported in 2021 (18 fewer chemical and 9 fewer hydrocarbon releases than 2020) (Figure 1). The 15 hydrocarbon releases were attributed to either the release of crude oil, or from utility systems installed to support the production of oil and gas and consisted of hydraulic oil, diesel and oil-based lubricants. No mobile drilling operations took place in 2021.

Total number of hydrocarbon and chemical releases reported to the regulator

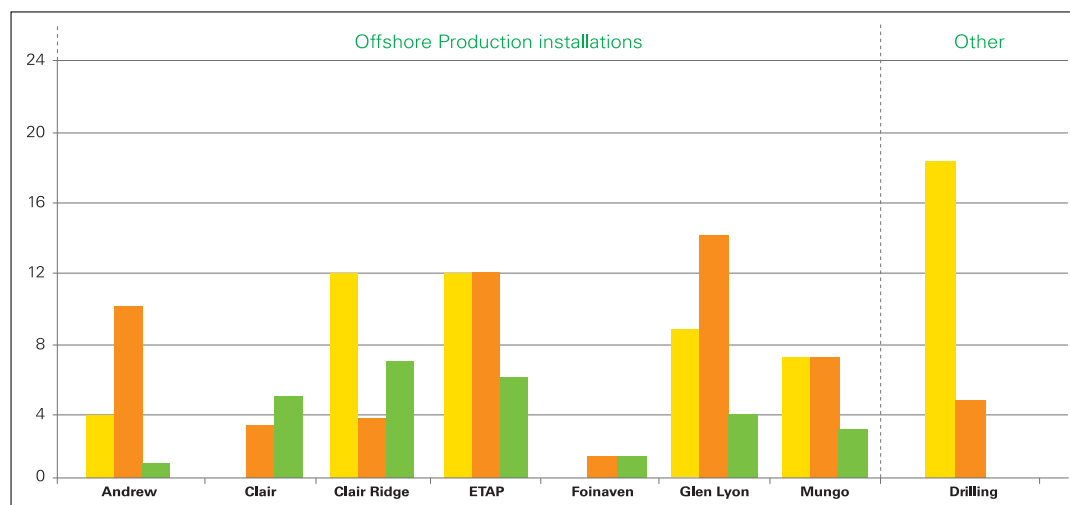


Figure 2: Number of hydrocarbon and chemical releases reported to the regulator between 2019 and 2021 for bp-operated installations and third-party mobile drilling rig activities while providing services to bp entities

NOTE Releases shown for Foinaven relate to subsea system only. Topsides releases are reported by Altera Infrastructure, the duty holder of the Petrojarl Foinaven floating, production, storage, offload (FPSO) vessel.

NOTE All drilling activity in 2021 was undertaken from the Clair Ridge Platform, therefore releases were attributed to that asset.

1. Releases to the Environment (cont'd)

In 2021, the total quantity of hydrocarbons and chemicals unrecovered from our offshore operations in the UKCS declined by approximately 32% (Figure 3). A total of 2.2 tonnes were released to the marine environment in 2021, of which 0.01 tonnes were oil and oil-based products.

Quantity of hydrocarbons and chemicals unrecovered (tonnes)

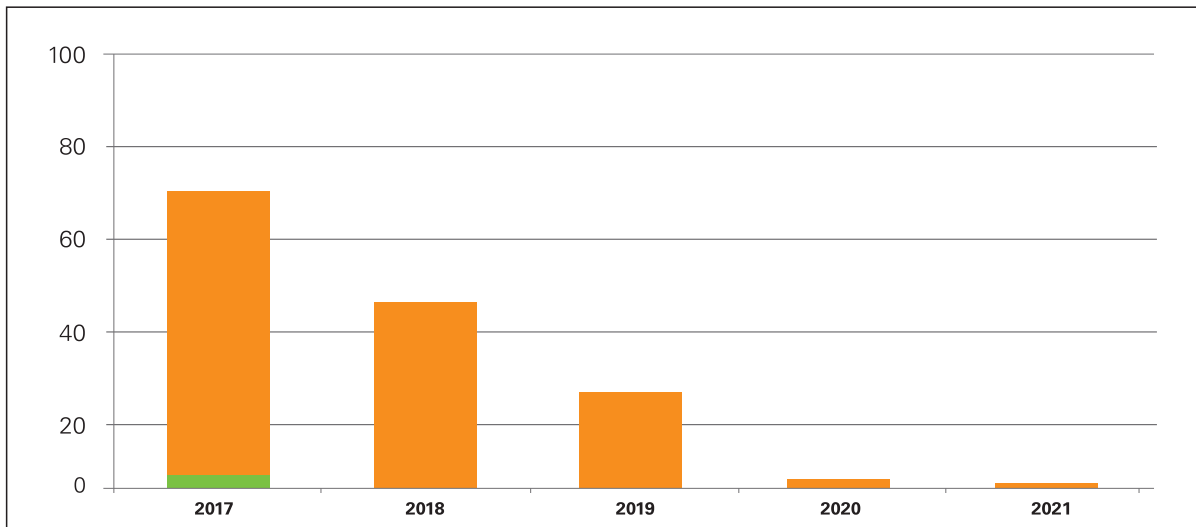


Figure 3: Total quantity (tonnes) of unrecovered hydrocarbon and chemical releases between 2017 and 2021. ■ Chemical ■ Hydrocarbon

Figure 4 shows the total hydrocarbon and chemical unrecovered releases from each operated installation.

