



Environmental Performance Report 2021

Offshore Operations



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Section 1 Introduction

Ithaca Energy (UK) Limited, hereinafter referred to as Ithaca Energy or the Company is an independent oil and gas company and it, together with its subsidiary entities, has production, development and exploration operations focused on the UK North Sea, headquartered in Aberdeen. The Company was founded in 2004 and has grown through a combination of acquisitions and new field developments.

Ithaca Energy is a wholly owned subsidiary of the Tel Aviv stock exchange listed Delek Group Limited (TASE: DLEKG, US ADR: DGRLY), Israel's leading integrated energy company.

Further information on Ithaca Energy can be found at: <https://www.ithacaenergy.com/>

Pursuant to OSPAR Recommendation 2003/5, all operators of offshore installations on the UK Continental Shelf (UKCS) are required to produce an annual public statement and make it available to the public and the Offshore Petroleum Regulator for Environment and Decommissioning (OPRED).

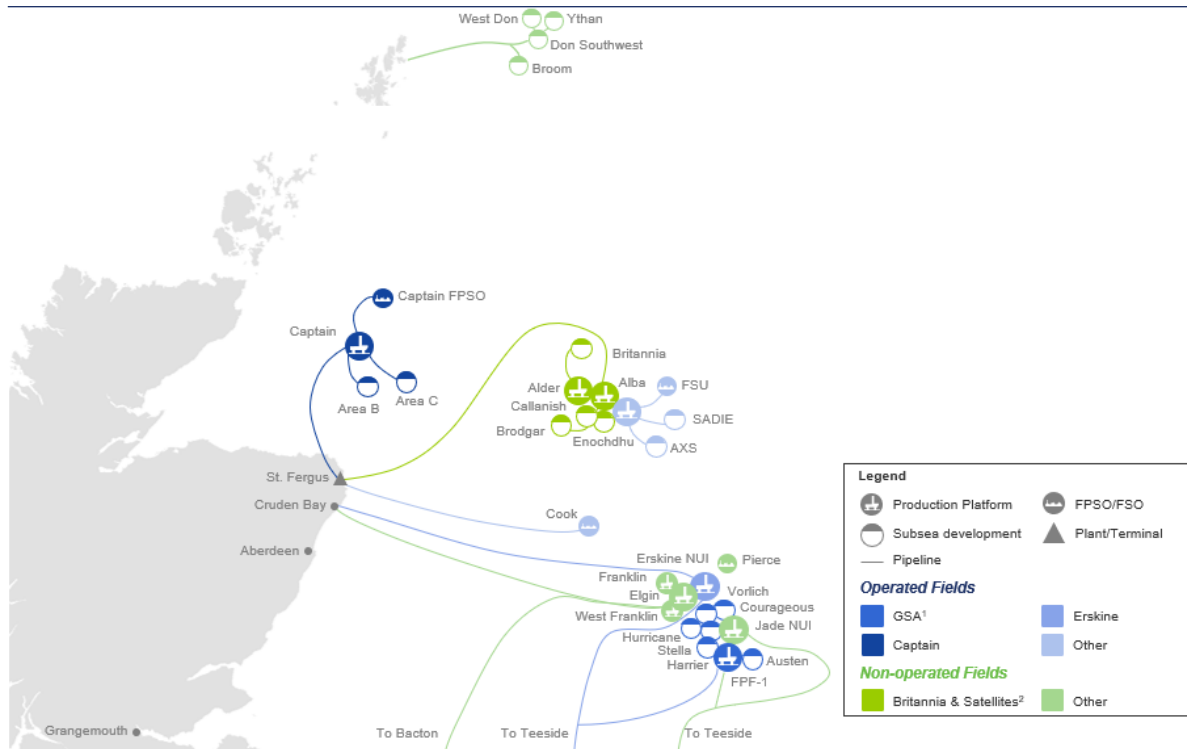
This is the sixteenth annual public environmental statement and it covers offshore installation activities carried out during 2021.

Section 2 of the report provides a general description of the Company and its activities; Section 3 provides an overview of Ithaca Energy's environmental management system, environmental policy and high level environmental objectives; and the final section presents 2021 environmental performance data for relevant operations, together with performance against environmental targets.

Section 2 Overview of Operations and Activities in 2021

2021 was a transformational year for Ithaca Energy achieving a strong operational performance on production and limited disruption arising from Covid-19 related restrictions. Similar to 2020, the main focus of the Company has been centred on maintaining the health of the workforce and reducing the risk of spreading Covid-19, whilst at the same time preserving the operational and financial resilience of the business. 2021 saw the Company implement ambitious greenhouse gas emissions reduction plans.

Our Operations



Ithaca Energy is one of the largest independent exploration and production companies in the UK with substantial production assets in the North Sea. The Company has a high quality, diverse portfolio of assets including operated and non-operated assets. The portfolio consists of 18 producing field interests, which lie predominantly in the Central North Sea area of the UKCS. The portfolio is heavily weighted towards operated assets, both in terms of production and reserves, providing the Company with significant control and flexibility over execution of the business' strategic and operational priorities. It includes eight operated assets (Alba, 36.67%; Captain, 85%; Erskine, 50%; Alder, 73.7%; Cook, 61,35%; Greater Stella Area (GSA contains Stella and Harrier 100% and Vorlich 34%); and ten non-operated assets (Britannia, 32.38%; Britannia Satellites (Brodgar, 6.25%; Callanish, 16.5%; Enochdhu, 50%); Don Southwest, West Don and Conrie oil fields, 40%; Elgin/ Franklin, 3.9%; Jade, 19.93%; and Pierce, 7.48%;). The scope of this environmental report will cover Ithaca Energy's operated assets only.

Ithaca Energy Operated Assets

Our operated assets are located in the Northern and Central North Sea and Moray Firth areas of the UKCS.

The Alba Field

The Alba field lies about 130 miles (210 km) north-east of Aberdeen, Scotland, in the UK Central North Sea. Alba is a heavy oil field. The field facilities include a fixed steel platform, the Alba Northern Platform, and a Floating Storage Unit (FSU). Ithaca Energy continues to review projects designed to sustain production and increase recovery at Alba.



The Alder Field

Alder is a high-pressure, high-temperature (HPHT) gas condensate field, approximately 17 miles (28 km) to the west of the Britannia field. Alder produced gas condensate (a mixture of hydrocarbon liquids from natural gas) is processed at new dedicated facilities on the Britannia platform. Condensate and gas is then exported to Scotland-based terminals at Grangemouth and the Scottish Area Gas Evacuation, St Fergus, respectively.

The Captain Field

The Captain field lies approximately 90 miles (145 km) north-east of Aberdeen, Scotland, in the Outer Moray Firth. Captain crude oil is offloaded from the Floating Production, Storage and Offloading (FPSO) vessel to a dynamically positioned shuttle tanker and transported to customers. Captain gas is exported (and imported) via subsea pipeline to the Frigg UK Gas Transportation System and then on to St Fergus gas terminal.

Ithaca Energy continues to implement projects designed to sustain production and increase recovery at Captain. This includes active platform and subsea well in-fill drilling and completion programmes targeting key areas of the reservoir. Continued development drilling is expected through the next decade.



The Cook Field

The Cook field lies approximately 105 miles (170 km) north-east of Aberdeen, Scotland, in the UK Central North Sea, in water depths of approximately 301 feet (92 m). The Cook field development consists of one production well (on natural depletion) tied back approximately 10 kilometres to the Anasuria Operating Company operated Floating Production, Storage and Offloading (FPSO) vessel, which also serves as a host facility for a number of nearby fields.



