

A.3 The United Kingdom

Overview of Onshore and Offshore Gas Flaring and Venting in the United Kingdom

The U.K. Offshore Operators Association (UKOOA)⁹² calculates quantities of waste gases produced by its members, including oil and gas operators. Using 2001 data, it calculated that the oil and gas operators' CO₂ emissions represent some 4.5 percent of overall U.K. emissions. Out of that percentage, about 71 percent of offshore CO₂ emissions are from gas consumed in turbines (that is, fuel gas), with an additional 20 percent from flaring. Venting accounts for only 0.05 percent of the industry's total atmospheric emissions.

Table A.5 shows how gas flaring fell between 1996 and 2001 by about 20 percent.

Table A.5 Gas Flared Onshore and Offshore 1996–2001

Year	Gas flared (tons)		
	Onshore	Offshore	Total
1996	253,686	2,054,542	2,308,228
1997	182,586	1,860,947	2,043,533
1998	169,177	1,886,572	2,055,749
1999	179,736	1,768,184	1,947,920
2000	282,488	1,688,512	1,971,000
2001	265,424	1,561,694	1,827,118

Source: UKOOA

U.K.'s Government Policy on Gas Flaring and Venting

The U.K.'s government policy on gas flaring and venting has to be assessed within its overall policy objectives in regard to:

- Maximizing economic recovery of the U.K.'s oil and gas reserves
- Reducing greenhouse gas emissions.

Under the Kyoto Protocol the United Kingdom has a legally binding target to reduce a basket of six greenhouse gases by 12.5 percent below 1990 levels in the period 2008–2012. The United Kingdom further set a domestic goal to cut CO₂ emissions by 20 percent below 1990 levels by 2010.

To achieve those targets the U.K. government issued a policy statement in November 2000⁹³ specifying detailed policies and measures and containing a balanced package across all sectors to tackle climate change and emission reductions.

⁹² UKOOA is the representative organization for the U.K. offshore oil and gas industry. Its members are companies licensed by the government to explore for and produce oil and gas in U.K. waters. UKOOA currently has over 30 members, including all major oil and gas companies.

⁹³ *Climate Change: The U.K. Programme*, Department for the Environment, Transport and the Regions, November 2000

At the same time the government not only has policy objectives to achieve environmental targets, but also to maximize economic recovery of the United Kingdom's oil and gas resources. Hence, in assessing proposals for new field development, the government considers the following policy objectives:⁹⁴

- Ensuring the recovery of all economic hydrocarbon reserves
- Ensuring adequate and competitive provision of pipelines and facilities
- Taking proper account of environmental impacts and the interests of other users of the sea.

The government specifies that no single policy objective takes precedence, and where a conflict arises, the relative merits of each will be viewed in light of particular facts of the oil and gas field proposal on a "case-to-case basis."

Who Regulates Gas Flaring and Venting in the United Kingdom?

The Licensing and Consents Unit of the Department of Trade and Industry (DTI)⁹⁵ is responsible for developing and coordinating government policy related to:

- The oil and gas fields on the land territory of Great Britain (onshore)
- The U.K.'s territorial waters and on the U.K. Continental Shelf (UKCS) (offshore).

DTI is responsible not only for policy issues but also for regulating the upstream gas and oil markets through powers given in the Petroleum Act.⁹⁶ These responsibilities include regulating and supervising gas flaring and venting. Under the Energy Act 1976, *consent* of the secretary of state for trade and industry⁹⁷ is required for the disposal of natural gas (whether at source or elsewhere) by flaring or by releasing it unignited into the atmosphere (venting).⁹⁸ This applies to all onshore hydrocarbon fields as well as offshore fields.

There are also other departments and government institutions that have responsibilities in regard to gas flaring and venting, including local authorities that assess the likely impact of "noise and vibration" of onshore gas flaring.⁹⁹ However, the ultimate responsibility of issuing gas flaring and venting consents lies with DTI.

The Environment Agency and the Scottish Environment Agency also issue stringent consents regarding emissions from onshore operations.

⁹⁴ Guidance Notes on Procedures for Regulating Offshore Oil and Gas Field Development.