Total hydrocarbon and chemical unrecovered releases (tonnes)

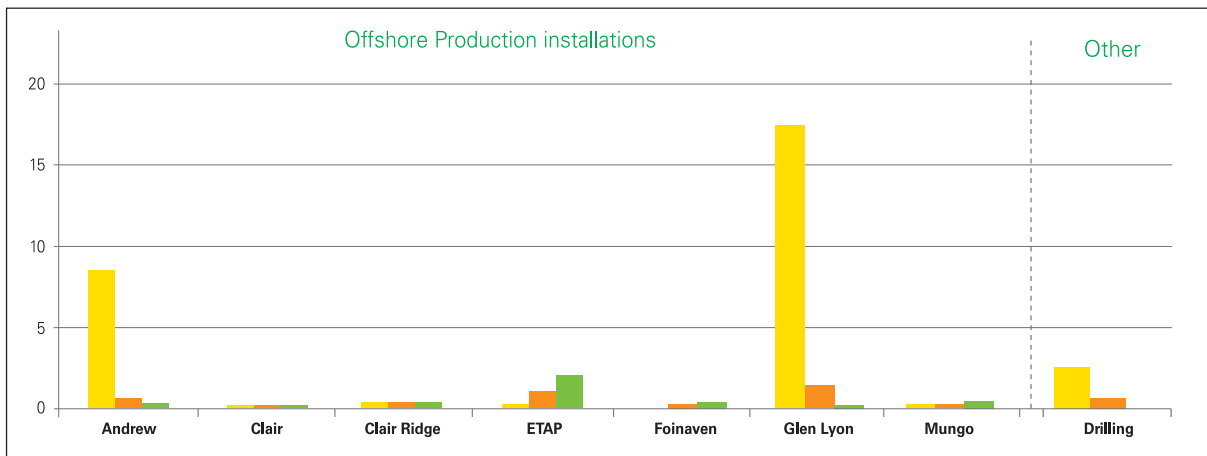


Figure 4: Quantity (tonnes) of hydrocarbon and chemical releases reported to the regulator between 2019 and 2021 for bp-operated installations and third-party mobile drilling rig activities ■ 2019 ■ 2020 ■ 2021

2. Atmospheric emissions

Atmospheric emissions occur in our operations, mainly through combustion of fuel gas to generate power and through flaring. We track and report our greenhouse gas (GHG) emissions and non-GHG emissions. We work to manage our emissions to air principally by focusing on plant reliability, energy efficiency and the introduction of technology, such as flare gas recovery systems.

We report GHG emissions on a carbon dioxide (CO₂) equivalent basis, including CO₂ and methane. bp continues to deliver what it refers to as Sustainable Emissions Reductions (SERs). In order to qualify as an SER, an intervention must have taken place to permanently reduce GHG emissions. The SER is quantified by comparing current emissions with those that would have happened in the absence of the intervention. In 2021 we delivered approximately 68,000 tonnes CO₂ equivalent of SERs through interventions such as spinning reserve reduction, commissioning a flare gas recovery system, and plant optimisation and efficiency improvements. In 2021, total greenhouse gas emissions reduced by approximately 22%, as shown in Figure 5, including SERs.

Total greenhouse gas emissions (millions of tonnes of CO₂ equivalent)

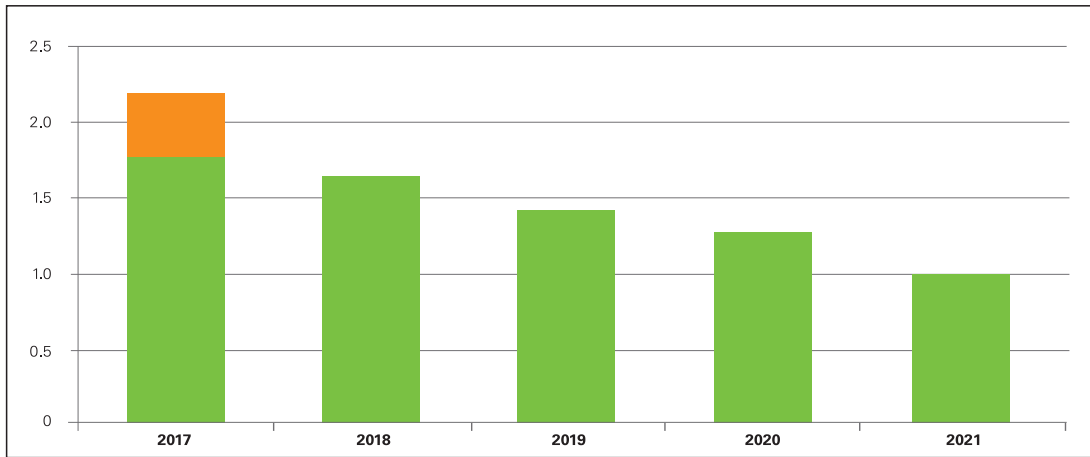


Figure 5: Total greenhouse gas (GHG) emissions (millions of tonnes of CO₂ equivalent) between 2017 and 2021 ■ Terminals ■ Offshore production

Greenhouse gas emissions by asset (tonnes of CO₂ equivalent)

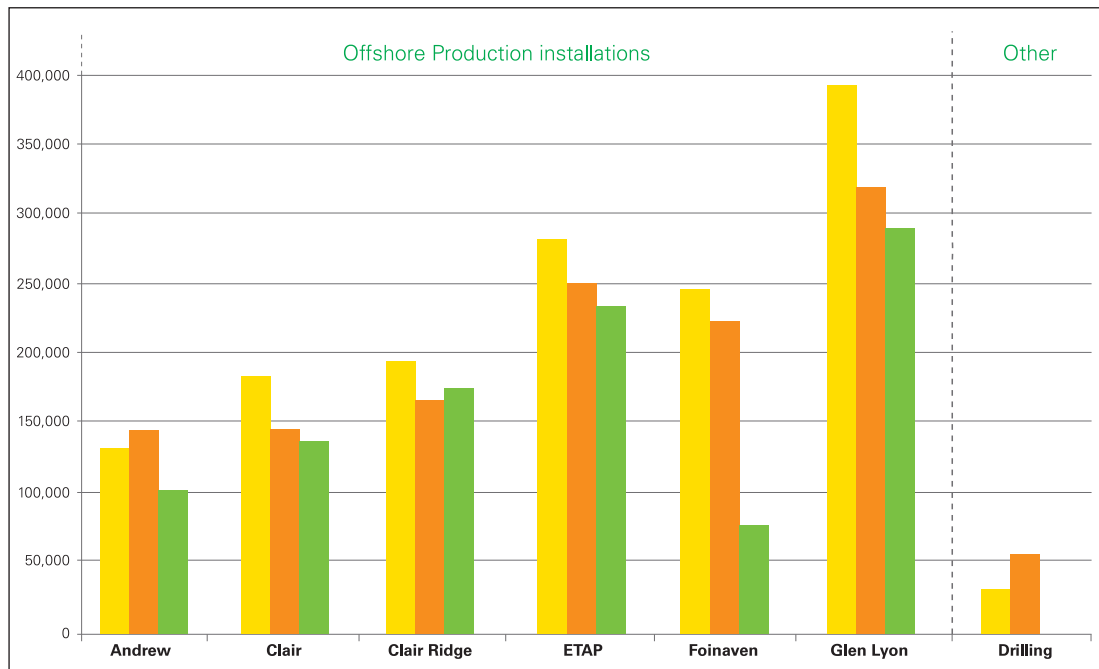


Figure 6: GHG emissions for bp-operated installations activities from 2019 to 2021 ■ 2019 ■ 2020 ■ 2021

NOTE Greenhouse gas emissions and gas flared at Foinaven FPSO are included. Non-greenhouse gas emissions are reported separately for the Petrojarl Foinaven FPSO vessel by the duty holder Altera Infrastructure.

