BP Confidential

Upstream Environmental Performance Book

February 2017

Contents

Note: All data and summaries provided in this Performance Book are for BP Internal Use only, with the exception of the data and commentary provided in the External Use Charts section which may be used for external presentations.

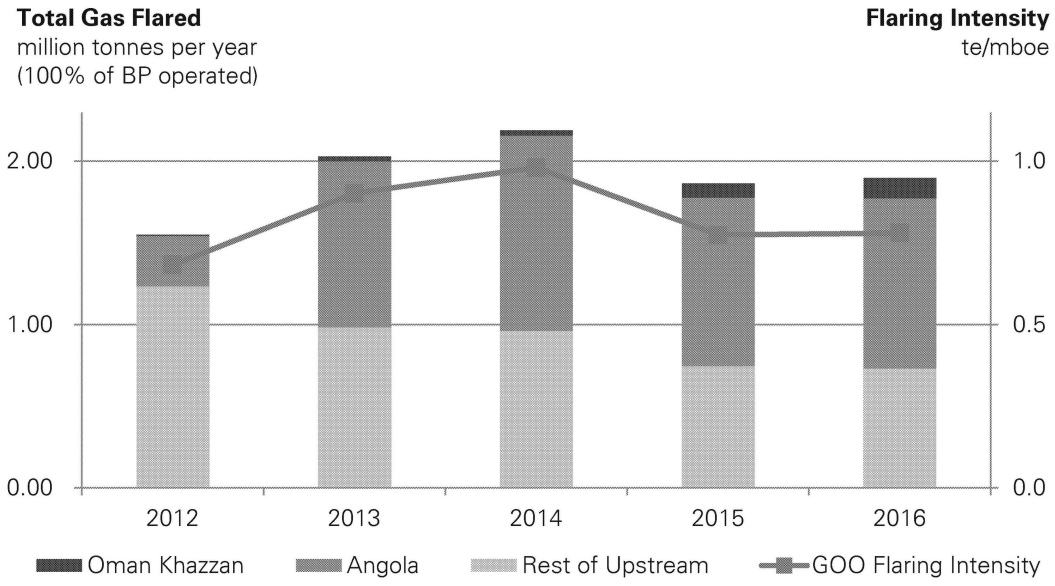
Executive Summary

Upstream Greenhouse Gas Emissions[1]:

- **Upstream Direct Operated GHG emissions** (on 100% of operated basis) increased by around 1.5% (0.5 Million Tonnes CO_2e) in 2016 compared to 2015, largely due to an increase in reported methane as a result of improved estimation of emissions following the Upstream Methane Surveys.
- **Upstream Equity GHG emissions** (including non-operated) increased by 6% (1.5 Million Tonnes CO_2e) in 2016, mostly due to increases in emissions reported from non-operated assets. Over 55% of Upstream's Equity GHG emissions now come from non-operated assets.
- **Upstream Carbon Intensity** increased in 2016 primarily because of increasing GHG emissions from non-operated entities (Angola LNG, Russia TAAS JV, Canada Oil Sands and Southern Cone) and lower production from late-life operations in some regions (mainly Alaska and AGT).

Upstream Flaring:

- **Total flaring in the Upstream rose by around 2% in 2016** when compared to 2015 (see chart below) primarily due to a ramp-up in well clean-up activity in Oman prior to Khazzan start-up and increased flaring at Prudhoe Bay due to field wide power outages. Flaring in Angola remained flat in 2016 as reductions on PSVM were offset by increases on Greater Plutonio. Beyond Angola, Oman and Alaska, flaring across the rest of Upstream fell by 2% overall when compared to 2015.



- Overall, total Upstream flaring is expected to remain flat in 2017 compared to 2016, because increased flaring in Oman is expected to be offset by reductions in Angola (due to increased gas export from PSVM and declining gas production rates on Greater Plutonio), and decrease from 2018 onwards.
- Projections for start-up flaring from Khazzan indicate that it could account for as much as 20% of total Upstream flaring in 2017. Once steady operations are achieved at Khazzan, baseline flaring is expected to be low (pilots and purges), with the exception of TAR periods and any unplanned shutdowns.
- The **future flaring profile** for Upstream beyond 2017 is expected to continue to be heavily influenced by Angola and Oman, but also by other Major Project start-ups (e.g. Shah Deniz II, Clair Ridge, Quad 204, West Nile Delta).

[1] See charts on Page 5

GOO Flaring Intensity[2]:

- **Full-year 2016 flaring intensity remained flat compared to 2015**, largely because reductions in flaring intensity in Angola and North Sea were offset by increases in flaring intensity in Alaska (Prudhoe Bay) and Asia Pacific (Tangguh).
- Prudhoe Bay flaring increased compared to 2015 due to field wide power outages (extreme weather), and Tangguh flaring increased as a result of plant trips and TAR start-up.
- Angola total flaring remained flat when compared to 2015 as reductions on PSVM were offset by increases on Greater Plutonio, however overall intensity reduced as a result of commencement of gas export to Angola LNG in 3Q 2016.
- North Sea flaring intensity reduced as a result of flaring reductions at FPS, Sullom Voe, Andrew and Clair Phase 1.

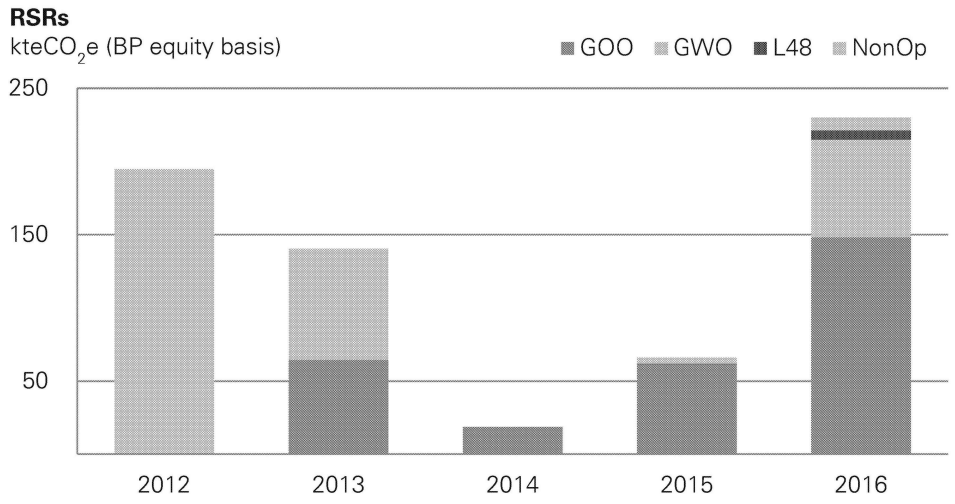
GOO Methane Intensity[3]:

- **Full-year 2016 reported methane intensity increased by around 15% compared to 2015** due to inclusion in 4Q 2016 of previously omitted methane sources (e.g. compressor seals, glycol dehydration units, storage tanks), and more consistent estimation of fugitive emissions, as identified by the non-US region methane surveys.
- As a result, methane intensity increased in a number of regions in particular the North Sea (the largest increase being at FPS where methane leaks from wet compressor seals were accounted for) and Trinidad (largely driven by improved estimation of fugitive emissions).
- All future reporting will be based on the improved methodology implemented in 4Q 2016.

Real Sustainable Reductions[4]:

- **Upstream Real Sustainable Reductions (RSRs) increased significantly in 2016** from 66 thousand tonnes CO_2 equivalent (kteCO_2e) in 2015 to **230 kteCO_2e in 2016** – mainly due to:
  - **Angola: 105 kteCO_2e** from PSVM flare reductions (new injector well and compressor reliability)
  - **Oman: 66 kteCO_2e** resulting from reduction in number of days of flaring during vertical well clean-up in 2016 compared to 2015
  - **AGT: 24 kteCO_2e** largely from Sangachal Terminal (flare reductions and energy optimisation) and Chirag-1 (flare reduction), as well as some smaller reductions from BTC, WREP and Deepwater Gunashli
  - **North Sea: 20 kteCO_2e** largely from Sullom Voe Terminal (Project Aurora), Foinaven (reduction in flaring during compressor cleanouts), ETAP (pump right-sizing) and Valhall (close-in of LP flare)
  - **Lower 48: 7 kteCO_2e** through installation of waste heat recovery at the Florida River facility.
- Full year 2016 **GOO** RSRs (excluding L48, GWO and Non-Operated) amounted to **148 kteCO_2e**. **GWO** RSRs totalled **67 kteCO_2e** (primarily from Oman).
- **9 kteCO_2e** RSRs were reported from **Non-Operated** businesses, mainly from VICO in Indonesia.

[2] A definition of Flaring Intensity is provided in Appendix 1.
[3] A definition of Methane Intensity is provided in Appendix 1.
[4] A definition of Real Sustainable Reductions is provided in Appendix 1.



Oil Spills:

- There were **73 oil spills >1 bbl** across the Upstream in 2016 (27 GOO, 23 GWO, 23 L48), compared to 59 in 2015 (26 GOO, 12 GWO, 3 GPO, 18 L48). The majority of spills in 2016 were reported from Lower 48 (23), North Sea (19) and AGT (12).