⁹⁵ www.og.dti.gov.uk.

⁹⁶ Petroleum Act 1998. "Petroleum" as defined under the Act includes any mineral oil or relative hydrocarbon and natural gas existing in its natural condition in strata. Please refer to Chapter 17, Section 1, of the Act.

⁹⁷ The secretary of state for Trade and Industry has the overall responsibility for the Department.

⁹⁸ Consent for flaring is also required under The Petroleum (Current Model Clauses) Order 1999.

⁹⁹ Environmental legislation applicable to the Onshore Hydrocarbon Industry (England, Scotland, and Wales).

How Has Gas Flaring and Venting Regulation Been Conducted?

The question of how regulation is being conducted refers to the translation of government policy objectives into detailed regulations that best ensure that those objectives are achieved in an efficient and transparent manner.

Issues that have been addressed in this context are:

- In which legislation has gas flaring/venting been embedded?
- What types of regulation have been implemented?
- Which processes and procedures have been adopted?

Gas Flaring and Venting Legislation

The following laws and regulations govern gas flaring and venting in the United Kingdom:

- *Primary legislation:* Energy Act 1976, Petroleum Act 1998; Petroleum (Current Model Clauses) Order 1999; Environmental Legislation applicable to the Onshore Hydrocarbon Industry (England, Scotland, and Wales); The Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999
- *Key instruments for invoking primary legislation:* Onshore (that is, Petroleum Exploration and Development Licenses); Offshore (that is, Exploration¹⁰⁰ and Production Licenses¹⁰¹); Guidance Notes on Procedures for Regulating Offshore Oil and Gas Field Developments; Field Development Program; Venting and Flaring Consents; Offshore Pipeline Works Authorizations.

Primary legislation gives DTI the power to regulate onshore and offshore gas production and exploration and gas flaring and venting. It also gives DTI the power to approve and issue flare and gas consents for onshore and offshore fields. Other agencies, such as local authorities, also have powers under primary legislation. For example, environmental legislation specifies that new onshore developments will be assessed by the local authorities on the likely impacts of “noise and vibration” of gas flaring and venting as part of the overall planning approval process.

Types of Regulations

Flare and Venting Consent

The flare and venting consent is a key regulatory instrument applied by DTI to control the volume of gas flared and vented and approve the amount of gas each facility and site can flare and vent each year.

DTI issues licenses and is responsible for authorizing the development of new gas and oil fields.¹⁰² Licensees submit a Field Development Plan for approval. Operators are given the opportunity to make representations about relevant technical and financial factors before DTI

¹⁰⁰ Production, or any drilling deeper than 350m, is not permitted under an Exploration License.

¹⁰¹ The main type of offshore license is the Seaward License, of which DTI has now granted more than a thousand.

¹⁰² As with any licensing system, many of the detailed regulatory provisions are laid down in conditions attached to the licenses. The Petroleum Act is rather unusual in that these conditions (“Model Clauses”) are published in secondary legislation.

determines whether to grant approval. If approved, a Production and Development consent will be issued.

Before startup, operators must submit a written application for the consent to flare and vent gas, specifying the proposed date the flaring or use of gas is to commence. This date must be not less than two months from the date the application is submitted, unless DTI notifies the operator of a shorter period as a consequence of the development plan approval procedure.

Consents are given mainly in the context of development plan approvals. Prior consents are not required for unanticipated flaring that is necessary to avoid personal injury. DTI requires licensees to keep flaring to the minimum that is technically and economically justified, including the flaring of gas during extended well tests. These may also require consent. Particular attention will be given to the facility's design, the potential for gas reinjection, and in the facility's commissioning program to ensure that all steps are taken to reduce the need for flaring.

For fields in the commissioning stage, or where there have been particular problems, operators are required to submit regular reports to DTI regarding the amounts being flared. Operators are also required to submit details of production and flare rates. These are published on the DTI website following a three-month confidentiality period.

There are currently no financial penalties for gas flaring and venting in breach of a consent. However, a breach of a consent is considered grounds for revoking an operator's license.

