

DATA SERIES

Environmental performance indicators – 2019 data

About IOGP Environmental Data

The International Association of Oil and Gas Producers (IOGP) has collected environmental data from its Member Companies every year since 1999. The objective of this programme has been to allow Member Companies to compare their performance with other companies in the sector leading, it is hoped, to improved and more efficient performance. The programme also contributes to the industry’s wish to be more transparent about its operations.

The analysis summarizes information on exploration and production (E&P) activities carried out by contributing IOGP Member Companies in 2019.

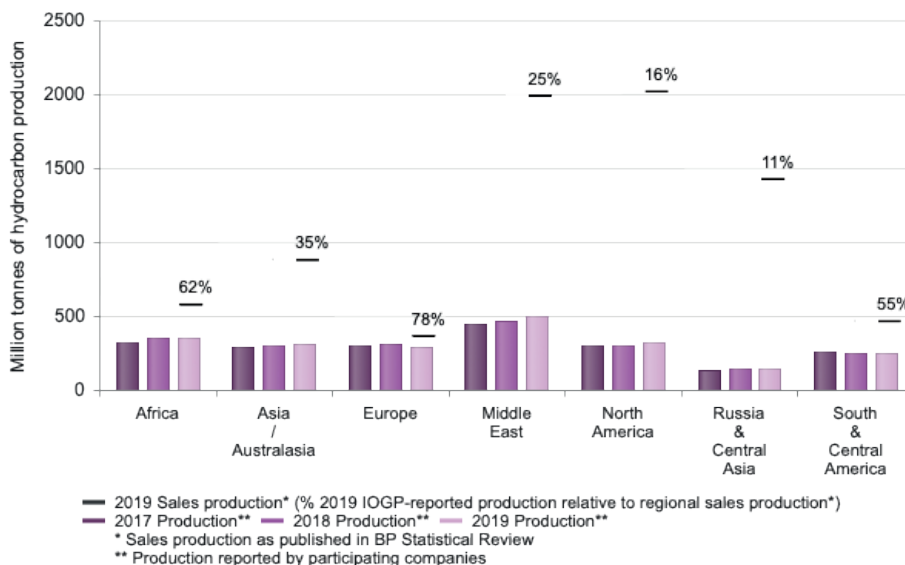
Data have been submitted by 42 of IOGP’s 60 Member operating companies covering operations in 71 countries worldwide. This total includes 38 of the 43 companies that contributed data in 2018.

Collectively, the 42 companies providing these data were responsible for operated oil and gas wellhead production¹ of 2,184 million tonnes (approximately 16.3 billion BOE), about 28% of 2019 global production sales², with the absolute and relative production values virtually unchanged

compared with 2018. Regional coverage is uneven, ranging from 79% of known production in Europe to 11% in Russia and Central Asia.

The majority of participating companies, as part of their assurance processes, have their publicly reported environmental performance data externally verified by third party auditors, although there are variations in terms of scope and level of assurance.

Production reported by participating companies relative to sales production in BP Statistical Review of World Energy by region (2017–2019)



¹ Production includes oil, gas, and condensate. Excludes LNG. See IOGP Report 2019eu for scope and definitions.

² Source: BP Statistical Review of World Energy 2020

Gaseous emissions

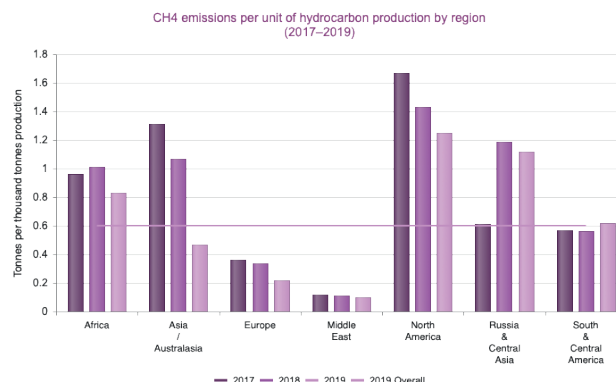
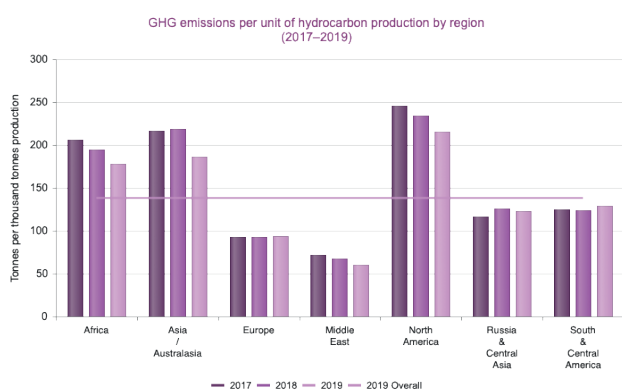
Releases of gases to the atmosphere are an integral and inevitable part of exploration, production, and processing operations.