ISO14001:

- Alaska and Trinidad moved to attestation in 2016.
- GOM plans to transition to attestation by 4Q 2017.
- AGT, Angola and North Sea require further work with local regulators to support a move to attestation.
- AsPac will maintain their ISO 14001 certification and do not plan to transition to attestation.
- Oman is required by the regulator to obtain ISO 14001 certification (date TBC).
- The Group ISO 14001 attestation contractor was confirmed as ERM CVS at the beginning of 2017. A transition plan is now being developed to move up to seven regions to the new contractor between 2017 and 2019.

HSSE Compliance Notices & Government Reportables:

- In Upstream there were 39 Compliance Notices reported in 2016, down from 66 reported in 2015. Of the 39, 28 were reported in GOO, 9 in GWO and 2 from Lower 48. There were 764 Government Reportables reported to the end of 2016, a 6% increase compared to 2015 (722).
- In 2016 the four most common topics cited within Compliance Notices reported were[5]:
  - **Signs and labels** (35) e.g. missing or incorrect to indicate equipment test due dates, PPE requirements and alert to abandon platform.
  - **Structural integrity / corrosion** (34) e.g. in production separators, vent boom, fixtures, railings, cable support brackets.
  - **Safety equipment** (20) e.g. incorrect breaker tag and activation lever, missing eye wash and grab hook equipment or Lifeboat faulty fuel pump.
  - **Emergency preparedness** (19) e.g. incorrect installation and numbering of life rings, lifesaving appliances missing signage, fire extinguishers location.

[5] Based on data reported to the end of 3Q 2016, analysis of 4Q 2016 data is currently ongoing. Number of times a topic was cited included in brackets; note that a single Compliance Notice may contain several items and therefore the total number of citations is greater than the number of individual Compliance Notices.

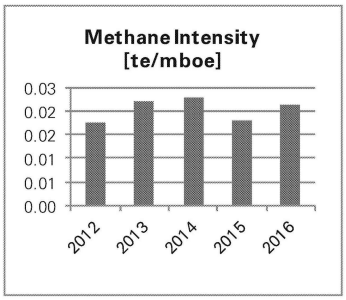
Upstream Environmental Performance Dashboard

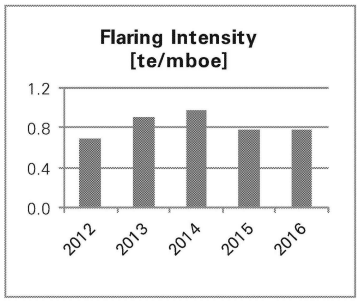
GOO Key Performance Indicators

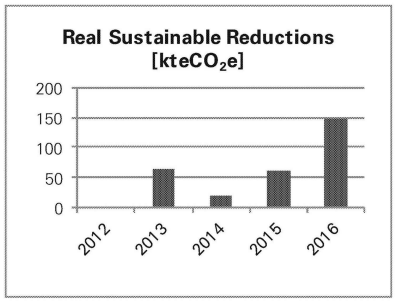
	2012	2013	2014	2015	2016
Methane Intensity [te / mboe]	0.017	0.022	0.023	0.018	0.021
Flaring Intensity [te / mboe]	0.68	0.90	0.98	0.77	0.78
RSRs [kteCO2e]	0	65	18	62	148
Oil Spills ≥ 1 bbl	38	24	29	26	27
Compliance Notices	29	15	15	55	28
Government Reportables	327	215	274	565	594

Comments:

- Quarterly reporting of GHG KPIs (Methane Intensity, Flaring Intensity and RSRs) commenced 3Q 2015. Increase in methane intensity in 2016 due to changes in reporting methodology
- Increase in Compliance Notices and Government Reportables from 2015 largely due to implementation of enhanced Orange Book reporting covering whole of Upstream.

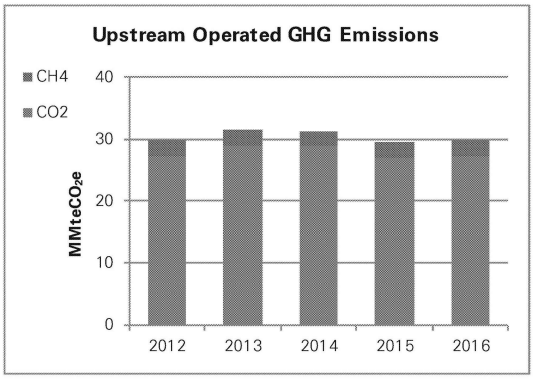


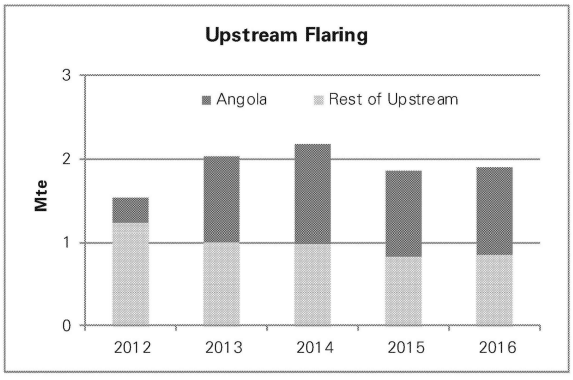


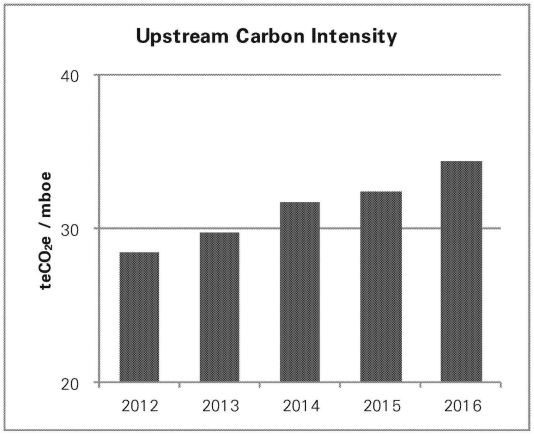


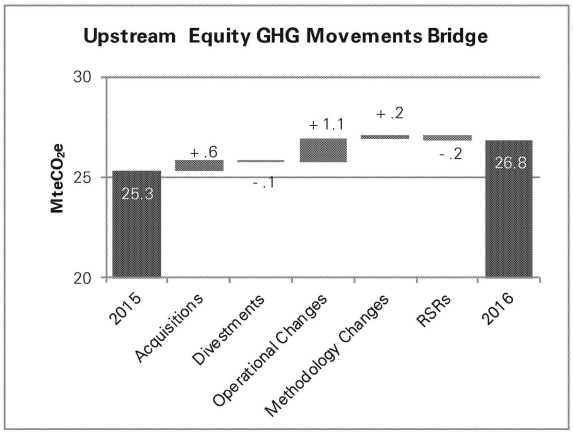
Data shown includes GOO operated sites only. Methane Intensity, Flaring Intensity and RSRs as reported in the MI Book, Oil Spills, Government Reportables and Compliance Notices as reported in the Orange Book.

Annual Performance Data









Operated GHG Emissions and Flaring shown on 100% of Operated Basis. Carbon Intensity and GHG Bridge data shown on a BP equity share basis and include non-operated. All data includes US Lower 48.

GHG KPIs Summary

Flaring Intensity - te / mboe

Region	2012	2013	2014	2015	2016	1Q16	2Q16	3Q16	4Q16
Alaska	1.8	1.8	1.8	1.6	2.0	1.6	2.5	1.8	2.0
Angola	4.8	10.1	10.8	9.3	9.1	10.9	10.7	7.8	7.2
Asia Pacific	2.7	1.0	0.7	0.7	0.8	0.3	1.5	1.3	0.3
AGT Offshore	1.1	0.5	1.0	0.5	0.4	0.2	0.4	0.5	0.5
AGT Midstream	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Gulf of Mexico	0.8	0.6	0.3	0.3	0.4	0.3	0.5	0.4	0.7
North Sea Offshore	2.8	2.4	2.9	1.9	1.7	1.7	1.9	2.0	1.3
North Sea Midstream	0.5	0.8	1.0	0.9	0.6	0.7	0.8	0.6	0.1
Norway	1.1	3.9	0.5	0.2	0.2	0.1	0.2	0.3	-
Trinidad	0.1	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1
GOO Total	0.7	0.9	1.0	0.8	0.8	0.8	0.8	0.7	0.7

Comments:

- Full-year 2016 flaring intensity remained flat compared to 2015, largely because reductions in flaring intensity in Angola and North Sea were offset by increases in flaring intensity in Alaska (Prudhoe Bay) and Asia Pacific (Tangguh)
- Prudhoe Bay flaring increased compared to 2015 due to field wide power outages (extreme weather), and Tangguh flaring increased as a result of plant trips and TAR start-up
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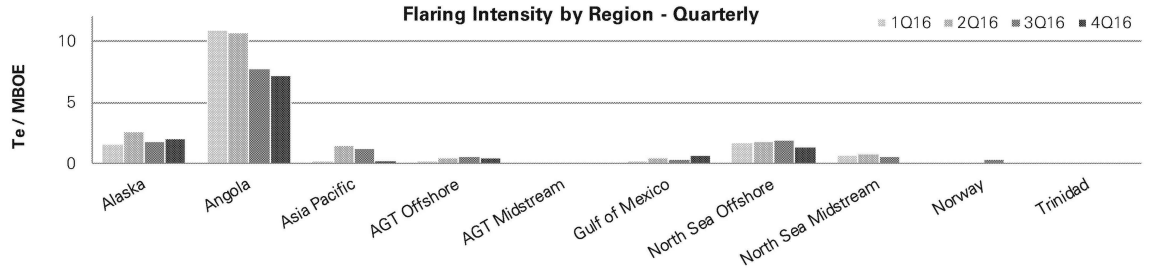