The Erskine Field

The Erskine field lies approximately 150 miles (241 km) north-east of Aberdeen, Scotland, in the Central North Sea, in water depths of about 296 feet (90 m). The field includes a normally unattended installation and is remotely controlled from Harbour Energy's Lomond platform.

Processing takes place in a dedicated module on the Lomond platform. Gas and condensate are exported separately to Harbour Energy's North Everest platform before gas is finally exported via the Central Area Transmission System and condensate is exported through the Forties Pipeline System.

The Greater Stella Area

The Greater Stella Area is located in the heart of the Central Graben area of the Central North Sea, on the UKCS approximately 158 miles East of Aberdeen. It is an area surrounded by various large producing fields, and numerous undeveloped discoveries. The Greater Stella Area licences contain the Stella, Harrier and Vorlich fields, which are in production, and the Abigail field, which in 2021 was in the planning stage of development (expected first oil October 2022). The Company also owns operated interests in the Courageous discovery, which, similar to Abigail, is planned to be developed from the hub infrastructure.



Development planning activities are also continuing to advance on expansion of the Captain field enhanced oil recovery (“EOR”) programme.

Future Developments

A key focus of Ithaca Energy’s operational activities is the delivery of lower risk growth through the appraisal and development of UK undeveloped discoveries.

F-Block

The Company completed drilling of the exploration well on the “Fotla” prospect (60% working interest) in Block 22/1b. The “F-Block” lies adjacent to the Alba field and contains two gas exploration prospects, “Fotla” and “Fortriu”. It is estimated that Fotla has mid case (best estimate) potentially recoverable resources of 21 million barrels of oil (boe), rising to 41m in the high case or dropping to 10m in the low case.

Decommissioning

In September 2021 the Ithaca-operated Jacky field (100% working interest) topside and jacket was removed for decommissioning using the Heerema ‘Thialf’ Semi-Submersible Crane Vessel (SSCV). The removed platform structures were transported to Hoondert in the Netherlands where they will be dismantled and recycled. A final phase will take place in 2023 to remove the remaining subsea equipment, mattresses, pipeline ends / spools and umbilicals which are not buried below the seabed. At the end of the Jacky field decommissioning programme, the seabed will be left clear.

Section 3 Overview of Ithaca Energy's Environmental Management System

Ithaca Energy's objective is to provide a safe and healthy working environment for all its employees, contractors and other personnel working for the Company, while simultaneously minimising the environmental impact of the Company's operations by working to operate in an ever-cleaner manner. The control and management of these issues lies at the centre of the policies and procedures that constitute the health, safety and environmental management system and the culture of the business.

Company Management System

The focus areas:

- **Workforce Safety and Health** - Eliminate fatalities, serious injuries and illnesses
- **Process Safety, Reliability and Integrity** - Eliminate high-consequence process safety incidents and operate with industry-leading reliability
- **Environment** - Assess and manage significant environmental risks
- **Efficiency** - Use energy and resources efficiently
- **Security** - Prevent high-consequence security and cybersecurity incidents
- **Stakeholders** - Address business risks through stakeholder engagement and issues management

Ithaca Energy's Management System into which the Environmental Management System (EMS) is integrated, is certified to ISO 14001:2015 standard. The EMS was last verified as meeting the ISO 14001:2015 standard in April 2021. It is designed to implement the environmental policy of Ithaca Energy. It demonstrates a commitment to compliance with environmental legislation and Ithaca Energy standards, processes, activities and objectives for environmental management of hydrocarbon exploration and production.

Ithaca Energy's policy for protecting people and the environment is the primary statement of Ithaca Energy's expectations for health, safety and environmental management, and provides a shared understanding throughout the Company of environmental performance expectations.

Our vision is to be the highest performing UK North Sea independent oil and gas company, focused on sustainably growing value.

We take pride in:

- Having a relentless focus on **high performance**
- Continuously improving the **health, safety and environmental impact** of our operations
- Developing an **engaged workforce**, in an inclusive, dynamic workplace
- Striving for **efficiency and simplicity** in all that we do

HES Policy

The Ithaca Energy vision is reflected in the following HES Policy which meets the requirements of The Corporate Major Accident Prevention Policy (CMAPP) required by The Offshore Installations (Offshore Safety Directive) (Safety Case etc) Regulations 2015; The Safety Policy required by the Health & Safety at Work etc. Act 1974; and The Environmental Policy required by ISO 14001 environmental management standard.

The HES Policy is endorsed by the Chief Executive Officer of Ithaca Energy on behalf of the Board of Directors. The HES Policy is a commitment to assess and manage the risks and impacts associated with our operations; and a commitment to comply with legislative requirements and corporate policies.

HES Policy and Company Management System Commitment

The Company's vision is to be the highest performing UK North Sea independent oil and gas company, focused on sustainably growing value. We strive to be leaders in terms of: process safety; occupational health and safety; environmental responsibility; asset reliability and efficiency. The Company aims to:

- Identify and reduce the risk from major accident hazards including process safety and environmental risks.
- Always be in control of work, taking time to reassess when conditions change.
- Understand the impact of errors and put in place barriers to mitigate the consequences.
- Promote a healthy workplace and mitigate significant health risks.
- Ensuring continual improvement in all aspects of our business.

Through consistent application of this policy and our Company Management System (CMS) we address the following:

Leadership

Our leaders are accountable for:

- Providing clear and consistent leadership in accordance with this policy and company values.
- Ensuring clear roles, responsibilities, and communications.
- Trusting and empowering our teams to apply a risk-based approach to decision making in accordance with this policy.
- Creating a culture that is built on our values and behaviours, enabling safe, reliable and secure operations and protection of the environment.
- Engaging with our community and other stakeholders.
- Ensuring that we comply with all applicable policies, codes and regulations and that we constructively work with the regulators to align objectives.

Organisation

Our organisation is fit-for-purpose and is designed to:

- Achieve results in accordance with Company values and policies.
- Ensure suitable and sufficient control of Major Accident Hazards.
- Ensure that staff and contractors are competent in their roles through the application of the Company Competence Assurance Process.
- Ensure structured and timely decision making.
- Ensure the effective management of safe work.

A Strong Safety Culture

Based on:

- The IOGP Life Saving Rules.
- Compliance with the provisions of our safety cases and this policy.
- The identification and management of Major Accident Hazards.
- The involvement of, and consultation with, our staff and contractors.
- The reporting and investigation of incidents and near misses.
- The use of stop work authority.
- The recognition and reward of desired behaviors through our performance management and reward processes.
- The implementation of company safety initiatives.

Stop Work Authority

Based on:

- Our employees and contractors understanding our leadership commitment to engage, encourage and support them.
- Everyone having the responsibility and authority to Stop Work.
- There being no repercussions when an action is taken to stop work.
- All employee's ideas being important, and always being encouraged to raise concerns.

Risk Management

Our people, at all levels of the organisation will:

- Systematically assess, prioritise and manage risk.
- Regularly review and re-evaluate risks.
- Maintain the integrity of dedicated systems through fit-for-purpose design and operating practices.
- Ensure that there are multiple, independent barriers in place to prevent Major Accident Hazards including, but not limited to, unplanned releases of hydrocarbons.

Asset Integrity Management

Our facilities, reservoirs and wells are designed and maintained to be fit-for-purpose throughout their lifecycles. This includes:

- Designing, constructing, modifying, operating and maintaining our facilities and wells to recognised safety and environmental protection standards, to avoid unplanned releases of hazardous substances and to prevent injury to people or harm to the environment.
- Minimising the potential for human error through the design and operation of our facilities.
- Maintaining the integrity of safety and environmental critical elements.
- Managing risks on a whole of life-cycle basis.
- Managing change in accordance with our management of change process.
- Compliance with all applicable codes, Regulations and Company standards.