Changes in emissions intensity (emissions per unit of production) between 2018 and 2019, including the effects introduced by changes in the companies reporting between the years, were:

- GHG³ intensity decreased by 7%
- CO₂ intensity decreased by 5%
- CH₄ intensity decreased by 16%
- NMVOC intensity decreased by 5%
- SO₂ intensity decreased by 5%
- NO_x intensity decreased by 3%

The overall reduction in greenhouse gas emissions can be attributed to various factors including:

- changes in reporting companies
- asset divestments
- decreases in carbon dioxide emissions due to operational improvements and the implementation of technology/abatement projects which reduced flaring and venting
- decreases in methane emissions as a result of the implementation of new technology/abatement projects such as CO₂ injection, storage tank improvements, and flare management strategies
- changes in quantification methodologies



Energy consumption

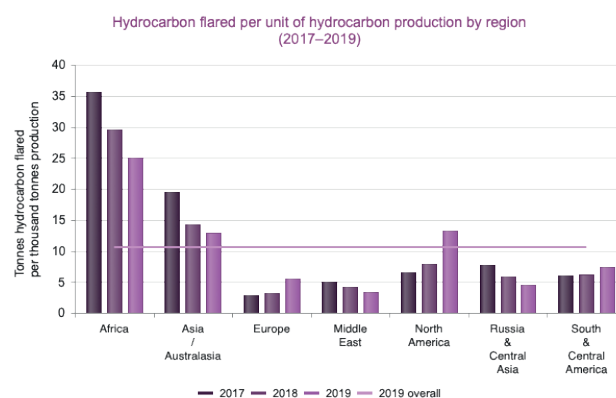
Production of oil and gas requires significant quantities of energy for extraction, processing, and transport. In many oilfields, those energy needs are met by locally produced gas.

In 2019, IOGP reporting companies consumed on average 1.5 gigajoules of energy for every tonne of hydrocarbon produced, virtually unchanged compared with the 2018 average.

As in previous years, data indicate that onshore production in 2019 was more energy intensive than offshore production.

Flaring

Flaring is the controlled burning of hydrocarbons produced during petroleum exploration and production operations. It includes the controlled and safe burning of gas that is not used or exported for safety or technical reasons, for lack of export infrastructure, or for lack/absence of sufficient facilities or amenable geology to re-inject the produced gas.



³ GHG: Total Greenhouse Gases (CO₂ + CH₄ expressed as CO₂ equivalent)

Despite some differences in the performance of individual companies or regions, it is apparent that there is an overall continual reduction in flaring.

In 2019, 10.6 tonnes of gas were flared for every thousand tonnes of hydrocarbon produced versus 10.5 in 2018 and 12.1 tonnes per thousand tonnes in 2017.

Produced water

Produced water is the most significant water discharge associated with E&P operations. An average of 56% of produced water is reinjected versus 44% of produced water discharged to the surface.

The quality of produced water discharges is measured in terms of oil content. In 2019, the average concentration of oil in produced water was 5.1 mg/l for onshore discharges and 21.0 mg/l for offshore discharges. When expressed in terms of oil production, overall, these discharges are equivalent to 7.2 tonnes of oil for every million tonnes of hydrocarbon produced.