2. Atmospheric emissions (cont'd)

Figure 7 below shows the ongoing improvement in offshore GHG intensity across bp’s North Sea portfolio compared with previous years. This was as a result of improved plant reliability, resizing of pumps, changes to compressor seals and reduced flaring through flare gas and vapour recovery projects outlined above.

Greenhouse gas emissions (tonnes of CO₂ equivalent per 1,000boe)

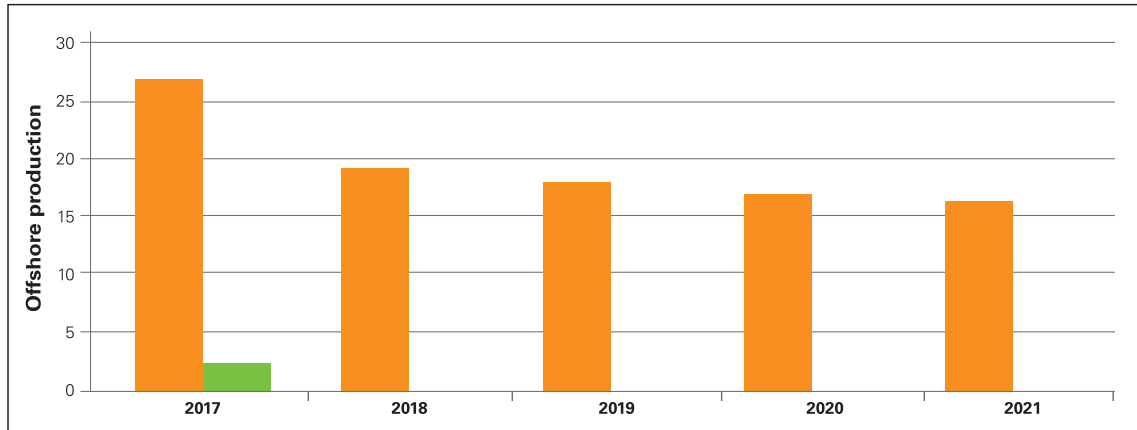


Figure 7: GHG intensity (tonnes of CO₂ equivalent per 1,000 boe) for bp-operated installations and onshore terminals between 2017 and 2021.

Flaring of gas on offshore installations is often essential for safety reasons. We seek to minimise flaring from our operations to reduce emissions, maximise resource recovery and ensure compliance with consented flaring limits. In 2021, approximately 41,000 tonnes of gas were flared (see Figure 8 below), a 36% decrease on the previous year as a result of improved compression train reliability, the flare gas recovery projects outlined above, and optimising shut down / start up processes to reduce gas to flare.

Lastly bp maintains a low flaring mindset which has reduced GHG from flaring by over 84,000 tonnes of CO₂ equivalent in 2021 (38% reduction from 2020). As part of the low flaring mindset, we created a dynamic monitoring system to allow operators to monitor close to real time changes in flaring performance. Optimisation opportunities are then identified which leads to improved flaring performance and a reduction in emissions.

Total production gas flared (tonnes)

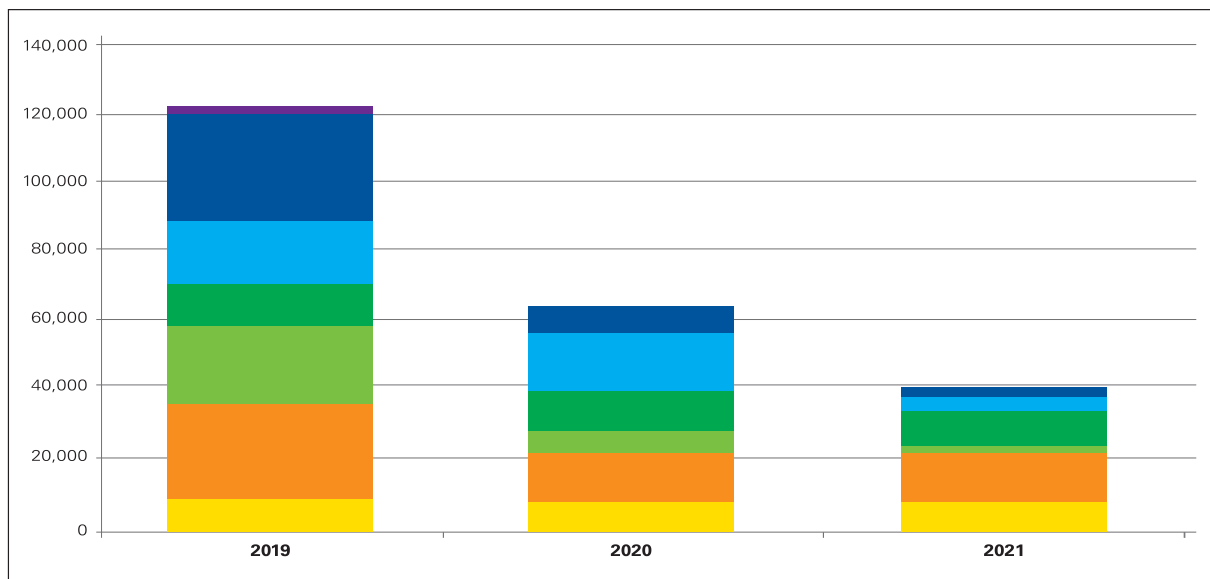


Figure 8: Total production gas flared (tonnes) for bp-operated installations from 2019 to 2021

2. Atmospheric emissions (cont'd)

The non-GHG emissions we track include Nitrogen Oxides, Sulphur Oxides, Carbon Monoxide and Volatile Organic Compounds. The emissions of these substances are shown in Figure 9 below.