Monitoring and Audit

Through a process of audit and workplace monitoring, we will examine our processes and operations to confirm:

- That our plans and processes are being correctly implemented.
- That we continually improve the effectiveness of our Company Management System (CMS) system including our verification and well examination schemes.
- The suitability and effective implementation of this policy.

Emergency Management

While prevention is the first priority, we are prepared for any emergency and have the tools to mitigate any incident quickly and effectively:

- We maintain a fit-for-purpose command and control system, based on defined scenarios and meet all UK legal requirements.
- We regularly test the effectiveness of the system through audits and exercises.
- We aim to prevent future incidents by identifying and eliminating their root causes.

This Policy applies to all offices and facilities operated by the Company.

The Company's Leadership shall champion the implementation of the Policy across the Company and lead the monitoring and auditing of its ongoing effectiveness.

Every individual has a duty to ensure they always comply with, and hold others accountable for compliance with this Policy, and prevent harm to themselves and others, and the environment.

This Policy is applicable without distinction between Company employees and contractors working for the Company.

This policy is a combined Health, Safety, Environmental and Corporate Major Accident Prevention Policy and satisfies the requirements of Section 2(3) of the Health and Safety At Work Act 1974 and Regulation 7 of the Offshore Installations Safety Case Regulations 2015.



Alan Bruoe
Chief Executive Officer

Environmental Stewardship

Our Environmental Stewardship (ES) process identifies and addresses significant environmental aspects relating to our operations, driving continuous improvement in environmental performance and reducing our environmental impact. It is applied across the life cycle of an asset and is used to identify, assess and manage potential environmental impacts and benefits. To achieve this, Ithaca Energy has implemented a step-wise process to be followed on an annual basis. First, an inventory of all emissions, releases, wastes and potentially impacted natural resources is prepared. This is followed by a procedure to identify, assess, mitigate and manage any significant risks and impacts to the environment associated with operations, emissions, releases and wastes. The outcome is an annually updated ES plan. The management system is independently certified to the international standard ISO 14001:2015 and requires Ithaca Energy to engage independent auditors who verify that our onshore and offshore operations meet requirements. All Ithaca Energy operated assets are included in the ISO 14001:2015 certification.

The ES plan includes objectives and targets for environmental performance, details of improvement implementation programmes and the process for tracking progress in meeting environmental objectives. The ES plan is approved by senior management and is aligned with other business and HES plans.

All Ithaca Energy operations and projects have the potential to impact on the environment and they are all subject to strict environmental regulatory controls which require Ithaca Energy to prepare and submit regulatory applications to gain approval before activities begin and during the ongoing operational activities. We monitor and report our ongoing emissions, discharges and waste streams to ensure we meet regulatory requirements and do not cause significant impact on the environment. In the event of an unplanned release/spill to sea, or a non-compliance with regulatory requirements, notification would be made to the appropriate regulatory authorities and action taken to respond to any threat of or actual pollution. Investigations of incidents are conducted to gain any learnings or actions to prevent recurrence.

The ES process is used to help provide assurance that we are protecting the environment and meeting our internal and regulatory requirements and obligations.

In 2021 the Company's environment stewardship planning included a commitment to analysing and reducing greenhouse gas emissions, both direct and indirect, in order to contribute towards Ithaca Energy's goal of a 25% emissions reduction by 2025.

Section 4 Environmental Performance

Ithaca Energy is committed to continually improving environmental performance through responsible design, development and operations. This is achieved by integrating environmental objectives and targets into the ES plan and regularly evaluating progress to adjust if required.

Performance Metrics

Ithaca Energy sets performance targets annually for key environmental aspects (produced water, oil releases/spills, waste and air emissions) to achieve the HES objectives.

Ithaca Energy's performance against targets for key 2021 environmental focus areas is summarised in the table below:

Table 1 - Ithaca Energy 2021 Performance Metrics¹

	Units	Ithaca Energy	
		Result	Metric
Oil spill volume rate	bbls/MMbbls produced	0	0.25
Total CO₂²	tonnes	339,753	467,032 ³
Oil-in-produced water mass	tonnes	80.092	118.805 ⁴
ISO 14001 re-certification	yes/no	Yes	Yes
Environmental audits completed	percent	100%	100%
Production operations waste recycling/reuse⁵	percent	84.5%	70%

Environmental Stewardship Improvement Program

As part of the preparation of the annual ES plan, improvement opportunities were identified by Ithaca Energy. These actions were grouped into improvement plans for Ithaca Energy's UK producing assets and for activities associated with drilling, including the use of a mobile offshore drilling unit (MODU).

The improvement opportunities centred around strengthening arrangements associated with prevention of, and response to, incidents and releases; produced water management; reduction of air emissions and management of waste. Progress in completing these actions was tracked throughout the year and was used as a leading measure of continual environmental performance improvement. By the end of 2021, Ithaca Energy achieved 73%

¹ Unless otherwise stated figures shown are for Ithaca Energy operated assets, excluding Alder and Cook field. The Alder field environmental emissions are reported through the Harbour Energy operated Britannia platform.

² This metric is total CO₂ for Captain, Alba, Erskine, FPF-1 and drilling operations. This does not include emissions from Alder and Cook which are accounted for by the operators of the Britannia Platform and Anasuria FPSO respectively, nor Erskine emissions which occur on, and are accounted by the operator of, the Lomond Platform.

³ CO₂ intensity is the total CO₂ over production. This does not include emissions from Alder and Cook. For comparison, 2020 data is shown as the metric.

⁴ Target figure shown is the combined Alba FSU (0.85), ANP (117) and Stella FPF-1 (0.95514) oil discharge permit figures for 2021.

⁵ This metric relates to the proportion of waste from UK production operations for which waste recycling is possible. The figure excludes drilling-related wastes and waste generated from occasional operations for which there is no current alternative but disposal in accordance with applicable law. Such disposed waste streams are tracked and reported. The metric is set this way to allow meaningful comparison of year on year performance in managing our routine waste streams.

completion of its environmental stewardship high priority opportunities, with the remaining 27% in progress and carried forward to 2022.

In addition to improvement opportunities raised directly via the ES process there are also arrangements in place to drive continual improvement in response to compliance audits; regulatory inspections/changes; and/or ongoing HES and asset work scopes.

Atmospheric Emissions, Carbon Dioxide

In 2021 the total scope 1 Carbon Dioxide (CO₂) emissions from our operations was 451,182 tonnes. This was a reduction of 2% from 2020 CO₂ emissions. The chart below shows the Scope 1 CO₂ emissions broken down by asset for our operations. The CO₂ emissions for Cook and Alder are reported by the operator of the Anasuria and Britannia facilities to which these fields tie back and are therefore not included in this breakdown. Emissions at the Erskine NUI are included in the breakdown, but like Cook and Alder the fluids are tied back to a host platform, emissions occurring at the host, Lomond, are not included in this breakdown.

The Captain Field (WPP and FPSO) is responsible for the largest portion of our emissions, but also the largest proportion of our production. The Alba field (ANP & FSU) is responsible for the largest proportion of CO₂ emissions; the Erskine NUI is responsible for less than 1% of our operated emissions, with fluid processing occurring on its host facility. The Alba field (FSU & ANP) and the Stella FPF-1 are each responsible for approximately a third of our emissions.