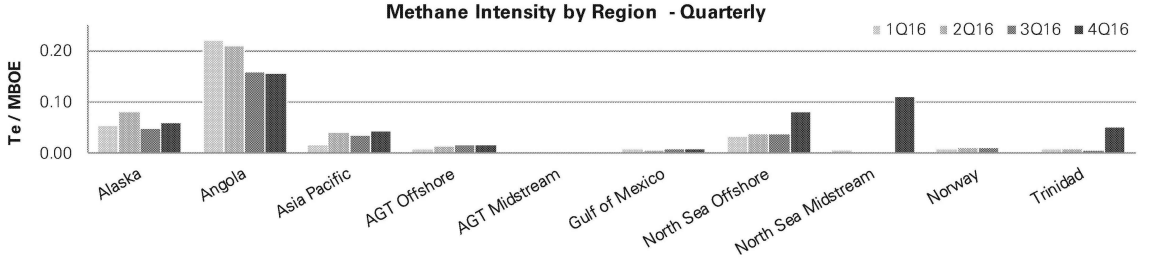
Data shown is for GOO only excluding Lower 48 on a 100% of Operated basis. As reported in GOO MI Book.

Methane Intensity - te / mboe

Region	2012	2013	2014	2015	2016	1Q16	2Q16	3Q16	4Q16
Alaska	0.06	0.06	0.05	0.05	0.06	0.05	0.08	0.05	0.06
Angola	0.10	0.26	0.22	0.19	0.19	0.22	0.21	0.16	0.16
Asia Pacific	0.11	0.05	0.03	0.02	0.03	0.02	0.04	0.04	0.04
AGT Offshore	0.03	0.01	0.03	0.01	0.01	0.01	0.01	0.02	0.02
AGT Midstream	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gulf of Mexico	0.03	0.01	0.02	0.01	0.01	0.01	0.01	0.01	0.01
North Sea Offshore	0.05	0.04	0.05	0.04	0.05	0.03	0.04	0.04	0.08
North Sea Midstream	0.00	0.01	0.01	0.01	0.03	0.00	0.00	0.00	0.11
Norway	0.04	0.02	0.02	0.01	0.01	0.01	0.01	0.01	-
Trinidad	0.00	0.00	0.00	0.01	0.02	0.01	0.01	0.00	0.05
GOO Total	0.017	0.022	0.023	0.018	0.021	0.019	0.020	0.017	0.030

Comments:

- Full-year 2016 reported methane intensity increased by around 15% compared to 2015 due to inclusion in 4Q 2016 of previously omitted methane sources (e.g. compressor seals, glycol dehydration units, storage tanks), and more consistent estimation of fugitive emissions, as identified by the non-US region methane surveys
- As a result, methane intensity increased in a number of regions in particular the North Sea (the largest increase being at FPS where methane leaks from wet compressor seals were accounted for) and Trinidad (largely driven by improved estimation of fugitive emissions)
- All future reporting will be based on the improved methodology implemented in 4Q 2016



Data shown is for GOO only excluding Lower 48 on a 100% of Operated basis. As reported in GOO MI Book.

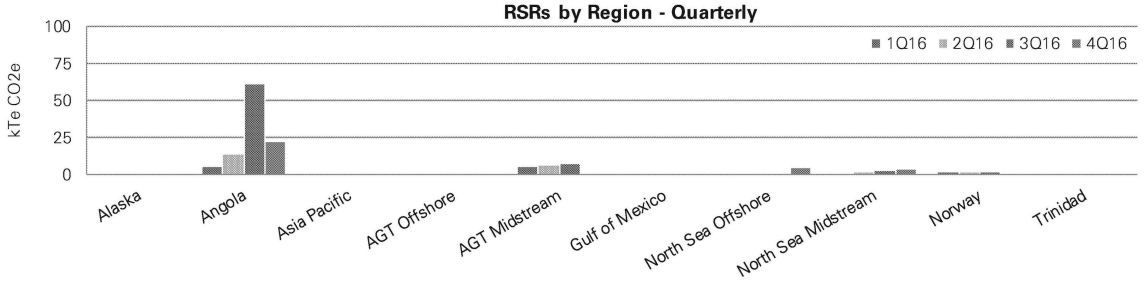
Real Sustainable Reductions kte CO_2 Equivalent (CO_2e)

Region	2012	2013	2014	2015	2016	1Q16	2Q16	3Q16	4Q16
Alaska	0.0	0.0	2.3	11.5	0.0	0.0	0.0	0.0	0.0
Angola	0.0	0.0	0.0	16.8	105.2	5.9	14.5	61.8	22.9
Asia Pacific	0.0	7.7	14.4	16.2	0.0	0.0	0.0	0.0	0.0
AGT Offshore	0.0	43.2	0.0	3.1	1.5	0.0	0.0	0.0	1.5
AGT Midstream	0.0	0.0	1.8	14.1	21.6	5.8	6.5	8.0	1.3
Gulf of Mexico	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
North Sea Offshore	0.0	0.0	0.0	0.0	5.3	0.3	0.3	0.0	4.6
North Sea Midstream	0.0	0.0	0.0	0.0	9.0	0.0	2.0	3.4	3.6
Norway	0.0	13.8	0.0	0.0	5.6	1.9	1.9	1.9	-
Trinidad	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
GOO Total	0.0	64.7	18.5	61.6	148.2	13.9	25.3	75.1	33.9

Comments:

GOO Real Sustainable Reductions increased significantly in 2016 when compared to 2015, mainly as a result of:

- Angola: PSVM flare reductions (new injector well and compressor reliability)
- AGT: Sangachal Terminal (flare reductions and energy optimisation) and Chirag-1 (flare reduction), as well as some smaller reductions from BTC, WREP and Deepwater Gunashli
- North Sea: Sullom Voe Terminal (Project Aurora), Foinaven (reduction in flaring during compressor cleanouts) and ETAP (pump right-sizing)
- Norway: Valhall LP flare close-in

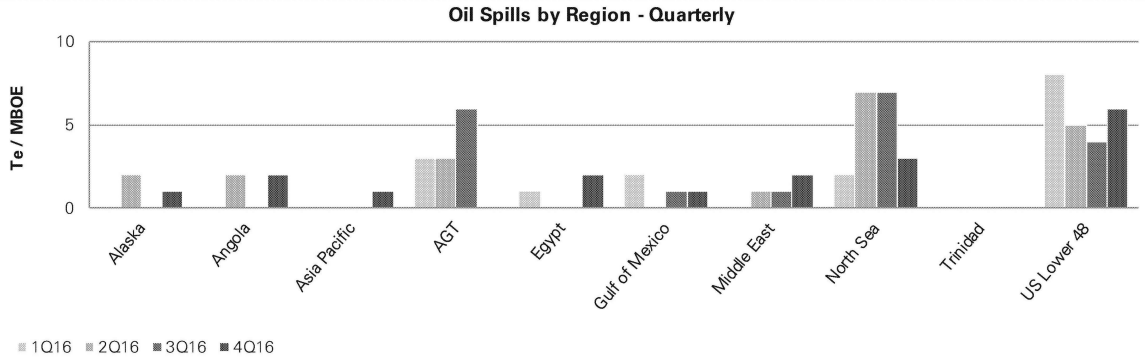


Data shown is for GOO only excluding Lower 48 on a BP equity share basis. As reported in GOO MI Book.

Upstream Oil Spills

Oil Spills > 1 bbl

Region	2012	2013	2014	2015	2016	1Q16	2Q16	3Q16	4Q16
Alaska	17	11	8	7	3	0	2	0	1
Angola	5	10	4	7	4	0	2	0	2
Asia Pacific	2	0	0	0	1	0	0	0	1
AGT	11	10	6	3	12	3	3	6	0
Egypt	1	9	2	1	3	1	0	0	2
Gulf of Mexico	8	6	6	6	4	2	0	1	1
Middle East	2	1	1	3	4	0	1	1	2
North Sea	13	18	16	13	19	2	7	7	3
Trinidad	2	1	1	1	0	0	0	0	0
US Lower 48	20	20	12	18	23	8	5	4	6
Upstream Total	81	86	56	59	73	16	20	19	18



Upstream Oil Spills including GWO and GPO and Lower 48. As reported in the Orange Book

AGT Region RCE Synopsis

Overview

AGTR activity covers **Upstream** and **Midstream** operations in **three countries** - Azerbaijan, Georgia and Turkey based on ACG and SD PSAs and three Host Government Agreements (HGAs). Facilities cover two giant offshore fields: ACG (oil) and Shah Deniz (gas), with 6 oil platforms, 1 gas platform and 3 mobile drilling rigs, Sangachal terminal, an extensive network of subsea pipelines (1400 km) and three international export pipelines (BTC – 1768 km, WREP – 833 km, SCP – 692 km), Supsa terminal on the Black sea coast and Ceyhan terminal on the Mediterranean Sea coast. BP also manages a logistics base, a hazardous waste management facility, and two central waste accumulation areas. All of AGT Region's operational sites and related support facilities are covered by an **Environmental Management System (EMS)** which is **certified to** the **ISO14001:2004 standard** (this is a regulatory compliance requirement) and a **Compliance Management System (CMS).**