The average concentration of oil in produced water discharged increased by 9% in 2019 compared with 2018. This can be attributed mainly to:

- increases in offshore production involving higher concentrations of oil in produced water discharges to sea
- operational challenges leading to higher oil in water concentrations

The average quantity of oil discharged per unit of hydrocarbon production increased by 6%.

Non-aqueous drilling fluids retained on cuttings discharged to sea

While much of the offshore drilling is achieved using water-based drilling fluids, some technical requirements during well drilling operations favour the properties that are only available from non-aqueous drilling fluids (NADFs).

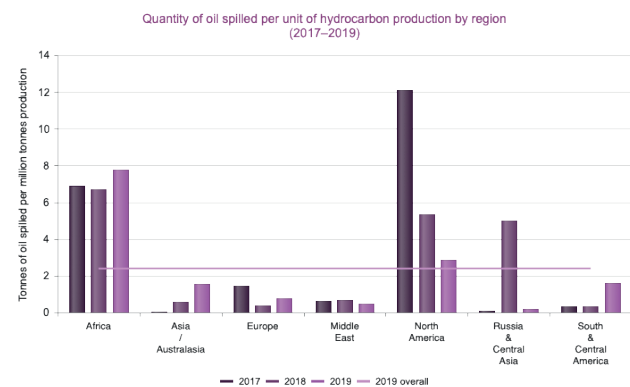
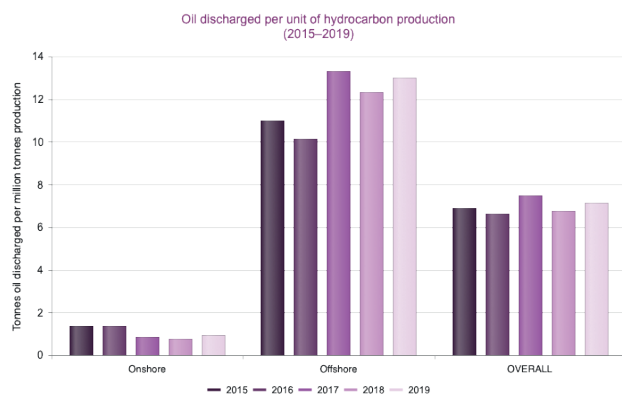
In 2019, companies that provided data on cuttings disposition discharged 6,941 tonnes of non-aqueous base fluids (NABF) on drill cuttings to sea. 94% of these discharges contained IOGP Group III base fluids (lowest toxicity enhanced mineral oils and synthetics) and 4% contained Group II fluids (low toxicity mineral oils). The group was not specified for the remaining 2%.

There have been no reports of discharges of Group I fluids retained on cuttings since the reporting of NABF by Group I, II and III classification began in 2003.

Oil spills

In this analysis, a spill is defined as a loss of containment event in which material released reaches the environment, i.e., is not retained within secondary or other containment. The spill volume reported includes the total volume that reaches the environment, irrespective of the quantity of material that may be recovered.

In 2019, participating IOGP Member Companies reported 1,029 oil spills greater than 1 barrel in size, resulting in a normalised spill rate of 0.5 oil spills per million tonnes of hydrocarbon production (0.5 in 2018, 0.5 in 2017).



The reported oil spills >1 barrel resulted in the release of a total of 5,046 tonnes of oil. The quantity of oil spilled per unit of hydrocarbon production was 2.4 tonnes per million tonnes production, 4% lower than the rate for 2018 and 28% lower than the rate for 2017.

Equipment failure (excluding corrosion) and Corrosion were the leading causes reported for 2019, each accounting for 38% of operational spills greater than 100 bbl in size that were not induced by third parties.

Equipment failure (excluding corrosion) was also the leading cause reported for spills in the 10-100 bbl size range.

Fresh water

In 2019, participating companies reported a total of 175 million cubic metres of fresh water withdrawn for use. This equates to 106 cubic metres of fresh water for every thousand tonnes of hydrocarbon produced versus 113 in 2018, 125 in 2017, 90 in 2016, 106 in 2015, 85 in 2014 and 90 in 2013.

To download the full environmental performance report,
visit the IOGP Data Portal at: <https://data.iogp.org>