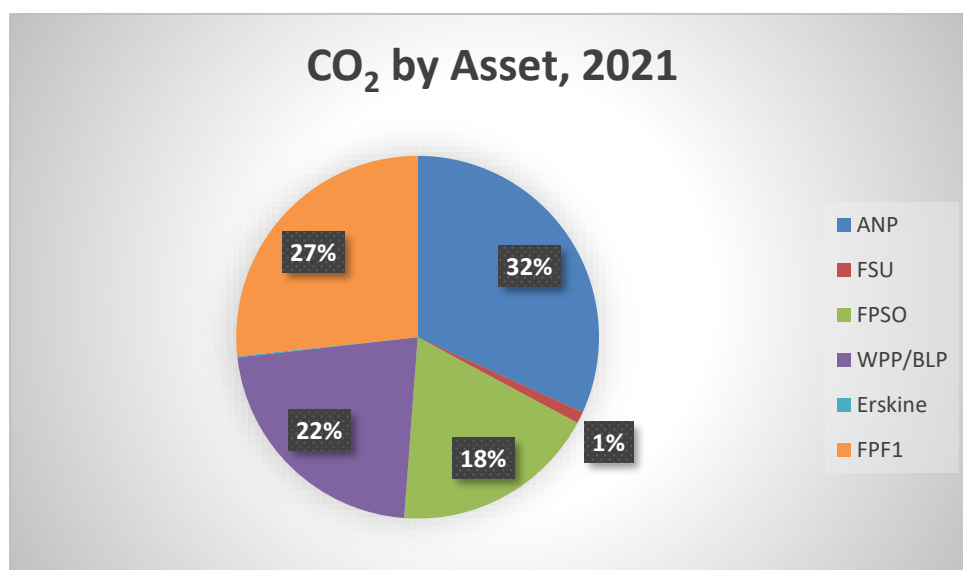


Figure 1 CO₂ by asset 2021

As shown in the chart below emissions from the combustion of fuel gas and diesel for power generation offshore account for the largest proportion of our CO₂ emissions. Fuel gas is used for power generation in gas turbines. Diesel is used for power generation in engines and turbines, in process heaters heating the well fluids, and marine services, such as engine thrusters used to keep the Alba Floating Storage Unit (FSU) on location. Wherever possible Ithaca preferentially uses fuel gas for power generation. This has multiple benefits: fuel gas is cogenerated with the oil offshore, it reduces transport emissions associated with importing diesel, fuel gas burns more cleanly than diesel resulting in less CO₂ emissions and using it as a fuel gas reduces flaring.

In 2021 flaring accounted for 16% of Ithaca's CO₂ emissions, a 2% proportional reduction in comparison to the previous year. Reductions in flaring was reported across all assets. These

reductions reflect the continuing to focus on reducing flaring rates; in quarter 4 the FPF-1 flare gas recovery system was fully reinstated.

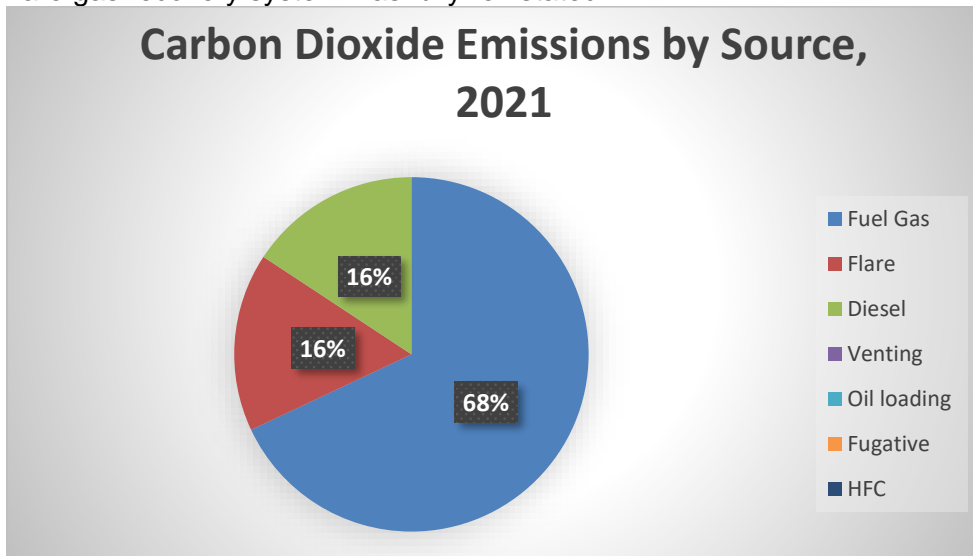


Figure 2 Carbon Dioxide by Source, Ithaca Energy Operated Assets 2021

Alba Northern Platform (ANP)

During 2021, Carbon Dioxide emissions from the Alba Northern Platform (ANP) were predominantly from gas consumed in the gas turbines for power generation. However, there was a significant proportional reduction in CO₂ from flaring when compared to 2020.

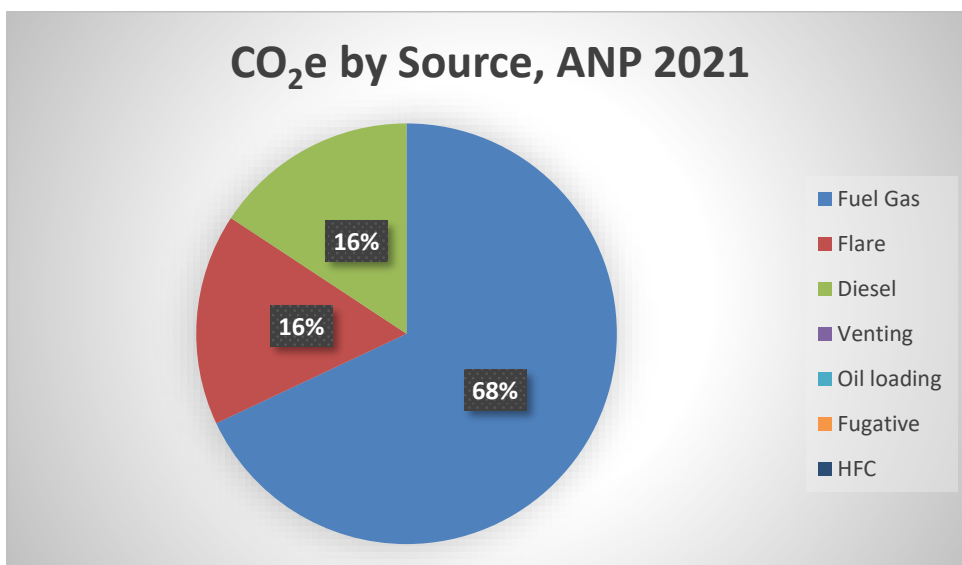


Figure 3 Carbon Dioxide by Source, Alba Northern Platform (ANP) 2021

Table 2 Carbon Dioxide by Source, Alba Northern Platform (ANP) 2021

Source - ANP	CO ₂ (tonnes)
Diesel Consumption	22552
Fugitives	0
Gas Consumption	97543
Gas Flaring	23347
Unlit flaring	6
HFC	
Propane	0

Alba FSU

There is no fuel gas or flare on the Alba FSU. During 2021 CO₂ emissions from the Alba FSU were predominantly from diesel consumed in the diesel engines for power generation, with a small proportion arising from the cargo tanks during cargo offloading.



Figure 4 Carbon Dioxide by Source, Alba FSU 2021

Table 3 Carbon Dioxide by Source, Alba FSU 2021

Source	CO ₂ (tonnes)
Diesel Consumption	4623
Oil Loading	90

Captain WPP

During 2021 CO₂ emissions from the Captain WPP were predominantly arising from gas consumed in the gas turbines for power generation, and gas flared.

