

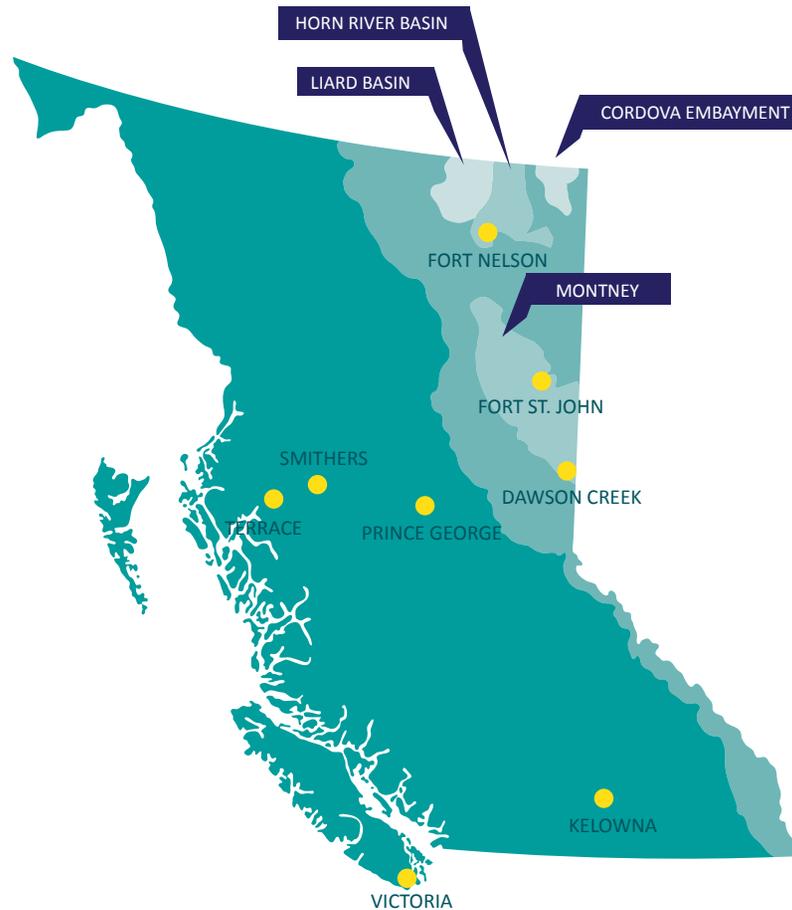
Air Summary

2014 | BC Oil and Gas Commission



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Commission office locations and major B.C. natural gas plays

ABOUT US

The BC Oil and Gas Commission is the single-window regulatory agency with responsibilities for regulating oil and gas activities in B.C., including exploration, development, pipeline transportation and reclamation.

The Commission's core services include reviewing and assessing applications for industry activity, consulting with First Nations, cooperating with partner agencies, and ensuring industry complies with provincial legislation and all regulatory requirements. The public interest is protected by ensuring public safety, respecting those affected by oil and gas activities, conserving the environment, and ensuring equitable participation in production.

For general information about the Commission, please visit www.bcogc.ca or phone 250-794-5200.



About the Air Summary

This Air Summary provides information on air quality and related initiatives for oil and gas activities regulated by the BC Oil and Gas Commission (Commission) in the 2014 calendar year.

The provincial government's [B.C. Energy Plan](#) sets overarching regulatory and policy guidance for the Commission. Further direction is provided by the [B.C. Natural Gas Strategy](#) and accompanying [Liquefied Natural Gas: A Strategy for B.C.'s Newest Industry](#).

Specific authorities related to air quality the Commission is directly responsible for regulating include:

- Producing and administering the [Flaring and Venting Reduction Guideline](#). Adherence is ensured through site inspections and regular interaction with oil and gas operators.
- Site-specific authorizations for upstream oil and gas operations. Each authorization contains allowable discharge limits for air and water, along with monitoring and reporting requirements. Compliance is ensured through site inspections and monitoring.
- Facilities registered under the [B.C. Oil and Gas Waste Regulation](#). Each facility is required to meet defined environmental standards. Compliance is ensured by site inspections and reviewing submitted information.

What types of emissions come from oil and gas activities?

Greenhouse Gases (GHGs)

Emissions associated with oil and gas activities are classified as either GHGs or air contaminants. GHGs allow the sun's rays to pass through and warm the earth, but keep air close to the earth's surface warmer than it otherwise would be.