Field operators on short-term consents are required to provide DTI with detailed reports (weekly or monthly or at longer intervals as agreed) of production, flaring, efficiency of the plant, any technical problems, and so forth. Operators then have to justify their application for the next consent period. These consents are considered on a case-by-case basis. For companies on annual consents DTI will not issue a consent for the following year until it is satisfied that the amounts being requested are justified from a technical and economic point of view. Though production consents and venting may be issued to cover several years, the maximum offshore flaring consent is one year.

Technical and Operational Regulations and Restrictions

Technical and operational regulations typically apply to:

- Burn technology and practices
- Timing of burning and venting
- Location of flaring and venting
- Heat and noise generation.

In the United Kingdom., technical and operational requirements are set out in guidelines and codes of conduct issued by the oil industry. The UKOOA publishes guidelines on reducing emissions and maintaining flaring and venting safety.

Regulatory Processes and Procedures

Field Development Program

The documentation required for new oil and gas field authorizations is the Field Development Program (FDP).¹⁰³ The FDP provides a summary description of the actual field development and the principles and objectives that will govern its management. The FDP includes provision of how the operator plans to deal with flaring and venting of gas.

As part of the assessment process of a new field development, the operator is required to provide a spreadsheet called the Common Reporting Format (CRF), which provides detailed information on the new field and will help DTI to make an efficient assessment. The spreadsheet includes projections of annual gas flaring and venting in the field.¹⁰⁴

A new field development will be authorized once the secretary of state is satisfied that the FDP meets the government's policy objectives and the Environmental Impact Assessment (EIA)¹⁰⁵ process has been completed successfully. An EIA is mandatory for all developments where the level of oil production is intended to exceed 500 metric tons a day (3,750 barrels per day).¹⁰⁶

For new oil field developments, DTI expects that where, over the life of the field, the value of the produced gas is higher than the costs of bringing it to the market, the licensees will make provisions for its processing and transportation to shore. In considering whether the gas should be brought to the market, DTI will regard the overall costs and benefits that may not reflect the commercial positions of individual licensees.¹⁰⁷

If it is not economic to bring gas to shore, the licensees should carefully consider:

- Its use as a fuel
- It as a means of improving oil recovery
- Conversion to other fuels
- Injection for disposal
- Sale to a neighboring development
- Flaring/venting.

The option that maximizes the economic recovery of the field would normally be selected.

¹⁰³ The norm for Field Development Program documentation for all fields is a maximum of about 15 pages of text plus associated figures.

¹⁰⁴ A copy is available on www.og.dti.gov.uk/upstream/field_development/CommonReportingFormat.xls.

¹⁰⁵ The Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999 came into force on March 14, 1999. These regulations implement the European Council Directive on the Assessment of the Effects of Certain Public and Private Projects on the Environment insofar as it relates to certain offshore oil and gas projects' effects on the environment. Please note that the public has the right to comment on the Environmental Statement, and the secretary of state must be satisfied that the regulations' requirements relating to publicity and consultation have been substantially met.

¹⁰⁶ Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999.

¹⁰⁷ In this context, where gas transportation and processing involves the use of third-party infrastructure, in the first instance, access to those facilities is a matter of commercial negotiations. The secretary of state may, however, use his or her discretionary powers under the Petroleum Act 1998 to set charges or to require access to infrastructure if the parties cannot agree.

Gas Flaring and Venting during Commissioning

Appendix 9 of the Guidance Notes¹⁰⁸ provides further details on the procedures for dealing with gas flaring and venting during the commissioning phase of new field developments.

It is DTI's policy that gas flaring during commissioning should be kept to its lowest level that is consistent with the safe and efficient commissioning of oil- and gas-related plants.

To achieve this the operator should:

- Take the initiative in keeping in close contact with DTI at all stages, from design through construction (during the commissioning process, DTI will insist on regular meetings)
- Demonstrate that all reasonable steps have been taken to keep flaring and venting to a minimum.