Headline Issues

RCE performance / headline issues:

- **Carbon intensity** calculation methodology changed as per recommendation from Upstream HSE. In 2016 **Flaring** reduced by 5.14% in comparison with 2015. This has led to reduction of flaring intensity.
- In 2016 **GHG emissions** increased by 2.8% due to the slight production increase, and change of GHG calculation methodology for ACG Offshore platforms (new CRAE tool considering new emissions factor and methane emissions from storage tanks, glycol dehydration unit and compressors seals based on CH4 survey completed in 2016).
- 2016 was marked with a **>28% increase** in **Real Sustainable Reductions** from 16.9 to 23.6 kteCO_2e.
- **Methane intensity** reduced by 10.5% due to significant reduction in venting from SCP Azerbaijan and SCP Georgia in 2016 (in 2015 there was PSD at SCP Export Pipelines when significant amount of venting took place both in Azerbaijan and Georgia).
- **Unplanned/unpermitted material releases** to environment were subject of dedicated meetings in level of Regional President and Operations VP. The plans and actions on reduction and elimination of such PW and Sewage discharges were discussed in those meetings.
- **PW Management**:
  - In 2016 PW unpermitted discharges made 375.7 thousand te in 2016 versus to 23 thousand te for 2015. The major reasons: releases from passing valves at CA and DWG platforms and routine operational discharges at CA and Deepwater Gunashli (DWG) associated with pump swaps/trips and pigging activities. Since August 2016 the volume of **PW discharges significantly reduced** as a result of repair of the leaking valve at CA. It was introduces a new and more accurate quantification method for calculation of PW discharge volumes using ultrasonic measurement and re-calculated discharge volume are also significantly less than the one calculated and reported to government before.
  - PW is separated onshore and exported offshore for reinjection at CA platform. DWG and West Azeri (WA) platforms launched 3-phase offshore PW separation. This process is now available at three platforms, and is in plan for West Chirag (WC) platform.
  - Offshore separation and injection was selected as a long-term option for managing the increasing PW volume.
  - There are some PW discharges during normal operations requiring an advocacy and permitting solution, as well as engineering upgrade and fix where it is available.
- **Performance of Sewage Treatment Plants (STPs)**. As a result of a trial launched at DWG and Azeri platforms, stable and compliant sewage treatment performance was achieved across all

ACG offshore operations. More work required at Azeri and DWG offshore platforms in 2017 to implement permanent STP upgrades applying learnings from the trial.

CMS/EMS - ISO 14001 key points:

- OMS 7.1 conformance level for OMS 7.1 was confirmed at Level 4 after AGTR OMS 7.1 Gap Assessment and conformance gateway review. The Conformance Plan was approved by a Regional President - implementation is in progress. The objective is to accomplish Level 5 by end 2018 in line with a new guidance released by Upstream.
- Self-assessed conformance level for OMS 3.6 is at Level 4.
- ISO 14001 certifier change process started with a Transfer audit planned for 1Q 2017 and 3rd surveillance audit round planned for May 2017 by ERM, the Group Provider for ISO 14001 services.

External / LTO context:

- 2015 GGFR Excellence award received, recognizing significant contributions towards global gas flaring reduction.
- Considering Tehran Convention's request BP decided to support the second phase of the Caspian Environmental Data Base Project
- Represented AGTR at International Environmental Exhibition in November 2016 in Baku

Activity set and future developments:

- Continued Self-Verification on **OMS 3.6; 4.6; 6.2; 7.1; 7.2** for GOO and GWO and for Exploration projects in the region, as well as environmental support to **Cat C projects**
- **Support to GPO:** Environmental monitoring, regulatory compliance and permitting support of Shah Deniz 2 and South Caucasus Pipeline Expansion projects are ongoing.
- **Support to Exploration:** Shallow-Water Absheron Peninsula (SWAP) 3D Environmental and Social Impact Assessment (ESIA) was disclosed and approved by regulator. Self-verification over implementation of ESIA commitments during the SWAP 3D seismic project is in progress. Extensive plans are in place for more exploration (seismic and drilling) in the region, including SWAP, Shafag-Asiman, D230 and other projects. RCE provides all required support for these projects.
- **40 Environmental permits** obtained for Exploration, GOO and GPO projects and operations in 2016, including critical permits for Chirag-1 Drilling Program and for SWAP 3D Seismic project implementation including permission to progress seismic inside the buffer zone of International Protected Area (IPA).

Emerging Issues

- **Oiled Wildlife Response Capability** in Azerbaijan requires an attention to progress to the higher OMS conformance level. RLT discussion resulted in carrying out a Feasibility Study for Azerbaijan Wildlife Response Capability building in order to identify the required actions and options to build adequate response capability in Azerbaijan. The study has been completed and is planned to be presented to RLT in 1Q 2017.
- **Dispersant Application and In-Situ Burning:** A comprehensive application package for Azerbaijan Regulatory pre-approval for In-Situ Burning, Dispersant Products Import and Authorization for Dispersant Use has been finalized and submitted to regulators in 4Q 2016, awaiting regulator response.
- NORM – the plan has been developed to get a government licence for storage of NORM waste at Serenja.

5-Year RCE Performance Data

	2012	2013	2014	2015	2016		5-Year Trend
Operated GHGs ($MteCO_2e$) *	4.05	3.42	4.33	3.68	3.78	▲	Increase in operated GHG in general due to increase in production and clean up flaring from Istiglal MODU
Carbon Intensity ($teCO_2e$ / mboe) *	3.2	2.7	3.3	2.7	2.8	▼	Calculation methodology changed as per recommendation from Upstream HSE (Gross operated CO2e/Gross operated production and throughput)
Methane Intensity (te / mboe) **	0.009	0.006	0.009	0.005	0.004	▼	Slight reduction from 2015 to 2016. New emissions calculation introduced to Offshore operations (CRAE tool).
Flaring Intensity (te / mboe) **	0.38	0.20	0.32	0.15	0.14	▼	Overall flaring reduction across the AGT Region from 2011-2016. In 2016 flaring reduced in particular from ACG ST, by about 37% and Offshore, which regardless of increased flaring from EA and DWG, in total reduced by about 12%. Operations AGT Region flaring decreased by >5% in 2016 comparing to 2015.
Real Sustainable Reductions ($kteCO_2e$) †	0.0	43.2	1.8	16.9	23.6	▲	2013: RSRs from EA and WA through change in general flaring practice 2014: RSR from ACG Sangachal Terminal (compressor performance improvements) 2015: RSR from Chirag 1 platform (Flash Gas Compressor bundles changed, HP Gas spill off replaced - flaring reduction); RSR from ST ACG (True Vapour Pressure trial ongoing – reduction in fuel gas consumption); RSR from ST SD (Gas Export Compressors overhaul completed – reduction in flaring); RSR from Supsa terminal (grid power installation at Supsa terminal – reduction in diesel fuel utilization) 2016: RSR from ST ACG (1. Phase 1 ACG flares overhauled pilots reliable, purging adjusted to minimum. 2. True Vapor Pressure project. 3. EOP plant bypassed from Feb 2016); RSR from ST SD (Waste Heat Recovery unit was online 27 days in 3Q and used as a primary source for oil heating which resulted by fuel gas consumption reduction equal to 1.03 mmscfd); RSR from Supsa Terminal (facility switched to grid power); RSR from BTC Geo (PSG 2 switched to grid power); RSR from Chirag 1 (NRV replacement completed); RSR from WMF (one ITD removed from Serenja HWMF).
Percentage Produced Water Reinjected	97%	98%	95%	99%	94%	▼	Decrease in % of PW re-injected in 2016 happened due to the following reasons: in 2016 PW discharges from leaking valves started to be reported from CA in January and from DWG in May. Calculation methodology was established and more precise data started to be obtained using ultrasonic measurements, rather than previously used mass balance.
Oil in water concentration (ppm)	0.0	51.2	6.7	18.5	41.1	▲	In September 2015 ST stopped using flocculants and coagulants for ST PW (trial project, which is still ongoing) to decrease filter change out frequency offshore, which led to increase in discharged PW OiW content
Total water withdrawal (thousand m^3)	1027	1040	576	407	479	▲	Increased water usage in general at Logistics and Waste Management Facilities due to increased operations and project activities.
Production chemicals discharged (kte)	0.05	0.03	0.00	0.00	0.05	▲	Discharges of production chemicals took place from CA platform in 2016 (51 te discharged). Associated with increased discharge of injection water and produced water in 2016. *Note: biocide excluded due to batch application and not stable concentration in discharges.*
Oil Spills ≥ 1 bbl ‡	11	10	6	3	12	▼	
Compliance Notices ‡	-	-	-	0	0	—	
Government Reportables ‡	-	-	-	245	261	▲	

* Data on a 100% of operated (gross) basis
** Data includes GOO only
† Data on an equity (net) basis for operated sites only
‡ Data includes GOO, GWO and GPO

Alaska Region RCE Synopsis

Overview

BP Alaska operates the **Prudhoe Bay field** on 397 sq. miles (1,028 sq. km.) of land leased from the State of Alaska. The field produced **~281,000 boe production in 2015**, and is still the third largest in the US after more than 12 billion barrels of production. Facilities include ~1200 active wells on 45 pads, 7 oil and gas separation facilities, 2 gas plants (handling and injection), a power plant, 2 seawater plants (treatment and injection), a crude oil topping plant, ~900 miles of pipelines, ~230 miles of roads, 2 docks, and hazardous and solid waste management facilities. Facilities are on ~5 feet of gravel and pilings to prevent thawing of permafrost. Additional non-operated production comes from Kuparuk River (ConocoPhillips), Milne Point (Hilcorp), and Pt. Thomson (ExxonMobil). Liberty (Hilcorp) is an offshore field in the permitting stage.