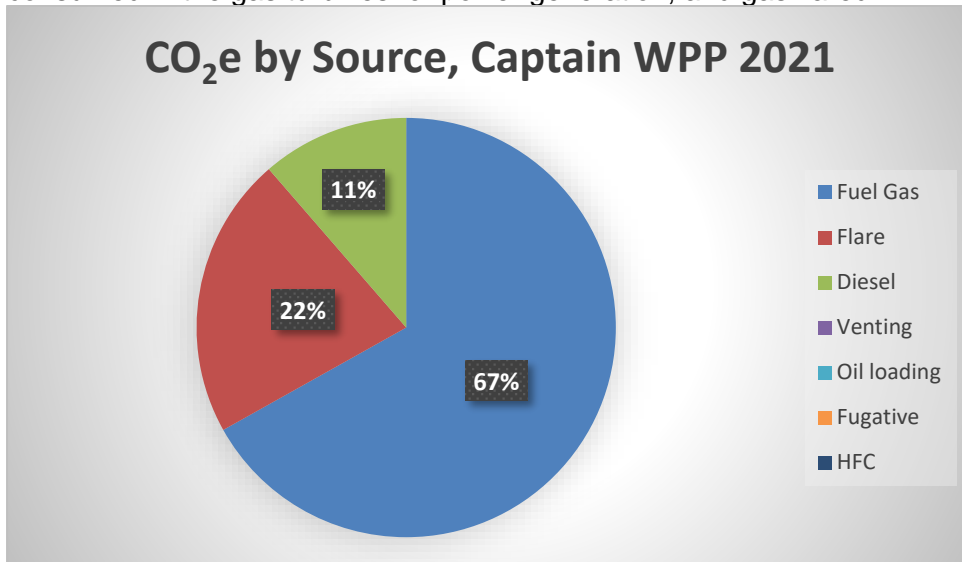


Figure 5 Carbon Dioxide by Source, Captain WPP 2021

Table 4 Carbon Dioxide by Source, Captain WPP 2021

Source	CO ₂ (tonnes)
Diesel Consumption	11295
Fugitives	0
Gas Consumption	66402
Gas Flaring	21617
Process Venting	1
Propane	60
HFC	0

Captain FPSO

During 2021 CO₂ emissions from the Captain FPSO were predominantly from diesel consumed in the diesel engines for power generation, and by the heaters to keep the fluids warm to allow them to be pumped into the awaiting cargo vessel during offloading.

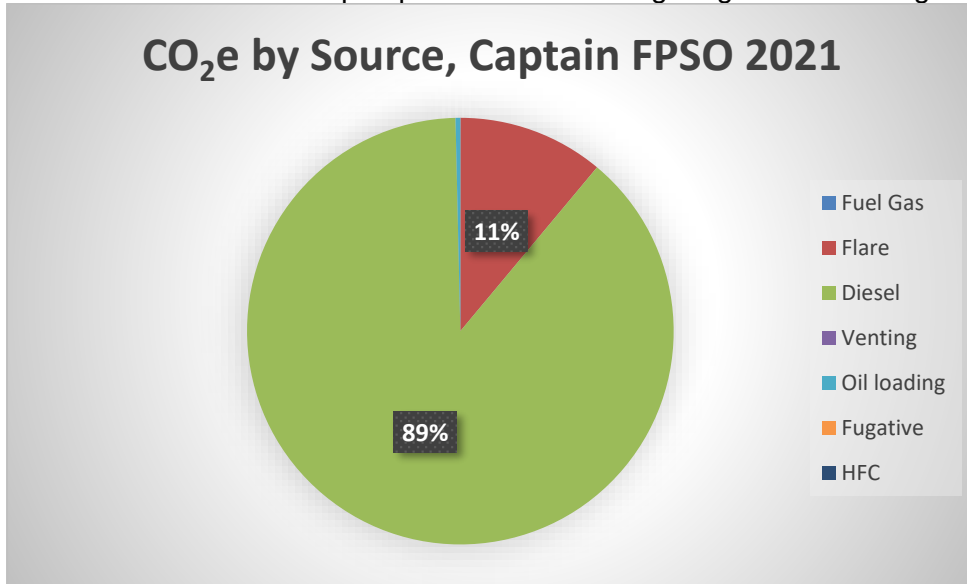


Figure 6 Carbon Dioxide by Source, Captain FPSO 2021

Table 5 Carbon Dioxide by Source, Captain FPSO 2021

Source	CO ₂ (tonnes)
Diesel Consumption	73348
Gas Consumption	0
Gas Flaring	9159
Oil Loading	300
Propane	9
HFC	0

Erskine

During 2021 CO₂ emissions from the Erskine field were from diesel consumed for power generation.

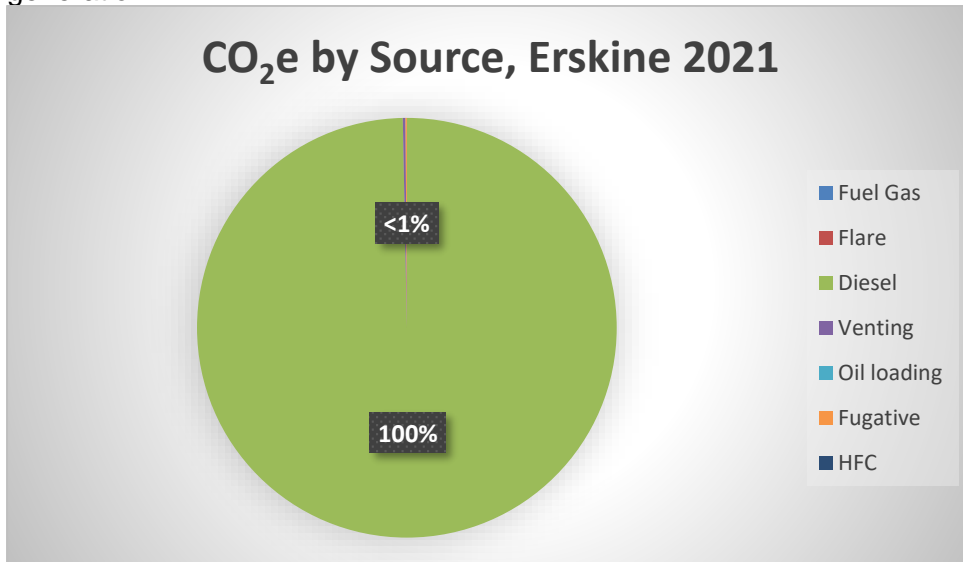


Figure 7 Carbon Dioxide by Source, Erskine 2021

Table 6 Carbon Dioxide by Source, Erskine 2021

Source	CO ₂ (tonnes)
Fuel Consumption	0
Gas Flaring	0
Diesel Consumption	536
Fugitives	1
Process Venting	1

Stella FPF-1

During 2021 CO₂ emissions from the Stella FPF-1 were predominantly from gas consumed by gas turbines for power generation and export gas compressors.