The following points should be noted in this respect.

a. Plant design

Should the operator propose any venting of hydrocarbons, for example, from low-pressure drains, rather than disposing of them via the flare system, this should be discussed with DTI at the earliest opportunity.

b. Hookup and installation planning

All gas plants must be complete, fully leak tested, and otherwise tested and commissioned as far as is practicable, and able to receive gas, before First Oil. A gas flaring consent will not be issued until DTI is satisfied that the system is ready to receive gas as soon as stabilized flow is achieved.

c. Commissioning gas flaring and venting consent applications

These should be submitted at least two months before First Oil and should contain the following:

- A summary of the main points in the application.
- A summary of the main flaring assumptions.
- A detailed description of the plant startup procedures and philosophy.
- The commissioning schedule.
- Flaring calculations—to include flaring on a daily basis and total quantities. Where the gas stream contains a significant proportion of nonhydrocarbon gas a Venting Consent may also be required. The quantities of gas stated in the Venting Consent application should be on the same basis as the hydrocarbon gas in the Flaring Consent application.
- Commissioning gas flaring consents.

¹⁰⁸ Guidance Notes on Procedures for Regulating Offshore Oil and Gas Field Development.

Initially, these consents are short term, generally given on a monthly basis until stable plant operation is achieved. During the consent period, the operator is required to e-mail to DTI the following information every Monday relating to the previous week:

- A short technical summary of the gas handling plant's performance, highlighting any features that have affected or could affect the plant's operation
- Daily rates of oil production, gas production, gas export, gas used for fuel, and of gas flare
- Cumulative average for production and flare
- Weekly calculations of gas compression plant efficiency

DTI issued the following gas flaring and venting guidelines:

- During the commissioning of production facilities, flaring consents will usually be restricted to between one and three months and will be for a fixed quantity of gas based on an auditable program.¹⁰⁹
- Once stable operating conditions have been achieved, the duration of the consent will be increased to 12 months and will be subject to an agreed cumulative maximum for the period.

Gas Flaring and Venting at Existing Fields

A policy requirement for checking gas flaring and venting at existing fields is the Annual Field Report (AFR). Annual Field Reports ensure that operators are carrying out the work agreed in the Field Development Plan and highlight any new plans for the coming year. Production and flare figures are mentioned in the AFRs, but the main objective of the AFR is to supplement the Field Development Plan. Reporting periods for existing fields are annual, and production data, including gas flared and vented, are included in the Annual Field Reports.

Although Appendix 6 of the Guidance Notes¹¹⁰ illustrate how to prepare an AFR,¹¹¹ most operators have been using their own definitions of production metrics, loss analysis, and reporting formats.

To measure the performance of all the fields against a common and consistent set of performance indicators, DTI has recently issued a consultation paper¹¹² that proposes a wide range of performance indicators for measuring the production efficiency of UKCS offshore oil and gas production facilities. For gas flaring and venting, the following proposed measurements are of particular relevance:

¹⁰⁹ During the initial commissioning period, monthly reports may be requested, in which case the data should be presented on a monthly basis with rolling averages for the year to date. In regard to gas flaring, reasons must be given for any deviations from the production target flare figure and measures taken to minimize wasteful flaring and venting of gas.

¹¹⁰ Guidance Notes on Procedures for Regulating Offshore Oil and Gas Field Developments.

¹¹¹ A field report normally will be required annually, but for simple or well-understood mature fields with minimal flaring, the reporting should become less frequent.

¹¹² Performance Metrics for Measuring the Production Efficiency of UKCS Offshore Oil and Gas Production Facilities.

- **Gas Use Efficiency**

$$1 - \left(\frac{\text{volume of gas flared in 12 months}}{\text{volume of gas produced in 12 months}} \right) = X\%$$
- **Flare Ratio**

$$1 - \left(\frac{\text{daily volume gas flared}}{\text{daily volume of gas produced}} \right) = X\%$$

This will be expressed as a daily percentage and presented graphically over the 12-month reporting period. Flaring-related metrics would require daily production and flaring data to be recorded.

Flare Transfer Pilot Trading Scheme

The above sections describe the current regulatory framework for gas flaring and venting in the United Kingdom and show that over the last decade the U.K. oil industry has achieved substantial reductions in gas flaring without compromising oil production. These reductions have been achieved mostly by regulation of gas flaring and venting, increased plant efficiency, adoption of best working practices, and an increased awareness of the environment.