The proposed **Alaska LNG Project** involves a North Slope gas treatment plant, 800 mile export pipeline and LNG plant in Nikiski, Alaska to commercialize gas from the Prudhoe and Pt Thomson fields. During the 4th Quarter, BP Alaska, ExxonMobil and ConocoPhillips signed agreements with the Alaska Gas Development Corporation (AGDC) identifying the State of Alaska as the lead to advance the Alaska LNG Project. BP Alaska signed an additional agreement with AGDC to support AGDC in their lead role. The Federal Energy Regulatory Commission (FERC) is the lead regulatory agency for the proposed AKLNG project and provided comments to AGDC in response to Pre-FEED application submittals earlier in 2016.

Headline Issues

RCE performance / headline issues:

- **Environmental performance** for Prudhoe Bay remains **generally consistent with prior years**, although air permit exceedances trended up in 2016 due in part to outages at the power plant.
- There were **two Compliance Notices** in 2016, consisting of an unapproved delay in testing Subsurface Safety Valves (resolved without a fine), and deterioration of a cap on a closed landfill (under review by Remediation Management).
- The facility which grinds and injects drill cuttings did not operate during winter 2015-16, thereby requiring construction of temporary waste pits. During 3Q 2016, wastes from these pits were processed.
- Within the BP portfolio, Alaska has **high volumes of GHG emissions** as result of burning fuel gas in order to re-inject gas and produced water.

EMS / ISO 14001 key points:

- RCE conducted **external ISO attestation and supported a GWO 7.1 Audit in 2016**. Attestation identified opportunities for more cross-functional integration and an increase in internal audits.

External / LTO context:

- EPA promulgated and is **proposing regulations that significantly impact BP Alaska** by requiring additional emission controls, leak detection and repair programs, permitting, monitoring, inspections, testing, reporting and recordkeeping.
- **Arctic operations remain a focus of federal policy makers and NGOs.** There are efforts to use the Endangered Species Act to address climate change, although local activity has been found not to have a significant impact on polar bears and their habitat.

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- The US Fish and Wildlife Service issued new policy requiring **net benefit compensatory mitigation for resource development projects.** This policy will increase uncertainty around cost and permitting timelines for new projects in Alaska and nationally.

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5-Year RCE Performance Data

	2012	2013	2014	2015	2016		5-Year Trend
Operated GHGs (MteCO_2e) *	11.22	11.66	11.24	9.69	9.88	▼	Overall reduction due to Nov 2014 divestments (Endicott, Milne Point, Northstar).
Carbon Intensity (teCO_2e / mboe) *	88	94	98	94	96	▲	2016 increase due to higher flaring
Methane Intensity (te / mboe) **	0.06	0.06	0.05	0.05	0.06	▲	2016 increase due to higher flaring
Flaring Intensity (te / mboe) **	1.8	1.8	1.8	1.6	2.0	▲	2016 increase due to field-wide power outages.
Real Sustainable Reductions (kteCO_2e) †	0.0	0.0	2.3	11.5	0.0	–	RSRs in 2014/15 due to replacement of two gas turbines with one electrical compressor at processing facility.
Percentage Produced Water Reinjected	100%	100%	100%	100%	100%	–	
Oil in water concentration (ppm)	0.0	0.0	0.0	0.0	0.0	–	
Total water withdrawal (thousand m^3)	4,797	5,879	4,361	1,986	1,833	▼	Reduction due to Nov 2014 divestments.
Production chemicals discharged (kte)	0.0	0.0	0.0	0.0	0.0	–	
Oil Spills ≥ 1 bbl ‡	17	11	8	7	3	▼	
Compliance Notices ‡	8	6	3	3	3	–	
Government Reportables ‡	211	194	189	152	138	▼	Reduction due to systematic progression of OMS 7.1 to conformance levels 4 and 5, and Nov 2014 divestments.

* Data on a 100% of operated (gross) basis
** Data includes GOO only
† Data on an equity (net) basis for operated sites only
‡ Data includes GOO, GWO and GPO

Angola Region RCE Synopsis

Overview

The Angola Region has two FPSOs (Greater Plutonio (GtP) and PSVM) and one drilling rig[6] operating offshore. The two FPSOs operate with high GHG intensity and high produced water discharges. The region has contributed >50% of the Upstream flaring total since 2013. New stringent environmental legislation impacting operational discharges has been in effect since January 2016.

Headline Issues

Flaring:

- In 2016 GtP and PSVM flared 711k and 329k tonnes of gas respectively; which still represents the most significant contribution in Upstream total flaring (55% of total).
- **PSVM delivered a five-fold increase in its RSRs** in 2016, achieved through higher gas reinjection rates in 2016 compared to 2015 (16.8 v 105.2 kteCO_2e respectively).
- GtP showed a 6% increase in the volume of gas flared in 4Q16 compared to 3Q16 which was a result of compressor issues in November. Overall, GtP has seen a c. 19% increase of the volume of gas flared in 2016 compared to 2015 which was due to a combination of factors related to reservoir management, plant trips and maintenance. **Current flaring on GtP doesn't depend directly on ALNG export and is set to continue at a similar rate in 2017, due to GtP topside gas compression capacity issues.**
- PSVM has been exporting gas to ALNG since 2H 2016 which has contributed to the reduction of gas flared at that facility.
- In 2016 Angola Region established **GHG Improvement Programme** with the view to investigate the opportunities to reduce flaring without compromising production.

Produced Water:

- **Following successful water re-injection trials in 2015 PSVM started re-injecting its produced water in 2016.** The 2015 trials demonstrated that produced water re-injection was feasible with manageable injectivity losses (provided oil-in-water limits were met).

EMS / ISO 14001 key points:

- Implementing **transition to ISO 14001:2015** certification in 1Q 2017. Re-certification audit took place in January 2017 with five minor non-conformities identified by the auditor (Bureau Veritas). High level of environmental awareness, leadership commitment and effective engineering controls were recognised by the external auditors.
- The Angola Region has an **external commitment to regulators regarding maintaining ISO Certification**.

External / LTO context:

- **Increased enforcement of legislation**, additional reporting requirements (spills notification, radiation licences) and inspections. Potential for significant fines/penalties ($ millions).
- Challenges of managing **inconsistencies with new and amended legislation** coming into force and a lack of clarity on some requirements (e.g. Environmental Licences).
- Regional **OMS 7.1 Conformance Level moved from 2 to 3**.
- CTM performance has improved – e.g. late task completion in 2016 improved to 9% (2014 = 23%; 2015 = 19%).

[6] There are no drilling activities scheduled for 2017.

Activity set and future developments:

- **Southern Riser Gas Lift** project enters its execution phase in 2017. This project is required to protect GtP base production (8.3mmstb), and potentially provides an additional benefit of increased production (5.6mmstb). The scope of the project is to develop and deliver a replacement riser solution.

Emerging Issues

- **Regulations:** Lack of clarity and specific details in regards to the timelines to implement some new legislation (flaring).
- **Increased Enforcement:** The only fine received in late 2015 was contested by BP and retracted by the regulator in 2016.
- **Waste Management:** New NORM waste storage facilities commissioned in 2017, re-tendering of waste management services initiated with view to improve waste services.
- Flaring: Monitoring potential for future Angolan regulations (e.g. draft Gas Management Law); Angola Word Bank 'Zero Flaring by 2030' initiative; national implications of outcomes from COP21 Paris climate conference.

5-Year RCE Performance Data

	2012	2013	2014	2015	2016		5-Year Trend
Operated GHGs ($MteCO_2e$) *	1.46	4.04	4.57	4.22	4.27	▲	Increase due to PSVM start-up (2013) and Angola LNG unavailability
Carbon Intensity ($teCO_2e$ / mboe) *	23	40	41	38	37	▼	Decreasing trend in line with reduced flaring and commencement of export to Angola LNG in 2016
Methane Intensity (te / mboe) **	0.10	0.26	0.22	0.19	0.19	▼	Continued decrease in 2016 due to reduction in flaring on PSVM and start of gas export to Angola LNG.
Flaring Intensity (te / mboe) **	4.8	10.1	10.8	9.3	9.1	▼	Significant reduction in flaring on PSVM and start of export to Angola LNG.
Real Sustainable Reductions ($kteCO_2e$) †	0.0	0.0	0.0	16.8	105.2	▲	Significant RSR achieved through flare reduction on PSVM in 2016 related to new injector well and compressor reliability
Percentage Produced Water Reinjected	29%	66%	68%	80%	80%	▲	Increased produced water reinjection rates on Greater Plutonio
Oil in water concentration (ppm)	38.7	24.2	69.2	34.6	27.7	▼	Oil in water concentrations have increased as a result of separation issues on Greater Plutonio, but improved in 2015 and 2016
Total water withdrawal (thousand m^3)	0	0	0	0	0	–	No water withdrawal in Angola
Production chemicals discharged (kte)	1.3	1.5	1.5	1.5	6.8	▲	Increase in 2016 due to higher than usual methanol consumption dueing start-ups following plant trips, and increased use of corrosion inhibitor
Oil Spills ≥ 1 bbl ‡	5	10	4	7	4	▼	
Compliance Notices ‡	-	-	-	0	0	–	
Government Reportables ‡	-	-	-	106	125	▼	

* Data on a 100% of operated (gross) basis
** Data includes GOO only
† Data on an equity (net) basis for operated sites only
‡ Data includes GOO, GWO and GPO

Asia Pacific RCE Synopsis

Overview

Tangguh LNG site is located on the south shore of Bintuni Bay, Papua Barat Province, Indonesia. Existing facilities include **two offshore platforms** with associated production wells, **two onshore LNG production trains** with max. capacity of 7.6 million tonnes per annum (mtpa) and supporting facilities. To increase production capacity, BP and its partners plan to expand the Tangguh LNG facilities with the construction of **LNG Train 3** and additional production wells.