Every two years, the Ministry of Environment releases the [Greenhouse Gas Inventory Report](#) that includes all B.C. GHG releases. The 2012 report was released in 2014, and the next report will be available in 2016.

As shown in Figure 1, in 2012 oil and gas operations accounted for 16 per cent of total provincial GHG emissions, according to reported data.

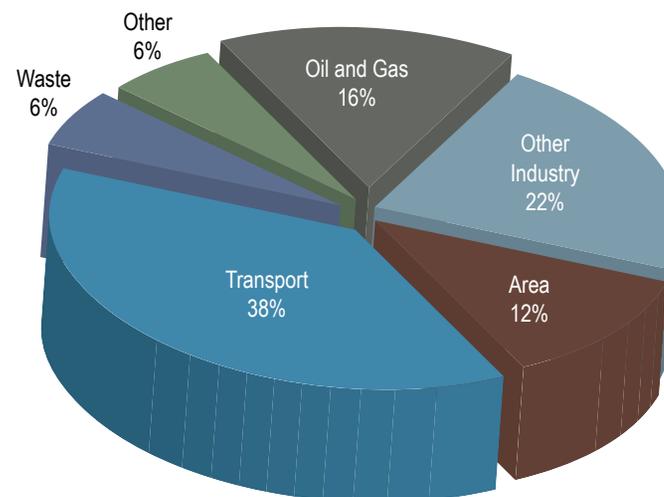


Figure 1 – B.C. GHGs by Source (2012)¹

¹ "Other Industry" – emissions from all industrial sources, excluding upstream oil and gas.
"Area" – emissions from smaller sources such as residential, commercial and industrial heating.
"Transport" – emissions from motor vehicles, marine, aviation and rail.
"Waste" – emissions from landfill releases.
"Other" – considers deforestation and afforestation.

Where do oil and gas GHGs come from?

Total GHG emissions from the oil and gas sector in 2012 were 9,990 kilotonnes. Figure 2 shows oil and gas GHG emissions by source.

PRODUCTION

Emissions are from gathering compressor fuel combustion, and flaring during well cleanup, testing and underbalanced drilling.



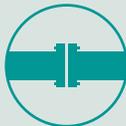
PROCESSING

Emissions are from combustion of natural gas to power processing plants, and flaring at gas processing plants and production facilities for safety reasons, maintenance and during process upsets.



TRANSMISSION

Emissions are from the operation of compressor station fuel combustion.



GHG data is derived from the Ministry of Environment's 2012 Greenhouse Gas Inventory Report

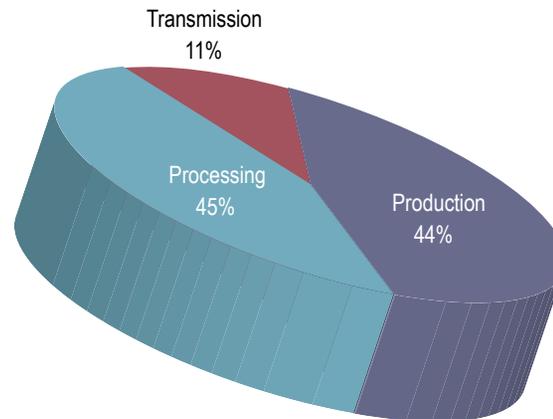


Figure 2 – Oil and Gas Industry GHG Sources by Percentage (2012)

Did you know...
Flaring emits considerably less greenhouse gas compared to venting.

Air Contaminants

Air contaminants are gases, liquids and particles in the air that have chemical properties that can impact air quality. The primary air contaminants emitted by the oil and gas industry are sulphur oxides (SO_x) and nitrogen oxides (NO_x). The [National Air Pollutant Release Inventory](#) tracks emission releases from all sources in Canada, including NO_x and SO_x (the latest data available is for 2013).

Upstream² oil and gas sources (noted in the inventory's data tables as Upstream Petroleum Industry) are attributed to 37.5 kilotonnes, or 45 per cent of the B.C. total for SO_x emissions. NO_x from oil and gas sources account for 61.3 tonnes, or 22 per cent of the B.C. total.

Total provincial breakdowns are shown in Figure 2 and Figure 3.

Others

Other air pollutants released from oil and gas operations show lower contributions. Volatile organic compounds (VOCs) account for 11 per cent of the provincial total, and carbon monoxide (CO) also accounts for 11 per cent of the provincial total.