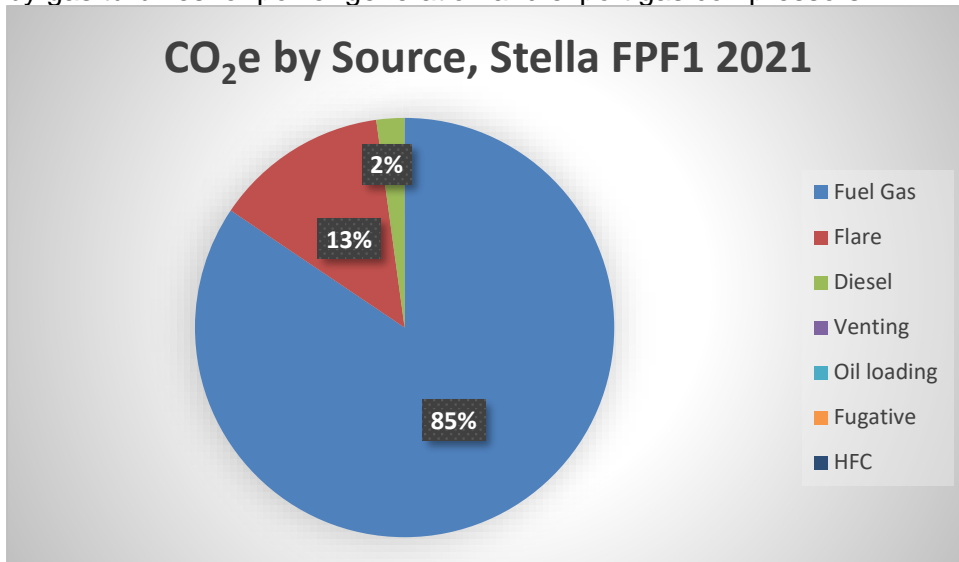


Figure 8 Carbon Dioxide by Source, Stella FPF1 2021

Table 7 Carbon Dioxide by Source, Stella FPF1 2021

Source	CO ₂ (tonnes)
Diesel consumption	2593
Fugitives	0
Fuel Gas	101562
Flaring	16127
Venting	10
Propane	0
F-Gas	0

MODU Drilling and Decommissioning

Table 8 Carbon Dioxide by Source, Stella FPF1 2021

Source	CO ₂ (tonnes)
MODU Diesel consumption	660
Decom Diesel consumption	84

Total Atmospheric Emissions

In addition to CO₂, other pollutants arise from the combustion of diesel and gases offshore. The table below shows the total tonnes of atmospheric pollutants emitted by each Ithaca Energy operated asset. CO₂ accounts for 98.8% of these emissions, 0.4% was Oxides of Nitrogen (NO_x), 0.3% Methane (CH₄), 0.2% Volatile Organic Compounds (VOC) and 0.2% Carbon Monoxide (CO). The combined emission of Sulphur Dioxide (SO₂), F-Gas and Nitrous Oxide (N₂O) account for less than 0.1%.

The 0.3% reduction in methane emissions was achieved by resolving the extinguished flare events on ANP, which were usually caused by weather conditions. Discussions with the flare tip vendor resulted in a change to the plant operating conditions which has eliminated extinguished flare events. When the 100-year AR4 greenhouse warming potential is applied this equates to a reduction of approximately 25,000 T CO₂e.

Table 9 Atmospheric Pollutants by Source, Ithaca Energy Operated Assets 2021

Asset	Tonnes							
	CO ₂	NO _x	N ₂ O	SO ₂	CO	CH ₄	VOC	F-Gas
FPF1	120,292	0	9	0	0	438	0	
ANP	143,448	322	10	126	282	470	35	78
FSU	4,714	59	0	3	15	31	23	219
WPP	99,375	500	7	7	209	273	9	
FPSO	82,816	1,031	6	48	294	188	37	12
Erskine	538	0	0	0	0	35	826	

Oil in Produced Water

Oil extraction results in the co-production of produced water containing hydrocarbons, some naturally occurring materials and other substances and residues of the chemicals used in the offshore production process.

At the Captain field, all produced water is re-injected back into the reservoir with none being discharged to sea. At the Alba field, produced water is treated to reduce the concentration of residual oil before being discharged to sea. Both these activities are regulated under the provisions of a permit issued by the environmental regulator OPRED. Erskine produced fluids are exported and processed on the Lomond installation (operated by Harbour Energy) and produced water is discharged and reported from this location under the provisions of a discharge permit issued to Harbour Energy. The Alder field is tied back to the Britannia Platform operated by Harbour Energy, with any water produced from it discharged in accordance with the Britannia regulatory discharge permit. Produced Water discharge from the Cook field is managed under the existing Oil Pollution Prevention Control (OPPC) permit for the Anasuria FPSO, operated by Petrofac.

In 2021, Ithaca Energy re-injected more than 70% (16.4 million tonnes) of total produced water. A total of 80.09 tonnes of oil in produced water was discharged into the sea at an average (weighted) oil-in-water concentration of 8.641 mg/l. See table 10 below for more information.

Produced water handling remains a key challenge at the Alba field because the volume of water co-produced with the oil is rising as the field matures. Further initiatives and projects to address this challenge are being pursued through the 2022 ES plan.

Table 10 – Ithaca Energy 2021 oil-in-produced water data

Facility	Oil-in-Produced Water Discharge Concentration (mg/l)	Oil Discharged (tonnes)	Water Discharged (tonnes)	Water Injected (tonnes)
Captain Wellhead Protector Platform (WPP)	N/A	N/A	N/A	16,438,687
Alba Floating Storage Unit (FSU)	12.628	0.137	10,849	N/A
Alba Northern Platform (ANP)	8.592	79.11	9,207,693	N/A
Stella FPF-1	16.758	0.843	50,305	N/A
Total	8.641⁶	80.09	9,268,847	16,438,687

Chemicals

Chemicals are an essential requirement in drilling and production operations with many different types being used – primarily to control corrosion, inhibit bacterial growth, assist with the production process, and assist with the drilling process. Due to the nature of these processes some discharge of chemicals to the sea will occur. Chemical use and discharge is strictly regulated and a permit is required before any use or discharge to sea of a production or drilling chemical can take place.

⁶ This figure is not the direct average of the FSU, ANP and FPF-1 discharge concentrations, but is weighted to capture the average oil in water in relation to the total water discharged to surface water. Hence the overall figure closely matches that of the ANP individually.

In 2021, approximately 4% of the production chemicals used were discharged to sea, most of which were low hazard - that is chemicals classed E or banded Gold under the regulated Offshore Chemical Notification Scheme. A breakdown of Ithaca Energy chemical use by operation is provided in table 11 below, with a breakdown of discharge by chemical type provided in table 12 below.

Ithaca Energy continues to focus on replacement of higher hazard chemicals with less hazardous substitutes where this is technically feasible. Discharge of chemicals is affected significantly by increased water production at Ithaca Energy's Alba field as it matures. Since 1998, all water produced from Ithaca Energy's Captain field reservoir has been used either as re-injection water for reservoir pressure maintenance or as power water for downhole hydraulic pumps; chemical discharges at this field are therefore already minimal.

Ithaca Energy discharged 288 tonnes of chemicals from drilling operations during 2021.

Ithaca Energy discharged 694 tonnes of chemicals as a result of well workover operations during 2021.

All chemical use and discharge are subject to strict regulatory controls and are managed in accordance with internal procedures and processes.

Table 11 – Ithaca Energy 2021 chemical use and discharge

Facility/Operation	Mass Used (kg)	Mass Discharged (kg)
Alba Floating Storage Unit (FSU) Production Operations ⁷	321	13,071
Alba Northern Platform (ANP) Production Operations	1,398,970	774,954
Alba Northern Platform (ANP) Drilling Operations	0	0
Alba Northern Platform (ANP) Workover Operations	824,075	677,141
Captain Wellhead Protector Platform (WPP) drilling operations	0	0
Captain Wellhead Protector Platform (WPP) Workover Operations	368,590	17,181
Captain FPSO Production Operations	15,022,569	12,333
Captain WPP Production Operations	1,453,951	107,540
Erskine Production Operations ⁸	154,786	21
Erskine Workover Operations	0	0
Stella FPF-1 Production Operations	381,408	288,055
Pipeline Operations	14	2
MODU (Fotla)	1,412,213	288,055
Total	21,016,897	2,041,165

⁷ No processing occurs at the FSU; therefore, little chemical is used there. The apparent discrepancy in FSU chemical use and discharge figures is as a result of the FSU receiving processed crude from ANP, from which water that requires discharging settles out, meaning some chemicals applied at the ANP get discharged at the FSU.