Headline Issues

RCE performance / headline issues:

- Tangguh is being a candidate for **GREEN PROPER** Rank for the 1st time after obtaining 4th BLUE PROPER Rank in four consecutive years, meaning that **Tangguh Operation is beyond compliance with respect to Environmental Management System Implementation.**
- **Environmental performance** for Tangguh remains generally **consistent with prior years**. New Environmental regulations have been issued by government in 2016, internal and external discussion is ongoing in order to manage the compliance to the new regulations
- There were **no Compliance Notices received in 2016**.

EMS / ISO 14001 key points:

- Tangguh LNG Operations Environmental Management System (EMS) has been **ISO 14001:2004 certified since 2010**. A recertification audit was conducted at the end of October 2016 by TÜV Rheinland® and Tangguh was certified to ISO 14001:2004. As per approved AMDAL (ESIA), **Tangguh operation will maintain EMS certification**.

External / LTO context:

- **Lender Audit for Trains 1 and 2 was conducted in February** and no non-conformances were identified and the recommendations are being completed.
- **Rehabilitation obligation** – Received approval in July 2016 from the Ministry of Environment and Forestry Decree for the determination of the planting site to rehabilitate 1320 Ha of substitute area. This is the first step prior towards completing the rehabilitation obligation - the remaining area of ±5600 will be determined later by the Government.

Activity set and future developments:

- **GPO: Tangguh Expansion Project (TEP)** - onshore dual FEED was completed at the end 2015. TEP execution is being prepared. ENVIID Workshop for Tangguh Expansion Project – Early EPC Activities has been conducted. Finalized the overall ENVIID aspects-impacts register. This includes checking 'recommended actions' arising from the ENVIID session with the relevant action owner and develop the report.
- **Due Diligence (DD) audit for TEP financing process** has been conducted. The critical finding of the DD is to develop **Critical Habitat Assessment (CHA) and Biodiversity Action Plan (BAP)**. Development of the CHA and BAP was completed in 2Q 2016 and documents are currently disclosed via ADB website. Ongoing process to complete the Lenders E&S requirement as part of the Lenders requirement.
- **GWO:** Provide environmental and social support to **Wiriagar Deep Paleocene Appraisal Drilling** project. Including EBA study as requested by the Government. Wiriagar Drilling Project Environmental & Social Screening has also been conducted on September 2016.
- **Seismic:** Provide environmental and social support to TIRS project.

5-Year RCE Performance Data

	2012	2013	2014	2015	2016		5-Year Trend
Operated GHGs ($MteCO_2e$) *	4.79	4.84	4.77	4.82	4.93	—	GHG emissions have remained broadly flat over last 5 years
Carbon Intensity ($teCO_2e$ / mboe) *	81	75	72	72	73	—	Intensity has remained relatively flat
Methane Intensity (te / mboe) **	0.11	0.05	0.03	0.02	0.03	▼	Decreasing methane intensity primarily due to reduction in flaring
Flaring Intensity (te / mboe) **	2.7	1.0	0.7	0.7	0.8	▼	Significant flare reductions as a result of ongoing flaring minimisation programme. Slight increase in 2016 due to plant trips and TAR
Real Sustainable Reductions ($kteCO_2e$) †	0.0	7.7	14.4	15.7	0.0	—	RSRs in 2013, 2014, 2015 associated with flare minimisation programme
Percentage Produced Water Reinjected	0%	0%	0%	0%	0%	—	No reinjection
Oil in water concentration (ppm)	0.0	0.0	0.0	0.0	0.0	—	No oil in water discharged
Total water withdrawal (thousand m^3)	28	26	22	20	18	▼	The reduction is linked with the reduction of POB (Personnel On Board) in Babo.
Production chemicals discharged (kte)	0.0	0.0	0.0	0.0	0.0	—	No production chemicals discharged
Oil Spills ≥ 1 bbl ‡	2	0	0	0	1	—	
Compliance Notices ‡	-	-	-	0	0	—	
Government Reportables ‡	-	-	-	1	0	—	

* Data on a 100% of operated (gross) basis
** Data includes GOO only
† Data on an equity (net) basis for operated sites only
‡ Data includes GOO, GWO and GPO

GoM Region RCE Synopsis

Overview

The BP Gulf of Mexico (GoM) Region is the **largest deep water leaseholder in the Gulf of Mexico**, with ownership in more than 650 lease blocks at water depths of 1,300 feet or greater. GoM operates **four platforms**; two of the platforms operate both production and drilling units. GoM also leases **five mobile offshore drilling rigs**. Within BP, GoM contributes relatively low levels of greenhouse gas (GHG) emissions and high volumes of produced water discharges, which may contain residual quantities of oil and grease.

Headline Issues

RCE performance / headline issues:

- **2016 Compliance Notices** in GOO GoM: 11 (9 INCs and 2 USCG 835s,) compared to 39 for FY 2015 (27 BSEE INCs; 2 USCG NOV; 10 USCG 835s). 2015 Compliance Notices include 6 BSEE measurement INCs (Operational) issued to NaKika which are non-HSE.
- **Produced water sheens**: Thunder Horse has experienced an increase in PW sheening due to new wells being brought online and existing wells being shut in and brought online due to interventions work. Various equipment (flotation cells, hydrocyclone) was cleaned. Produced water system upgrades are being planned.
- **GHG emissions**: The region contributes very low quantities to the overall Upstream GHG emissions.

EMS / ISO 14001 key points:

- **GoM GOO is certified to ISO 14001 [2004]**.
- GoM is currently planning to **move from certification to attestation in December 2017**.

Key risks from an RCE perspective:

- Ensuring the **right balance of focus** on process safety, personal safety and regulatory compliance.
- **Gaps in standardized and documented environmental and regulatory processes** may result in deviations from required regulatory compliance activities/process.

External / LTO context:

- **Issuance of new/revised regulations** and agency policies increase obligations on operating and support staff.
- Regular **engagement with industry groups and regulators** help ensure data and best practices are considered in the development/revision of agency policies/regulations.

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5-Year RCE Performance Data

	2012	2013	2014	2015	2016		5-Year Trend
Operated GHGs ($MteCO_2e$) *	1.39	1.17	1.15	1.01	0.88	▼	Reduction in GHG emissions primarily driven by divestments
Carbon Intensity ($teCO_2e$ / mboe) *	19	13	10	10	8	▼	Production has increased (despite divestments) whilst GHG emissions have fallen
Methane Intensity (te / mboe) **	0.03	0.01	0.02	0.01	0.01	▼	Long-term decreasing methane intensity primarily as a result of reduced flaring
Flaring Intensity (te / mboe) **	0.8	0.6	0.3	0.3	0.4	▲	Increase in 2016 due to significant rise in flaring on Thunderhorse compared to 2015
Real Sustainable Reductions ($kteCO_2e$) †	0	0	0	0	0	–	
Percentage Produced Water Reinjected	0%	0%	0%	0%	0%	–	
Oil in water concentration (ppm)	17.4	13.6	14.5	15.2	14.5	–	
Total water withdrawal (thousand m^3)	0	0	0	0	0	–	
Production chemicals discharged (kte)	4.3	4.1	7.4	8.2	11.4	▲	Increasing production chemical use over 5 years on Thunder Horse, Atlantis and NaKika
Oil Spills ≥ 1 bbl ‡	8	6	6	6	4	–	
Compliance Notices ‡	36	28	17	39	11	▼	
Government Reportables ‡	36	19	24	30	24	▼	

* Data on a 100% of operated (gross) basis
** Data includes GOO only
† Data on an equity (net) basis for operated sites only
‡ Data includes GOO, GWO and GPO

North Sea Region (UK)

RCE Synopsis

Overview

The UK has **1 FPSO, 5 manned and 2 NUI platforms, 4 MODUs, 2 onshore terminals** and 500km+ of pipelines and associated infrastructure. Start-up of **Clair Ridge** and **Glen Lyon** major projects planned in 2017. Europe has the highest growth in new environmental legislation globally, with 200 changes per annum with potential cost impacts of $100M+. BREXIT has resulted in significant complexity and uncertainty in the regulatory landscape. Operating efficiency and reliability is a key driver of compliance and environmental performance in the UK

Headline Issues

RCE performance / headline risks:

- **Number of regulatory changes grown 327% since 2012**. Changes focus on GHGs, Air Quality and Effluent Discharges. Active advocacy underway to minimise impact on the business. 2016 advocacy efforts ensured most offshore assets will not be exempt from new 'LCP' and MCPD legislation, avoiding requirement to replace all GTs with DLE GTs offshore ($100M+). However significant risks remain including:
  - $80M for GL and CR, upgrade GTs to DLE machines (highest risk that derogation not granted)
  - $28M for Kinneil IED compliance; (GTs and compressor mods and storage buffer effluent)
  - $20-70M for new ETP at SVT (20M post rationalisation and 70M if flows remain high)
- **Carbon Risk:** Potential 4 fold increase in annual carbon costs by 2030 ($40M pa) – High uncertainty due to BREXIT and EUETS Phase 4. Significant focus area of advocacy efforts. Glen Lyon and Clair Ridge have the greatest financial exposure under Phase 4, and the potential to reduce annual costs by $12M through LoF. Proactive trading strategy in place with IST to optimise exposure – this reduced costs by $2.8M (BP net) in 2016.
- **Protected Areas (PAs):** BP infrastructure overlaps 24 PAs and within <5km of additional 107 PAs. 20% of Scottish Waters protected and growing; WoS most sensitive area representing potential risk to growth strategy. Foinaven, Glen Lyon, ETAP, multiple offshore pipelines, SVT and FPS operate within PAs. North Sea has 3 of the top 10 most sensitive IPA sites in BP Group, with FPS at #1. 3 licences in 28th Licensing Round withheld for 18 months for further assessment due to PA environmental sensitivities.
- On 2nd October, **95 tonnes of crude released to sea from Clair Phase 1** through the produced water treatment system, whilst bringing online a new well. Oil rapidly dispersed to sea, without use of dispersant. Incident covered by media and a Enforcement Notice issued by the regulator. Clair is 50km from Shetland and <30km from the nearest Marine Protected Area. Incident has raised concerns about oil pollution amongst stakeholders in Shetland who get 6x more income from fisheries than oil and gas.
- **Oil in produced water discharge performance** is a key regulatory area of focus offshore with focus expanding to whole effluent toxicity. Whole Effluent Testing (WET) and discharge modelling now required and discharge of chemicals likely to be higher risk to environment. BP has a higher than industry average use of PWRI (55% vs. industry average 20%); this reduces our effluent discharge risk. PWRI reliability averages ~80%; one PWRI trip per month can result in a non-compliance.
- **Decommissioning**: Region represents 50% of global budget, Bruce, Andrew, Thistle and Magnus = $3.1billion net. Supporting policy initiatives to reduce liabilities. SVT soil and groundwater remediation liabilities halved prior to Enquest sale agreed.
- **Flaring Noise** at Kinneil: significant pressure from SEPA with potential to result in FPS restrictions during periods of high flaring. Negotiations underway to address this risk and issue has been escalated to senior SEPA management. If acceptable solution cannot be agreed, BP will formally appeal SEPA imposed conditions which we consider unreasonable.
- Onshore, SEPA publish annual **Compliance Assessment Scores (CAS)** for major industrial sites in Scotland. Scores range from very poor (1) to excellent (5). In 2016, SVT scored 'good' (4), Cruden Bay and Dalmeny scored "excellent" (5). Kinneil scored 'poor' (2) due to non-availability of ground flares and flaring noise.

- **29T cement release** from Byford Dolphin in 2014 remains under formal investigation by DECC (now BEIS).

Licence to Operate (LTO) context:

- **5 key regulators –BEIS, OGA, SEPA, HSE and OSDR**. Significant organisational changes underway in all, except HSE. Regulators generally concerned about implications of oil price on HSE performance.
- Good relationships with BEIS, OGA and OSDR. Relationship with SEPA has been strained due to disagreements with site inspectors on flaring noise. Working with senior SEPA management to resolve.
- **BEIS regulatory capacity has grown 400%+ since Macondo** and BEIS increasingly using their Enforcement Powers. BEIS also under pressure to issue civil penalties particularly on EUETS non compliances. Mossmorran (Exxon) fined $5M for incorrect reporting of CO_2 emissions in 2012.
- **UK regulatory regime is complex** with 211 HSE regulations and 5 regulators. RCE team completes c.550 environmental compliance tasks per annum and 200-300 permit submissions to support Licence to Operate (LTO). Last minute variations, or accelerated new submissions, are routinely requested by business and these require excellent relationships with regulators to avoid significant delays to operations. **Zero NPT** due to compliance permitting since May 2012.

EMS / ISO 14001 key points:

- **OMS is ISO14001 certified.** Moving towards attestation to new standard by Sep 2018. Region at Conformance Score 4 OMS 7.1

Activity set and future development opportunities:

- 30th Licencing Round due in 2Q17 will require environmental assessment. Glen Lyon and Clair Ridge designed to be low flaring, low carbon intensity.

5-Year RCE Performance Data

		2012	2013	2014	2015	2016		5-Year Trend
Operated GHGs ($MteCO_2e$) *		2.27	1.97	1.84	2.15	2.19	▼	2012-2014 decline due to portfolio changes. 2015/16 increases in line with higher production
Carbon Intensity ($teCO_2e$ / mboe) *		8	10	11	9	10	–	
Methane Intensity (te / mboe) **	UK Offshore	0.05	0.04	0.05	0.04	0.05	▲	Increase in 2016 due to improved methodology for estimating methane emissions e.g. fugitives and compressor seals
	UK Midstream	0.00	0.01	0.01	0.01	0.02	▲	
Flaring Intensity (te / mboe) **	UK Offshore	2.8	2.4	2.9	1.9	1.7	▼	Decreased flaring offshore due to reliability improvements.
	UK Midstream	0.5	0.8	1.1	0.9	0.5	▼	Significant reduction in midstream intensity in 2016 due to SVT Aurora Project start-up
Real Sustainable Reductions ($kteCO_2e$) †		0	0	0	0	14.3	–	2016 RSR largely due to SVT Project Aurora, and also reductions on Foinaven and ETAP
Percentage Produced Water Reinjected		45%	55%	36%	32%	30%	▼	
Oil in water concentration (ppm)		10.0	15.0	8.0	9.2	11.6	▲	
Total water withdrawal (thousand m^3)		1,927	2,189	1,773	1,838	1,577	▼	
Production chemicals discharged (kte)		2.3	2.2	1.7	1.8	1.9	▲	
Oil Spills ≥ 1 bbl ‡		13	18	16	13	19	–	Majority are diesel, hydraulic/lube oil releases (Offshore), drainage issues (Onshore), OBM transfers (GWO). CIs underway to address.
Compliance Notices ‡		1	0	1	0	4	–	
Government Reportables ‡		183	77	130	137	163	▼	99% driven by offshore. Recent rise due to increased reporting requirements.
Number of new HSE regulatory requirements		60	128	117	196	-	▲	Significant increase in regulatory changes, many of which are low impact. Small number of potentially material changes ($100M+)

* Data on a 100% of operated (gross) basis
** Data includes GOO only
† Data on an equity (net) basis for operated sites only
‡ Data includes GOO, GWO and GPO
- Data unavailable at time of issue

Trinidad & Tobago RCE Synopsis

Overview

BPTT operates off the south-eastern coast of Trinidad and is primarily a gas producing business. The two gas fields located offshore, **Greater Cassia** and **Greater Mahogany** are designed according to the "hub and spoke" concept. In total, there are **four manned facilities** (Hubs) and **eight Normally Unmanned Installations (NUIs)** which feed into the Hubs. There are currently **three drilling rigs** on hire. Onshore, the BPTT business includes a Crude Oil and Stabilization Plant at the **Galeota Point Facility**, the **Beachfield Gas Processing Facility**, related pipelines and the two office buildings in Galeota and Port-of-Spain. BP also has a significant interest in Atlantic LNG.

Headline Issues

RCE performance / headline issues:

- Between 1998 and 2008, BPTT **reduced its average GHG Emissions by >80%** through flaring reductions offshore and operations optimization. However, no significant RSRs reported in the last few years.
- **C+ Environmental Risk – Produced Water**, managed through a Risk Action Plan ("RAP") since 2011 and owned by GOO. Operational Category C Projects have been implemented per the RAP and improvements noted in the effluent discharged. Category A project for Galeota Terminal (GEP) in Execute Stage which includes a new produced water treatment plant scheduled for start-up in 1Q 2019.
- At the end of 2016, BPTT would have successfully applied for and received **twelve (12) Certificates of Environmental Clearance (CECs)** for projects across GOO, GWO, GPO and Exploration & Reservoir Development per the BPTT ADP. Fifty eight (58) additional H&S approvals would have been sought and received for projects within the Region.
- In 2016, BPTT successfully tendered and awarded **long term contracts** for Laboratory Analysis, Waste Management and Environmental Monitoring. These contracts include locked-in rates for a 3-5 year period with price books applicable across all Functions in Region.