Total non-greenhouse gas emissions by asset (tonnes)

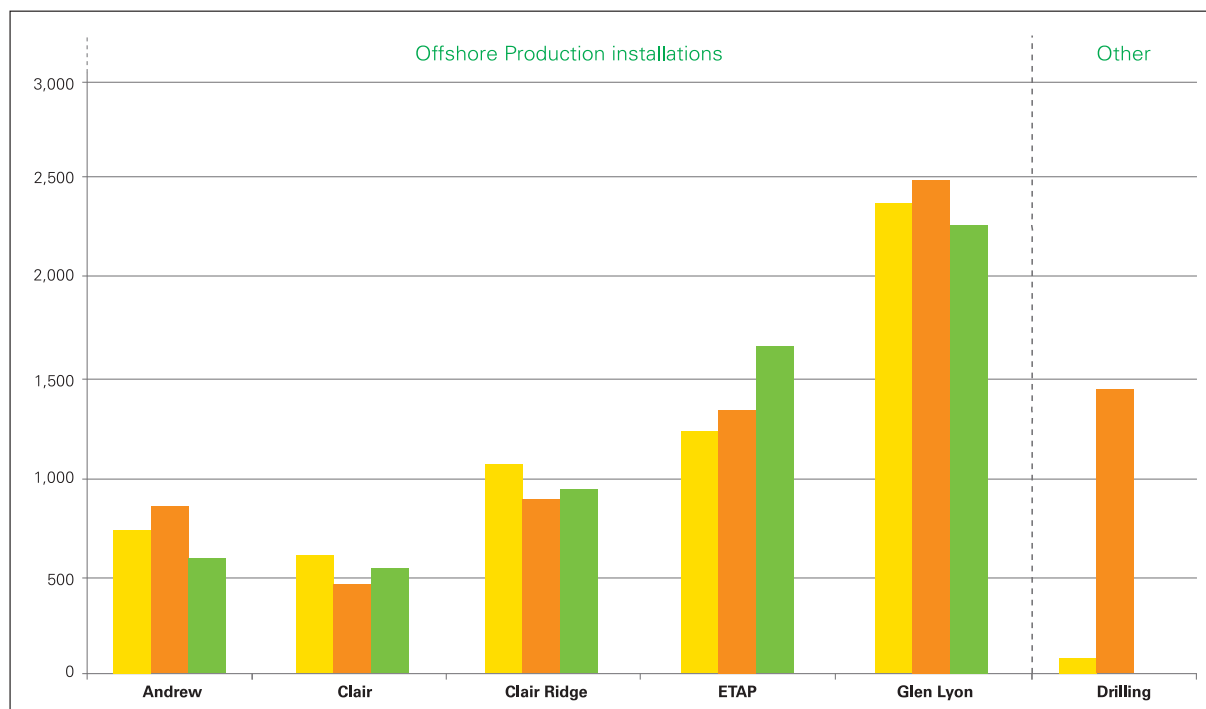


Figure 9: Total non-GHG emissions (tonnes) for bp-operated installations and third-party drilling activities from 2019 to 2021

3. Permitted discharges

We use chemicals offshore to improve the flow of fluids, to facilitate the separation of materials, to prevent the degradation and fouling of process equipment and in control systems. The composition of these chemicals is diverse, and their usage and discharge are permitted by the regulator. The majority of chemicals used in our production operations are not discharged to the marine environment.

Compared to the previous year, in 2021 our production chemical usage and discharge decreased approximately 5% and 23% respectively, as shown in Figure 10. Of these discharged to sea during 2021, 58% by weight were classed as posing little or no risk to the environment (PLONOR), and 15% were chemicals with a substitution (SUB) warning. Eight chemicals with SUB warnings were removed from production chemical permits in 2021. bp is continuing to assess possible reduction in the use and discharge of chemicals that carry a substitution warning.

Total production chemicals used and discharged by offshore facilities (tonnes)

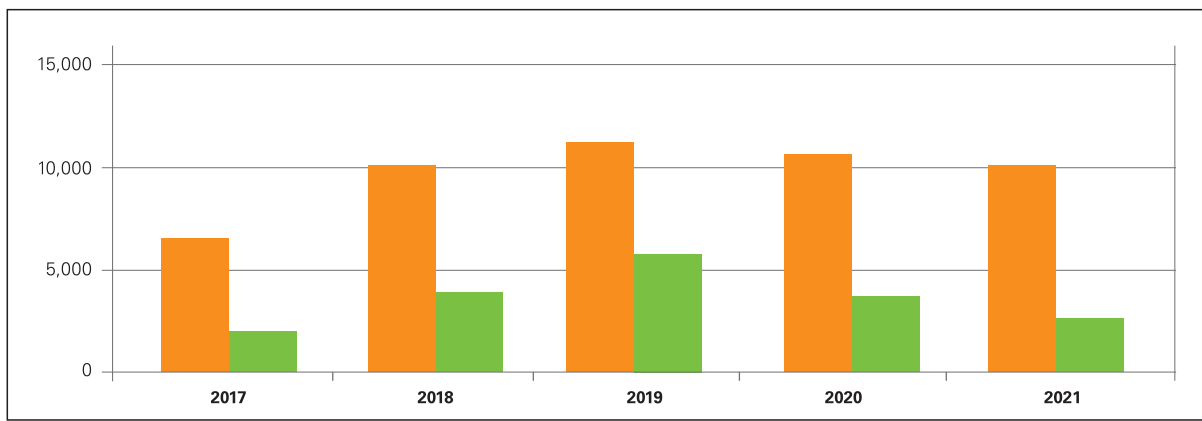


Figure 10: Total permitted production chemical use and discharge (tonnes) between 2017 and 2021

Figure 11 below shows the total use and discharge of production chemicals by bp-operated installations in 2021. A significant proportion of chemical use on Glen Lyon relates to using calcium nitrate for reservoir souring. Subsea chemical use and discharge relates to flushing of pipelines to remove hydrocarbons before maintenance and inspection activities are undertaken and for use in hydraulic control systems.