The government recognized that if the downward trend in flare volumes released was to continue, a further mechanism that created economic incentives for companies to reduce gas flaring would be needed. This consideration has led to the development of the Flare Transfer Pilot Trading Scheme (FTPTS).

Launch of FTPTS

The FTPTS is a voluntary scheme arising from an industry-government initiative and currently encompasses about 50 percent of the commissioned fields within the UKCS.¹¹³

The aim was to develop a flexible and economically efficient mechanism to create incentives for oil companies to further reduce gas flaring beyond the annual flare consent.

The FTPTS is aligned, as far as possible, with the U.K. Emission Trading Scheme (UKETS),¹¹⁴ and a longer-term possibility could be to integrate this flare transfer system with the wider domestic and international emission trading schemes. As a consequence, any credits would need to be acceptable in the domestic and international carbon market.

¹¹³ Onshore fields were not included because they were already covered by the UKETS run by Department for Environment, Food and Rural Affairs (DEFRA). This scheme involves monetary trades, while the FTPTS is purely voluntary and was introduced to get companies used to the benefits of trading while ensuring that the overall consent amount for those in the scheme was not raised. DTI is currently considering whether onshore terminals should be included in the scheme.

¹¹⁴ DEFRA, The U.K. Emission Trading Scheme, October 2002

A Rules Book¹¹⁵ was issued in October 2000 (updated annually) that set out the governance of the scheme and definitions of the transfer mechanisms between “buyer” and “seller,” and the FTPTS was officially launched on January 1, 2001.

Two Trading Schemes

Two scenarios exist under which the scheme operates, and both are made possible through a voluntary agreement between operators, including:

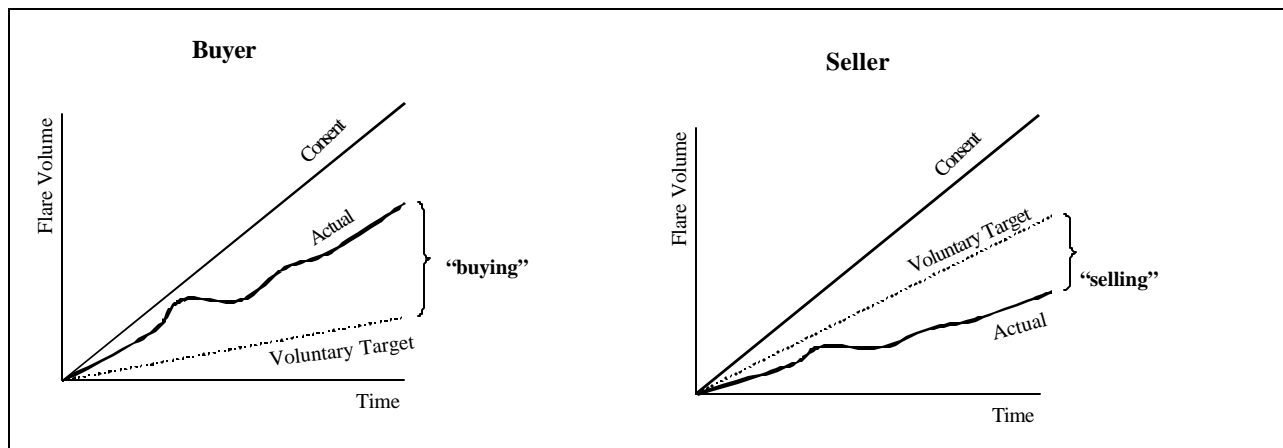
- Transfer of flare by assets operating within flare gas volume consents
- Transfer of flare gas volume by revision of flare consents.

Flare consents, which are issued on a field-by-field basis, typically contain an element for safety purposes and for unforeseen contingencies. It is in this contingency element where further flare reductions can be found. The flare-trading scheme provides the framework for operators to trade their unused contingency, while maintaining the flare consent and oil production targets from their fields.