EMS / ISO 14001 key points:

- Region was **ISO 14001 Certified since 1999**. Last recertification audit conducted in September 2013. BPTT successfully **completed its first Attestation Audit** in October 2016 to the ISO 14001:2004 Standard and will continue with Attestation to the ISO 14001:2015 Standard from 2017 onward. While there is no legal requirement for an externally certified EMS, BPTT has made external commitments through ESIAs, ENVIIDs, etc to have an EMS.
- Active and Functional **Compliance Management System (CMS) for GOO, GWO and GPO** in Region. Regional OMS 7.1 Gap Assessments across all Functions in Region completed in September 2015 and 2016. Currently ranked at Conformance Level 3 across Region.
- **Self-Verification** exercises conducted for H&S (pre-inspections for Ministry and OSH inspections, CMS and Maximo Self-Verification) and Environment (Environmental Permit CoA, EMS Internal Audits)

External / LTO context:

- Significant improvements in relationship with HSE Regulators (EMA, MEEA, OSH) in last 5 years.

5-Year RCE Performance Data

	2012	2013	2014	2015	2016		5-Year Trend
Operated GHGs (MteCO_2e) *	0.22	0.19	0.18	0.22	0.32	–	Operational GHG emissions have remained relatively flat - some year-on-year variability driven by development activities
Carbon Intensity (teCO_2e / mboe) *	0.8	0.6	0.6	0.9	1.4	–	Emissions per unit of production have remained relatively flat
Methane Intensity (te / mboe) **	0.00	0.00	0.00	0.01	0.02	▲	Increase in 2016 largely due to improved methane calculation and reporting methodology
Flaring Intensity (te / mboe) **	0.11	0.06	0.05	0.06	0.07	▼	Overall reduction in total flaring since 2012
Real Sustainable Reductions (kteCO_2e) †	0	0	0	0	0	–	
Percentage Produced Water Reinjected	0%	0%	0%	0%	0%	–	
Oil in water concentration (ppm)	32.7	29.3	27.9	14.0	22.1	▼	
Total water withdrawal (thousand m^3)	72	43	51	71	126	–	
Production chemicals discharged (kte)	1.1	0.8	1.2	0.9	1.0	–	
Oil Spills ≥ 1 bbl ‡	2	1	1	1	0	–	
Compliance Notices ‡	-	-	-	22	19	–	
Government Reportables ‡	-	-	-	2	5	–	

* Data on a 100% of operated (gross) basis
** Data includes GOO only
† Data on an equity (net) basis for operated sites only
‡ Data includes GOO, GWO and GPO

Brazil

Brazil is preparing to start the drilling campaign in 2018. There is 1 well scheduled to be drilled in 2018 and 1 well in 2019 (1 in Foz do Amazonas basin and 1 in Barreirinhas basin). **Alignment to support partner's operations in 2017** – BP is Total's partner in the Foz do Amzaonas basin and Total, as the operator, will drill 1 well starting in Q4-2017.

New stringent environmental legislation about drilling fluids and in-situ burning (ISB) are expected for 2017. **Oil Spill response legislation** under review trying to align to internationally accepted industry's standards and good practices, expected to be issued in 2018.

External / LTO context:

- **Increased enforcement of legislation and environmental requirements** - management of drilling/completion fluids and monitoring
- **Challenges managing new requirements with new and amended regulation** coming into force, some of them generating inconsistency to existing demands and process's unpredictability
- **Conflicts among different directorates and coordinates within National Environmental management framework** leading to lack of clarity in the environmental licensing requirements.

Issues / Risks:

- **Regulations:** New safety requirements for wells and rigs, controversial drilling fluids management guidelines and discharge requirements still under discussions; introduction of oil spill response equipment sharing opportunities in new reviewed norms.
- **Environmental Programs:** New emerging requirements to be implemented – Fauna Aerial monitoring, birds at operational facilities management, environmental noise monitoring and beach monitoring.

Activity set and future developments:

- Two exploration wells planned in 2018/2019
- Advocacy in oil spill response and environmental licensing requirements.

Canada

Exploratory drilling operations in **Nova Scotia** for a one-well program are expected to commence during 2018. Work is currently underway on the environmental impact assessment and regulatory/HSE planning.

External / LTO context:

- **Engagement with First Nations** (indigenous peoples), **government/regulators** and **other key stakeholders** underway with key concerns relating to well control, impact of spills and use of dispersants.
- **Increased focus on drilling issues and spill response** (especially time required for capping stack deployment) in media and public due to Shell drilling in an adjacent lease. Conversations between Shell, regulator, and other stakeholders have focused on preventative measures.
- **Environmental impact assessment** work to meet regulatory requirements is underway.
- New basin relative to other work in the Region (OBO oil sands, arctic, Newfoundland).
- Initial planning underway for **Newfoundland** leases with Environmental & Social screening to occur in 2Q.

Issues / Risks:

- Time required to **mobilise and deploy capping stack**.
- **Regulator capacity** (small regulator and significant activity expected in 2017/18).
- **Stakeholder (fisheries and First Nations) concerns** about impact of releases and use of dispersants.

Activity set and future developments:

- Initial exploration well planned in 2018 followed by up to six additional exploration wells after a 'pause'.

Lower 48 RCE Synopsis

Overview

The Lower 48 business entity operates across a vast geography and **operates over 10,000 producing wells**. The oil and gas industry is highly regulated in the US, with even more stringent environmental regulations constantly being proposed, with many focusing specifically on methane emissions.

Headline Issues

- **L48 OMS** is designed to deliver safe, reliable and compliant operations while enabling the business to be competitive in a low-risk onshore operating environment.
- **L48 is currently exempt from BP's internal attestation** requiring BP businesses to conform to the new ISO standard in 3 years. L48's deviation from ISO 14001 certification still holds.
- **EPA and BLM have finalized several regulations which impact L48** by requiring additional emission controls, leak detection and repair programs, monitoring, inspections, testing, reporting and recordkeeping.
- **D severity RC&E risks** (no C+ risks):
  - EPA rule to lower ozone NAAQS (rule was finalized, designations per state implementation plans pending)
  - Regulations that limit hydraulic fracturing (regulations were finalized, but currently under litigation)
  - Potential loss or modification of the E&P exemption from federal hazardous waste regulations

5-Year Environmental Performance

(excludes divested properties, operated only)

	2012	2013	2014	2015	2016		5-Year Trend
Operated GHGs (MteCO_2e) *	3.33	2.82	2.56	2.70	2.77	▼	Decrease from 2011-2015 driven largely by divestments. Slight rise in 2016 due to increased production
Carbon Intensity (teCO_2e / mboe) *	27	30	30	32	29	▼	Decrease in 2016 due to increased production
Methane Intensity (te / mboe) **	0.68	0.79	0.71	0.70	0.67	▼	
Flaring Intensity (te / mboe) **	0.19	0.16	0.09	0.09	0.11	▼	
Real Sustainable Reductions (kteCO_2e) †	0.0	0.0	0.0	0.4	6.5	–	2016 RSR resulted from commissioning of a Waste Heat Recovery Unit at the Florida River Central Delivery Point
Percentage Produced Water Reinjected	98%	98%	99%	99%	99%	–	
Oil in water concentration (ppm)	0.0	0.0	0.0	0.0	0.0	–	
Total water withdrawal (thousand m^3)	1,124	895	683	2,180	1,292	▼	Reduction in well count compared to 2015
Production chemicals discharged (kte)	0.0	0.0	0.0	0.0	0.0	–	
Oil Spills ≥ 1 bbl ‡	20	20	12	18	23	▼	
Compliance Notices ‡	9	5	4	2	2	▼	
Government Reportables ‡	60	77	42	48	72	▲	

* Data on a 100% of operated (gross) basis
** Data includes GOO only
† Data on an equity (net) basis for operated sites only
‡ Data includes GOO, GWO and GPO

Appendix 1: GOO Greenhouse Gas KPI Definitions

Flaring Intensity:

What:

$$Flaring\ Intensity = \frac{Total\ Flaring\ [Te]}{Production + Throughput\ [mboe]}$$

- **Total Flaring** includes all production gas flared from BP operated assets
- **Production + Throughput** includes total exported production as well as terminal / pipeline throughput (BP operated)

Why:

- Increasing external focus on flaring – e.g. *World Bank Zero Routine Flaring by 2030* (WB30)
- Flaring Intensity is normalised by production, and therefore enables better comparison between assets / years than Total Flaring

Methane Intensity:

What:

$$Methane\ Intensity = \frac{Total\ Methane\ [Te]}{Production + Throughput\ [mboe]}$$

- **Total Methane** includes all emissions of methane (CH4) from BP operated assets
- **Production + Throughput** includes total exported production as well as terminal / pipeline throughput (BP operated)

Why:

- Increasing external focus on methane e.g. *Climate & Clean Air Coalition (CCAC) Oil & Gas Methane Partnership*
- Demonstrating methane emissions management is integral to "*the case for gas*" in a low carbon economy
- Methane Intensity is normalised by production, and therefore enables better comparison between assets / years than total methane

Real Sustainable Reductions (RSRs):

What:

- RSRs are defined as "**an intervention which has led to a quantifiable, permanent reduction in GHGs which would not have occurred in the absence of the intervention**"
- RSRs include both CO_2 and CH_4 reductions expressed in tonnes of CO_2 equivalent (CO_2 + 25 x CH_4 where 25 is the Global Warming Potential for Methane over 100 years)

Why:

- To demonstrate continued emissions reductions. BP reports RSRs in the Sustainability Report
- Increasingly important given external focus on climate change and the role of oil and gas

For further information contact Sue Ford or Rob O'Brien in the Upstream HSE Regulatory Compliance & Environment team.

Appendix 2: External Use Charts

This page will be updated following publication of the BP 2016 Sustainability Report.

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