Total production chemicals used and discharged by asset(tonnes)

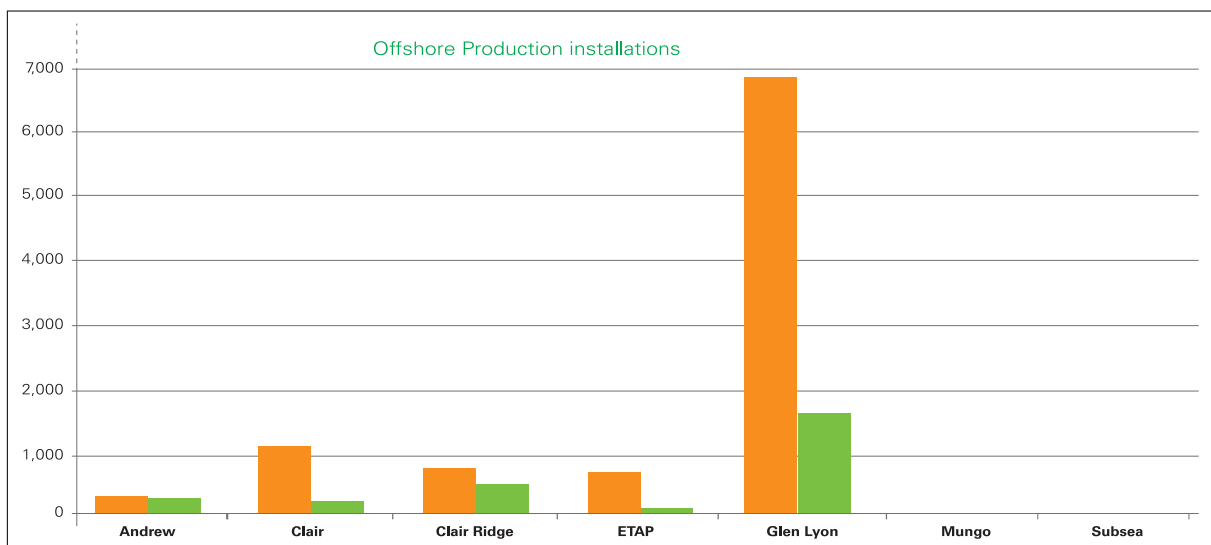


Figure 11: Total permitted production chemical use and discharge (tonnes) for bp-operated installations during 2021. Excludes third-party drilling chemicals (shown in separate graph)

NOTE Permitted production chemical use and discharge are reported separately for the Petrojarl Foinaven floating, production, storage, offload (FPSO) vessel by the duty holder Altera Infrastructure.

3. Permitted discharges (cont'd)

Fluids produced from oil producing wells often contain large quantities of water as well as hydrocarbons. The water and hydrocarbon are separated during processing. Hydrocarbons are exported and the remaining produced water, which contains trace amounts of oil, is either reinjected into the reservoir or discharged to sea in accordance with environmental permits. In order to minimise oil discharges, all but one of our offshore installations have been designed to reinject some or all produced water.

Figures 12 and 13 summarise the produced water discharges. Total produced water discharged by bp-operated installations decreased by 53% in 2021 when compared to the previous year. The ETAP installation reinjects 100% of its recovered produced water and therefore has no associated discharge.

Total produced water discharged (millions of tonnes)

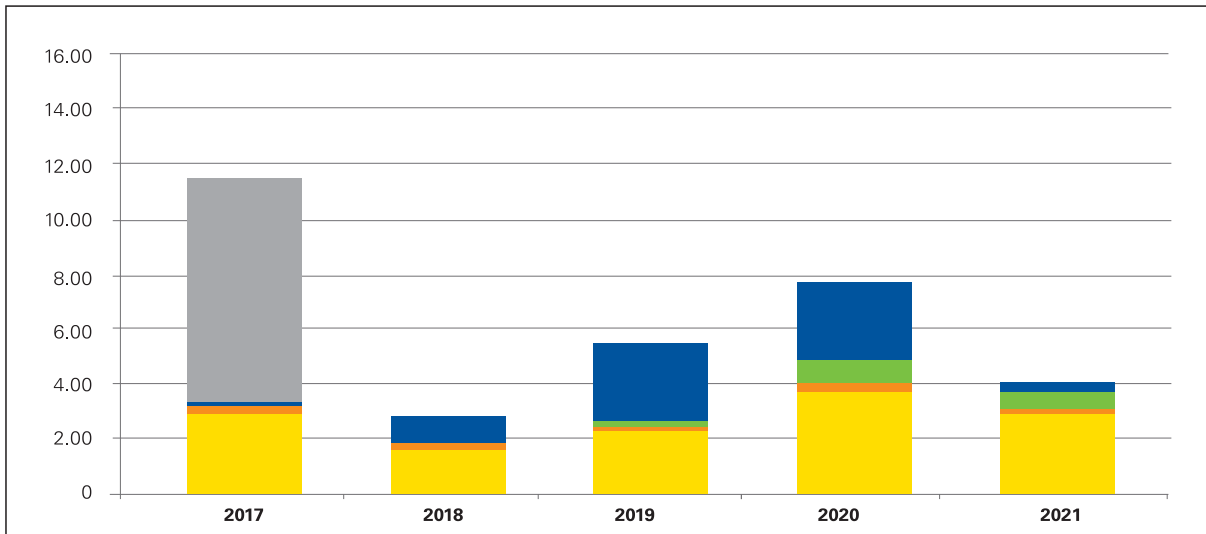


Figure 12: Total produced water discharged (millions of tonnes) between 2017 and 2021

Total produced water discharged by asset (millions of tonnes)