⁸ Erskine production fluids are processed at Lomond (operated by Harbour Energy), where discharge of chemicals used at Erskine occurs. These chemical discharges are covered on, and reported against, Harbour Energy's chemical permit for Lomond.

Table 12 - 2021 chemical use and discharge (detailed) ⁹

Facility/Operation	kg	A	B	C	D	E	Orange	Blue	White	Silver	Gold	Total
Alba Floating Storage Unit (FSU) Production Operations	Used (kg)	0	0	0	0	0	0	0	0	208	113	321
	Discharged (kg)	0	0	0	0	0	0	0	0	208	12,863	13,071
Alba Northern Platform (ANP) Production Operations	Used (kg)	0	0	0	10,407	265,734	0	55,461	0	132,163	935,205	1,398,970
	Discharged (kg)	0	0	0	10,407	265,734	0	427	0	37,832	460,554	774,954
Alba Northern Platform (ANP) Drilling Operations	Used (kg)	0	0	0	0	0	0	0	0	0	0	0
	Discharged (kg)	0	0	0	0	0	0	0	0	0	0	0
Alba Northern Platform (ANP) Workover Operations	Used (kg)	0	0	0	0	187,197	0	0	0	0	636,877	824,075
	Discharged (kg)	0	0	0	0	162,393	0	0	0	0	514,748	677,141
Fotla (Exploration Well) Drilling Operations	Used (kg)	23,000	5,947	0	0	1,373,194	0	0	0	0	10,072	1,412,213
	Discharged (kg)	0	0	0	0	150,863	0	0	0	0	0	150,863
Captain Wellhead Protector Platform (WPP) Workover Operations	Used (kg)	0	0	0	0	364,649	0	0	0	0	3,941	368,590
	Discharged (kg)	0	0	0	0	17,181	0	0	0	0	0	17,181
Captain FPSO Production Operations	Used (kg)	2,388	0	0	0	8,074	0	0	40,360	841	14,970,906	15,022,569
	Discharged (kg)	0	0	0	0	8,074	0	0	0	0	4,259	12,333
Captain Wellhead Protector Platform (WPP) Production Operations	Used (kg)	5,908	0	0	51,834	44,346	0	0	24,447	123,557	1,203,859	1,453,951
	Discharged (kg)	0	0	0	51,834	44,206	0	0	0	0	11,500	107,540
Erskine Production Operations	Used (kg)	0	0	0	0	17,586	0	0	0	0	137,200	154,786
	Discharged (kg)	0	0	0	0	0	0	0	0	0	21	21
Erskine Workover Operations	Used (kg)	0	0	0	0	0	0	0	0	0	0	0
	Discharged (kg)	0	0	0	0	0	0	0	0	0	0	0
Stella FPF-1 Production Operations	Used (kg)	122	9,811	12	0	161,832	0	0	1,274	0	208,357	381,408
	Discharged (kg)	122	9,811	0	0	185,796	0	0	1,192	0	91,134	288,055
Pipeline Operations	Used (kg)	0	0	13	0	0	0	0	0	0	1	14
	Discharged (kg)	0	0	1	0	0	0	0	0	0	1	2
Decommissioning Operations	Used (kg)	0	0	0	0	0	0	0	0	0	0	0
	Discharged (kg)	0	0	0	0	0	0	0	0	0	4	4
Total	Used (kg)	31,418	15,758	25	62,241	2,422,612	0	55,461	66,081	256,769	18,106,532	21,016,897
	Discharged (kg)	122	9811	1	62,241	834,247	0	427	1,192	38,040	1,095,083	2,041,164

⁹ The Offshore Chemical Notification Scheme (U.K.) (OCNS) conducts Chemical Hazard and Risk Management (CHARM) assessments on chemical products that are used offshore. They use colour banding to risk rank each product, with Gold products posing the lowest potential hazard and, on the table above, Orange being the highest risk. Products not applicable to the CHARM model (i.e. inorganic substances, hydraulic fluids or chemicals used only in pipelines) are assigned an OCNS grouping, A - E. Group A includes products considered to have the greatest potential environmental hazard and Group E the least.