As a first step, “voluntary asset targets” are set by individual companies for their own assets.¹¹⁶ Those voluntary targets are below the flare consent agreed on with DTI. Voluntary targets set by each company are publicly available. Both consent and voluntary targets may be changed if trades take place. One benefit of the scheme is that companies do not have to come to DTI to justify why an increase in their consent may be necessary, but they can obtain the necessary amounts from members. DTI brokers the transfer and issues the revised legal consents.

Because of a complex operating environment for oil exploration and production, actual flaring might be higher or lower than the voluntary target but still lower than the flare consent agreed with DTI. The scheme provides flexibility for those companies that are below or above the target to transfer (buy and sell) flare between sites and companies. Figure A.6 illustrates how the scheme works.

Figure A.6 Flare Transfer by Assets Operating within Flare Consents

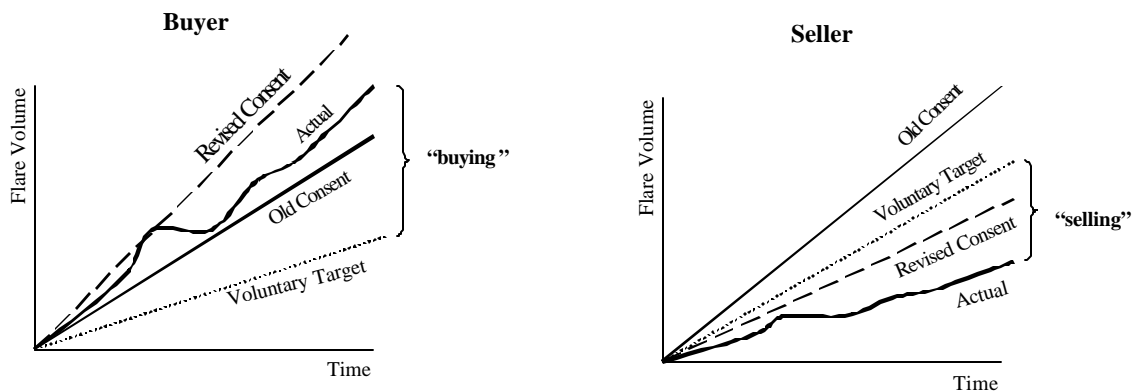


¹¹⁵ In 2000 several workshops were held at which industry representatives met with the government to determine the price mechanisms for governing the scheme.

¹¹⁶ Operators use internal methodologies to determine the level of contingency element built into their voluntary consents that could be used to contribute to reducing flare volumes below the flare consent issued by the department.

The above scenario describes a situation where companies remain within their department-approved flare consent. The FTPTS scheme also has provisions for the scenario whereby an operator anticipates that the flare consent could be exceeded because of unforeseen operational upsets. The scheme allows for one or more operators to agree to transfer flare volume to another flare consent, provided the sellers reduce their flare consent by the commensurate amount. As the flare consents regime requires legal compliance, any consent revision requires official approval by the regulator (DTI). Figure A.7 illustrates that scenario.

Figure A.7 Flare Transfer by Consent Revision



Monitoring and Measurement

Currently, a consultation process is being held with the objective of producing guidance for measurement and verification of the FTPTS. A document was produced that proposed three measurement categories be defined, each relating to how accurately a quantity of flared gas can be determined.¹¹⁷ By applying such categories, a financial incentive is inferred on measuring flare gas more accurately and should warrant an economic case for installing more accurate technology, thereby encouraging more efficient trading.

Other Measures That Affect Gas Flaring and Venting Volumes in the United Kingdom

The United Kingdom government has created incentives in the upstream and downstream gas market that have improved the economics of gas flaring and venting.¹¹⁸ Those incentives include:

- Restructuring and unbundling of the downstream gas market
- Third-party access (TPA) to the upstream gas pipeline network
- Wholesale and retail competition in downstream gas and electricity markets.

Restructuring of the U.K. gas market started in 1986 with the privatization of British Gas in 1986. Since then the industry has been fully unbundled into a legally separate network company

¹¹⁷ Proposal for a Measurement, Verification and Discount Scheme.

¹¹⁸ The U.K. government has not provided any direct fiscal incentives, such as tax breaks, to oil companies to reduce flaring and venting.