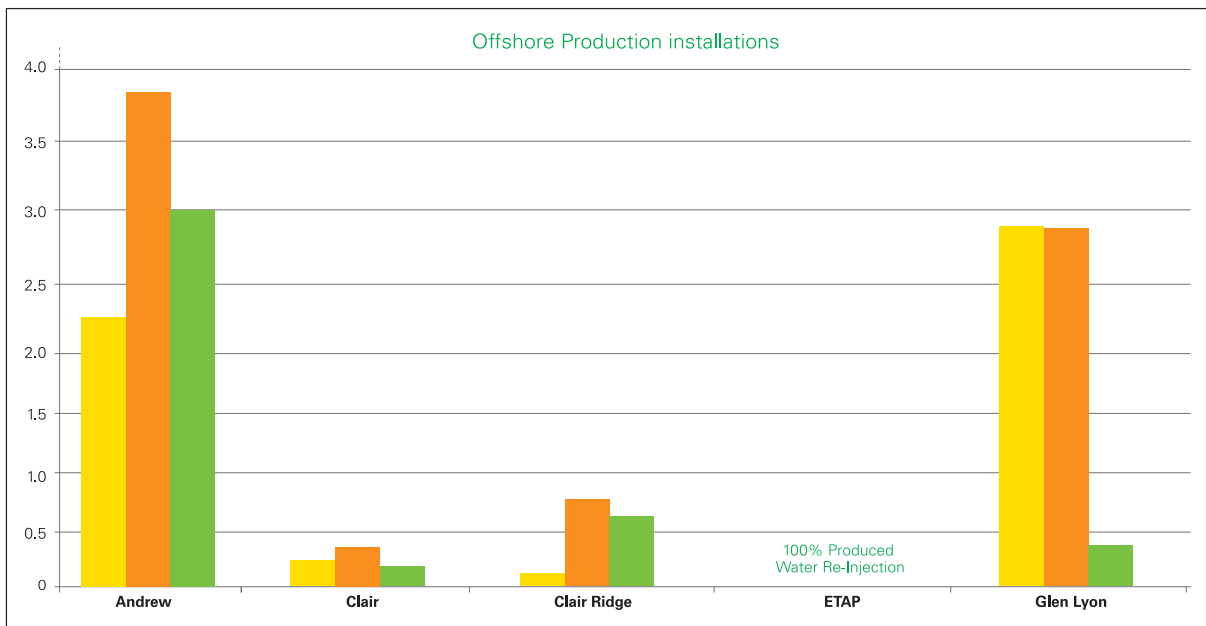


Figure 13: Total produced water discharged (millions of tonnes) for bp-operated installations from 2019 to 2021

NOTE Produced water discharged is reported separately for the Petrojarl Foinaven floating, production, storage, offload (FPSO) vessel by the duty holder Altera Infrastructure.

3. Permitted discharges (cont'd)

The total amount of oil discharged with produced water and concentrations of oil in produced water are governed by the Offshore Petroleum Activities (Oil Pollution Prevention and Control) Regulations 2005 as amended and specified in the permits for each operating installation. Where such installations discharge produced water, the permits require the monthly average concentrations of oil to be below 30 milligrams of oil per litre (mg/l).

Figure 14 below shows the annual average oil in produced water concentrations for each operating installation in 2021. All installations achieved the 30 mg/l threshold for discharges to sea. Andrew does not have reinjection facilities and therefore 100% of produced water at an annual average of 14.38 mg/l was discharged to sea vs. 18.24 mg/l in 2020.

Annual average oil concentration in produced water discharged (mg/l)

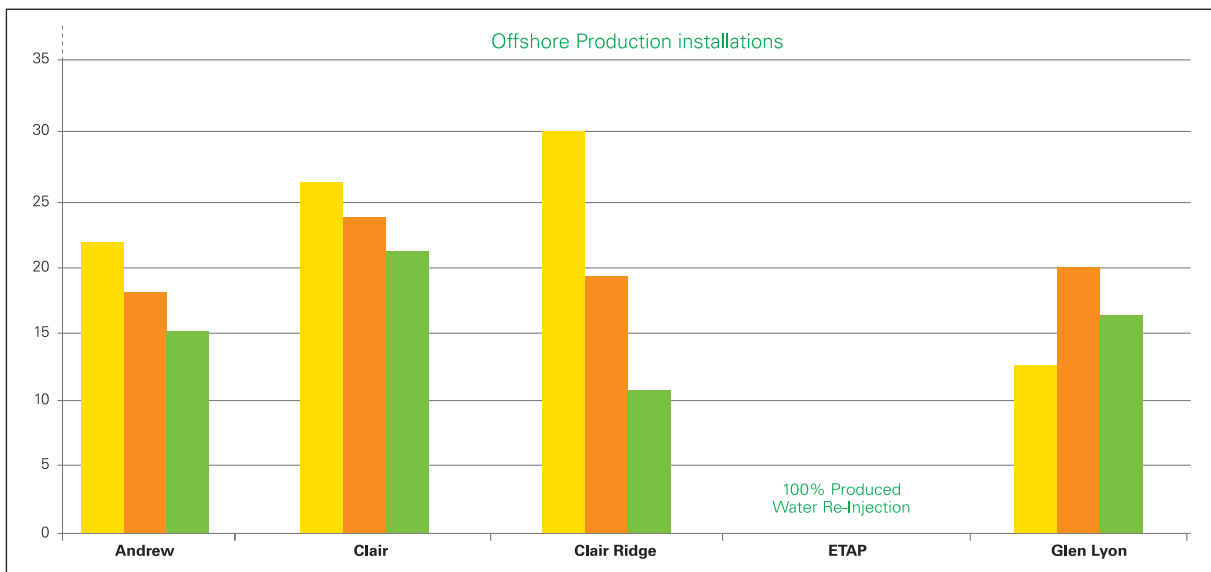


Figure 14: Annual average oil in produced water discharge (mg/l) for bp-operated installations for 2019 to 2021

Figure 15 shows the total oil in produced water discharged for our operated installations during 2021. Of all the produced water discharged by our operated installations, oil makes up less than 0.002% of the total mass.