Figure 9: 2021 Chemical Discharges from Production

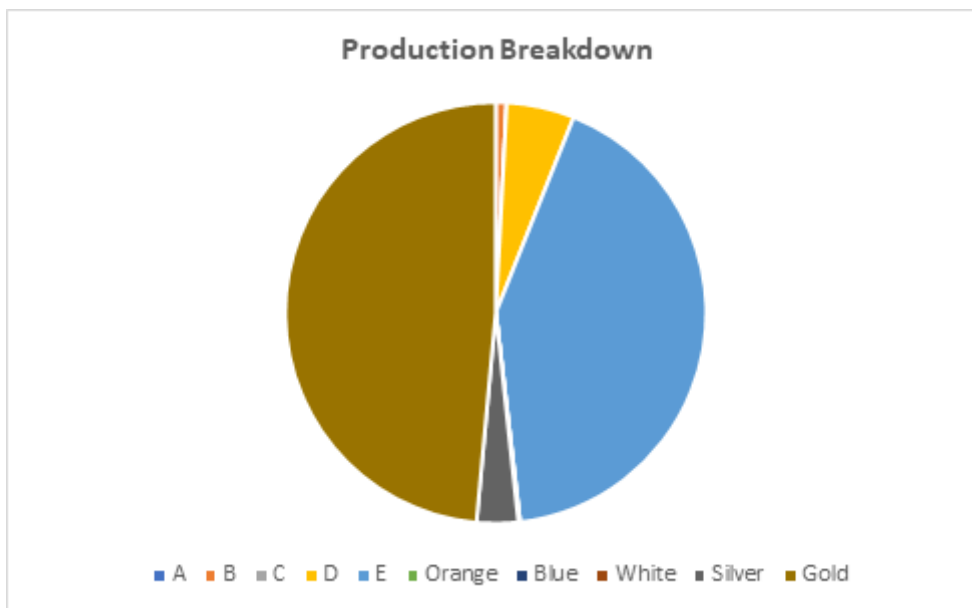


Figure 10: 2021 Chemical Discharges from Drilling

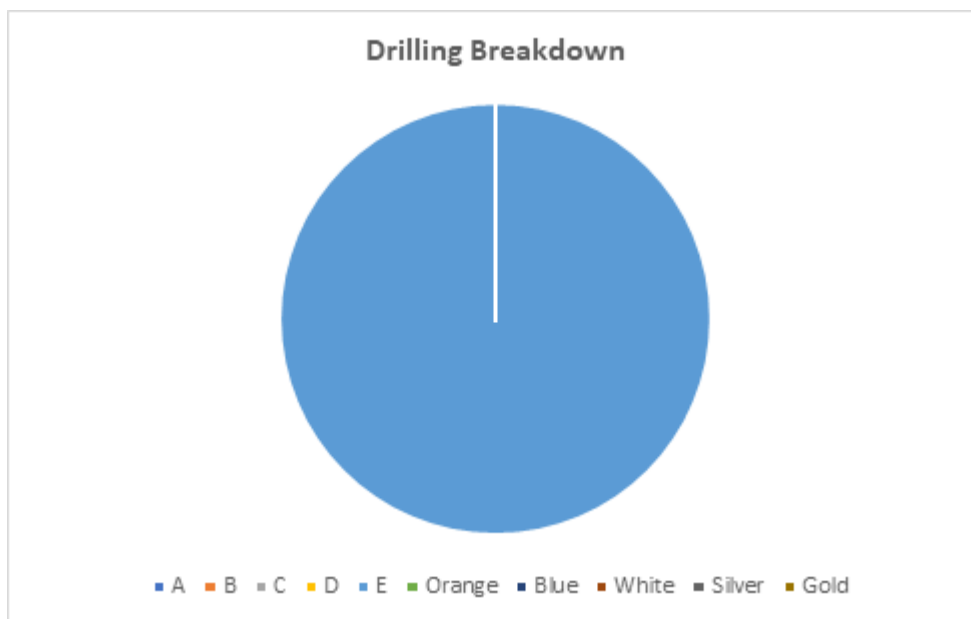
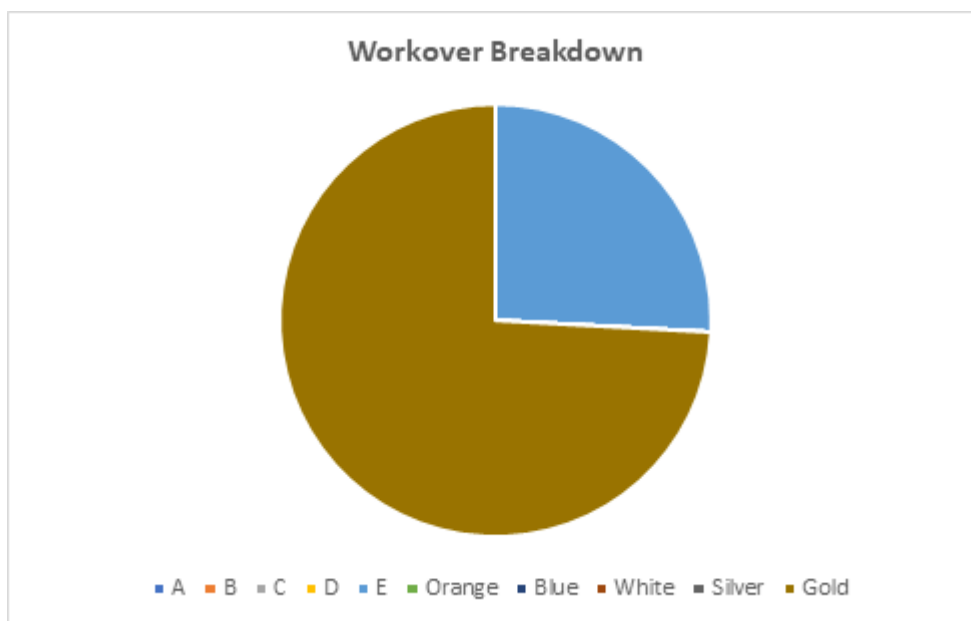


Figure 11: 2021 Chemical Discharges from Well Interventions/Workovers



Oil and Chemical Releases/Spills to Sea

Table 13 – Ithaca Energy 2021 unplanned oil and chemical releases to sea

Facility	Number of PON1s	Oil Released (tonnes)	Chemicals Released (kg)	PON1 - Oil or Chemical
ANP	1	-	2506.54	Chemical
Alba FSU	1	0.00001	-	Oil
Captain WPP	4	0.01164968	25	3 Oil, 1 Chemical
Stella FPF-1	6	0.00919070	3524.915	2 Oil, 4 Chemical
Total	12	0.0208504	6056.455	6 Oil, 6 Chemical

In accordance with regulatory requirements all unplanned accidental releases of oil or chemicals to sea, regardless of quantity, must be reported on a Petroleum Operations Notice No.1 (PON1). A summary of Ithaca Energy’s 2021 oil and chemical releases to sea is provided in table 13.

During 2021 Ithaca Energy reported 6 unplanned oil release events to sea and 6 chemical release events with the maximum reported release being 2506.54 kgs. Incidents were reported and investigations conducted.

Oil Spill Response Arrangements

Ithaca Energy has regulatory approved Oil Pollution Emergency Plans in place for each fixed asset and robust procedures in place for responding to any incidents which may occur. Personnel are trained and regular exercises take place to ensure effective response.

Waste

Ithaca Energy’s offshore operations produce a variety of waste streams which include packaging, scrap metal and redundant chemicals. Ithaca Energy works actively to reduce the amount of waste that it produces and to reuse or recycle what remains. Improvements in the proportion of recycled or reused waste have been identified – for example, wooden storage pallets are used for chipboard and plastic drums are shredded for recycling and reuse. Waste which is not reused, recycled or sent for energy production is mainly sent to landfill with small amounts being incinerated.

Ithaca Energy works with our waste management contractor to continuously improve waste management and minimise landfill volumes. Ithaca Energy’s 2021 waste production is shown in table 14.

In 2021, Ithaca Energy exceeded its target of recycling 70% of the recyclable waste in its production and office operations (see in table 1: 2021 Performance Metrics, of this report). This target was achieved through initiatives implemented at each of the installations and by the individual efforts of members of the offshore workforce.

Table 14 - 2021 reported total waste data

Category	Recycle/Waste to Energy (tonnes)	Landfill/Incinerate (tonnes)	Total (tonnes)
Special/Hazardous Waste	717.023	382.4	1099.423
Non-Hazardous Waste	841.776	205.892	1047.668
Total	1558.799	588.292	2147.091

For the purpose of relative annual performance tracking, the drilling-related (mud and cuttings) and tank washings waste streams are excluded in the target as these are extremely variable and operationally dependent, and their inclusion would not allow for long-term performance tracking. These are often the largest Ithaca Energy contributors to landfill volumes and consequently the Company is working to reduce the quantities and potential hazards of these waste streams. The use of non-aqueous drilling fluids can be necessary when drilling in certain reservoirs or long horizontal wells.

Abbreviations

ANP	Alba Northern Platform
bbf	barrel
CH ₄	Methane
CMAPP	Corporate Major Accident Prevention Policy
CMS	Company Management System
CO	Carbon monoxide
CO ₂	Carbon dioxide
CO ₂ e	Carbon dioxide equivalent
EMS	Environmental Management System
ES	Environmental Stewardship
ETS	Emissions Trading System
EU	European Union
FPSO	Floating Production, Storage and Offloading
FSU	Floating Storage Unit
GSA	Greater Stella Area
HPHT	High Pressure High Temperature
HSE	Health, Safety and Environmental
ISO 14001:2015	International standard for environmental management systems
mg/l	Milligrammes per litre
MODU	Mobile Offshore Drilling Unit
N ₂ O	Nitrous oxide
NO _x	Oxides of nitrogen
OCNS	Offshore Chemical Notification Scheme
OIW	Oil in water
OPEP	Oil Pollution Emergency Plans
OPPC	Oil Pollution Prevention and Control
OPRED	Offshore Petroleum Regulator for Environment and Decommissioning
OSPAR	Oslo and Paris conventions
PON 1	Petroleum Operations Notice Number 1
PW	Produced Water
Q1 Q2 Q3 Q4	Quarter of the Year
SO ₂	Sulphur Dioxide
T	tonnes
UKCS	United Kingdom Continental Shelf
VOC	Volatile Organic Compounds
WPP	Wellhead Protector Platform



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