Total oil in produced water discharged (tonnes)

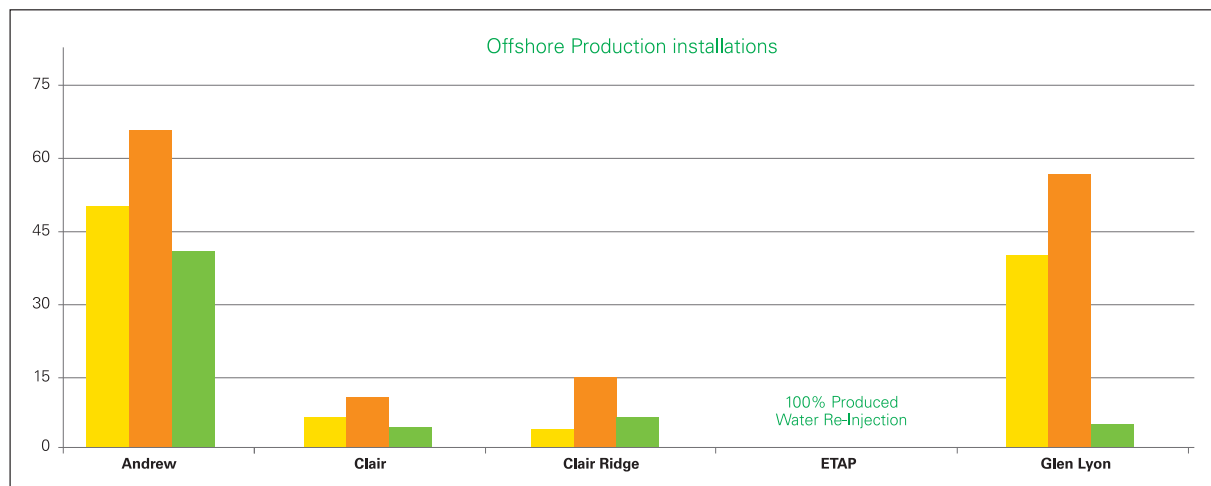


Figure 15: Total oil in produced water discharged (tonnes) within total produced water discharged for bp-operated installations for 2019 to 2021

4. Waste

Waste from our operations is segregated and, where possible, reused or recycled. Special waste includes paints, hazardous chemicals, oils, batteries, aerosols, heavy metals, wax from pigging operations and oily waste. Quantities of special waste generated by bp North Sea installations are shown below in Figure 16. The large quantity of special waste from Clair Ridge is attributed to waste liquids and sludges, including those fluids generated from tank washing activities. This waste is sent for treatment where the material is physically and chemically treated to remove contamination and then discharged to sewers.

Special waste from operating installations (tonnes)

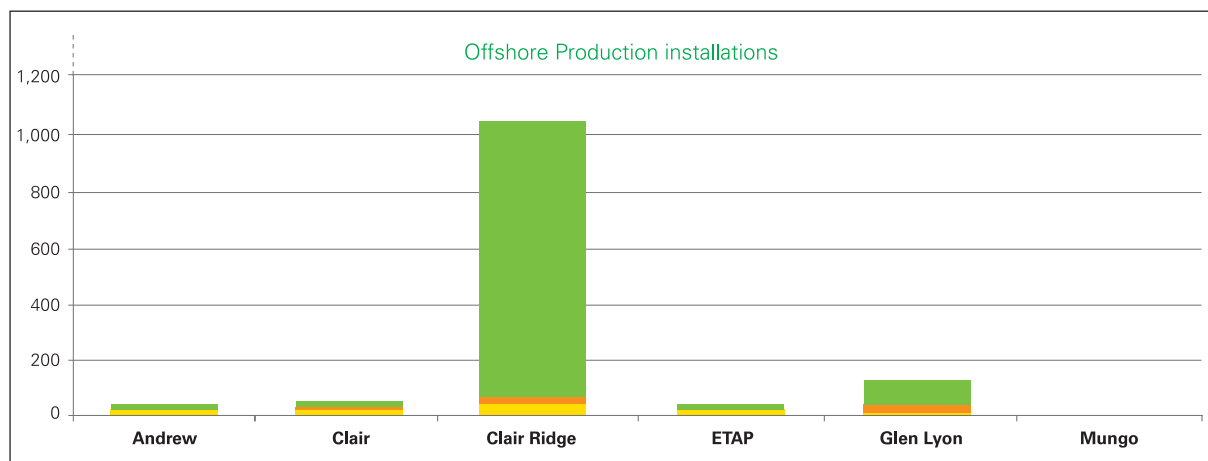


Figure 16: Special waste (tonnes) reported for bp-operated installations during 2021. Includes waste generated from drilling activities at Clair Ridge.

Non-special waste includes segregated recyclables (paper, packaging, wood etc.), general waste (i.e. accommodation waste) and uncontaminated scrap metals. Quantities of non-special waste generated by our operated installations are shown in Figure 17 below.

Non-special waste from operating facilities (tonnes)

Excludes drilling waste (shown on separate graph)

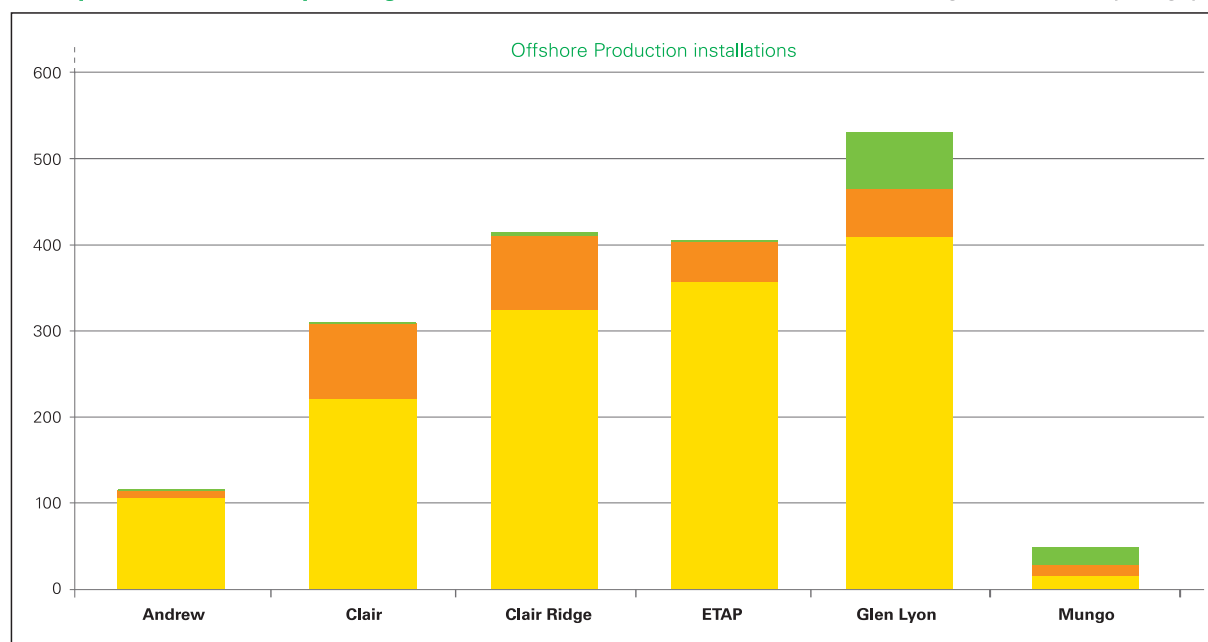


Figure 17: Non-special waste (tonnes) generated for bp-operated installations during 2021. Includes waste generated from drilling activities at Clair Ridge.

NOTE Waste is reported separately for the Petrojarl Foinaven floating, production, storage, offload (FPSO) vessel by the duty holder Altera Infrastructure.

5. Drilling specific environmental performance

During 2021 bp drilled and completed a total of 5 wells and permit returns were filed with the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED). No mobile offshore drilling units (MODU) were used during 2021, with the five wells being drilled from the Clair Ridge drilling platform. The Well Enhancer light well intervention vessel carried out two well interventions, at the Kinnoull and Machar fields.

As part of drilling and intervention operations, approximately 13,600 tonnes of chemicals were used, of which approximately 3,000 tonnes were discharged in accordance with environmental permits as shown in Figure 18 below. The majority of these chemicals were completion brines and water-based mud chemicals classified by OSPAR as posing little or no risk to the environment (PLONOR). Of the discharged chemicals, 93% by weight were classed as PLONOR.

The Clair Ridge platform re-injected approximately 1,300 tonnes of cuttings and discharged a further 2,400 tonnes (WBM) to the marine environment in 2021.

Drill cuttings and drilling chemicals (tonnes)

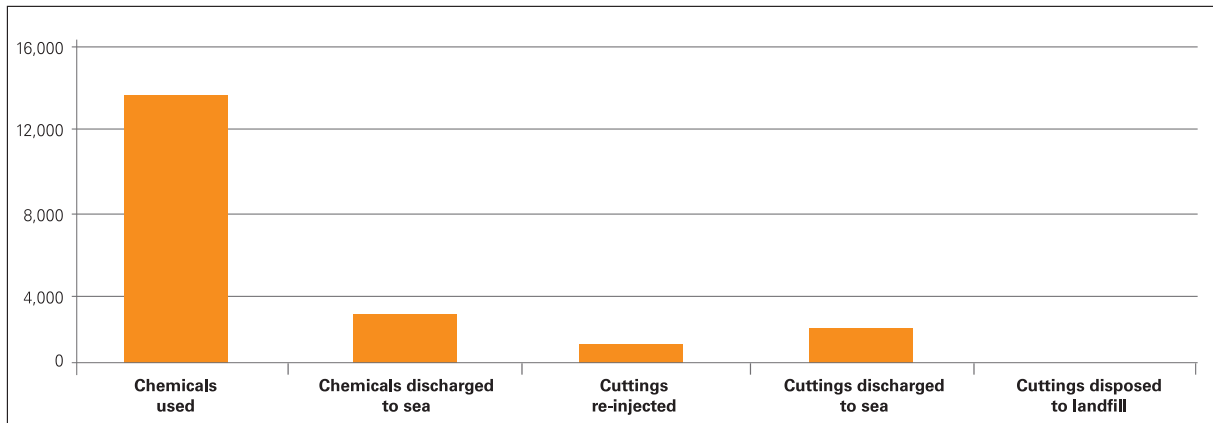


Figure 18: Total drill cuttings re-injected, discharged and disposed to landfill, and drilling chemicals used and discharged (tonnes).

Drilling waste includes special wastes such as hazardous completion, workover and drilling fluid additives. Although no mobile drilling rigs were used in 2021, some of the waste generated in the previous year was processed by the waste contractor in 2021, and therefore included in Figure 19 below.

Operational drilling waste from UK mobile drilling rigs owned and operated by third parties (tonnes)

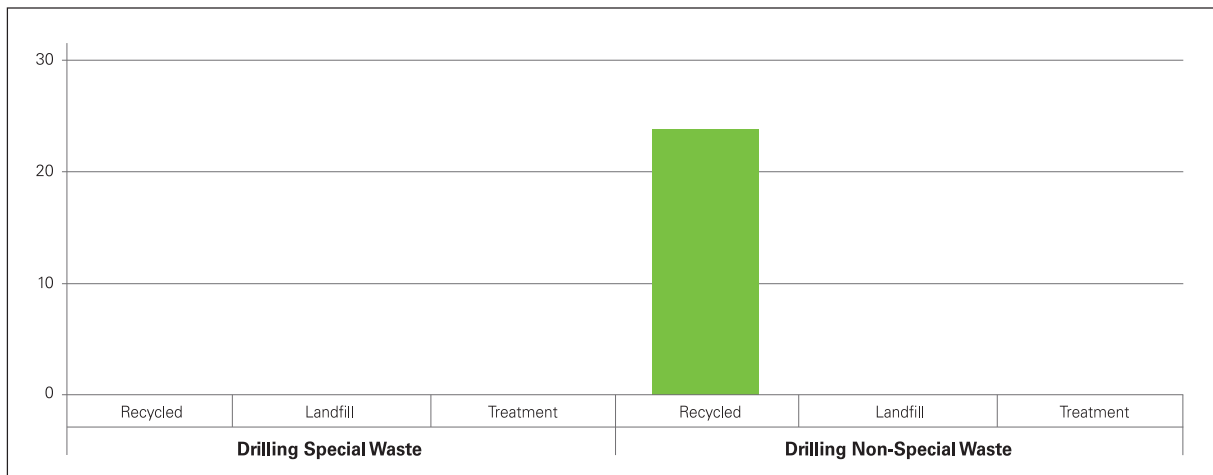


Figure 19: Special and non-special waste (tonnes) generated during third-party drilling activity in 2020 and processed in 2021. ■ Deepsea Aberdeen Clair Ridge waste generated from drilling activities is included in Section 4, Waste.