VOCs can come from a wide variety of sources, while CO releases are the result of fuel combustion. Particulate emissions (and fine fraction breakdowns of PM₁₀ and PM_{2.5}) for oil and gas are indicated to be low in relation to overall provincial totals (one per cent or less).

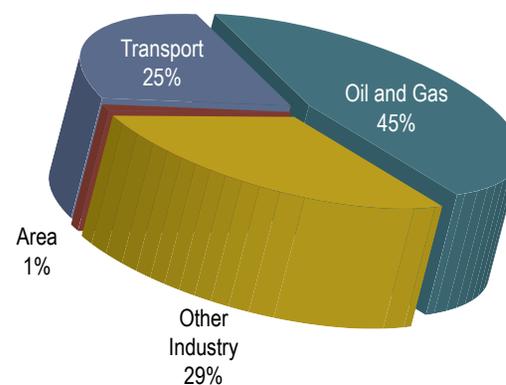


Figure 2 – Provincial SO_x Percentage by Source

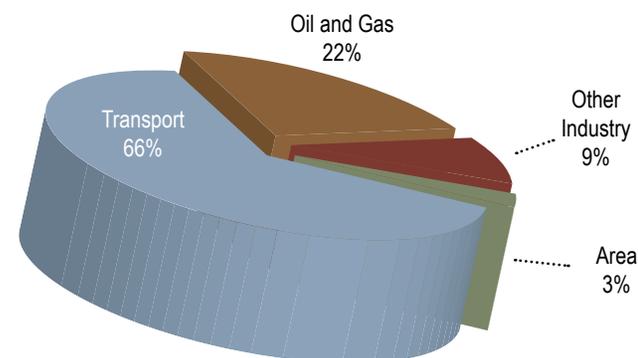


Figure 3 – Provincial NO_x Percentage by Source

² Upstream refers to exploration, production, processing and transmission stages of oil and gas activities.

Air Quality Initiatives

The Commission has a number of initiatives created to assist in studying, reporting and reducing emissions related to oil and gas activities in northern B.C.

Air Quality Website

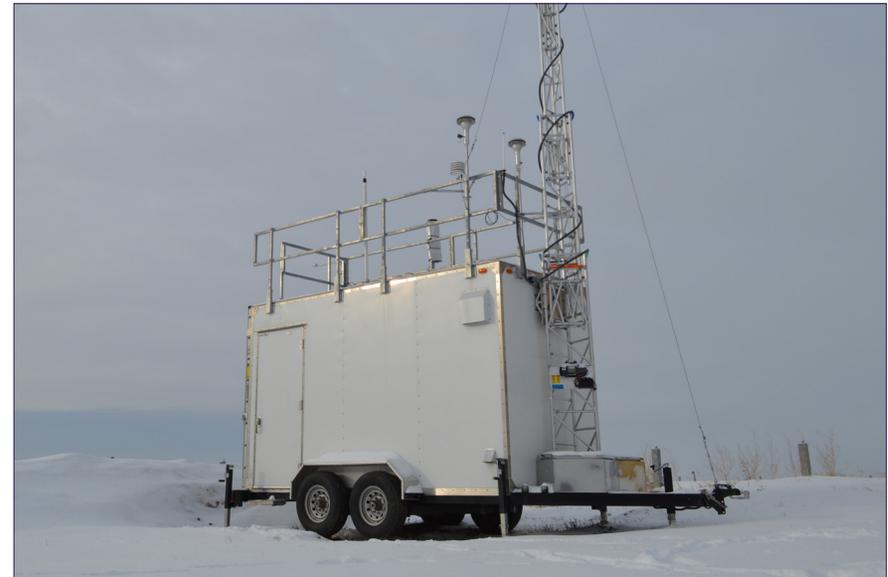
The Commission launched an [air quality website](#) to provide the public, First Nations and industry information and data on air quality as it relates to the oil and gas industry in B.C.

The website provides information on the [Commission Air Monitoring Environmental Laboratory \(CAMEL\)](#), the [Northeast B.C. Air Monitoring Project](#), authorizations under the [BC Environmental Management Act](#), and flaring data reports from previous years.

Northeast Air Monitoring Project

The Commission participates in the Northeast Air Monitoring Project, which is led by the Ministry of the Environment with input from Ministry of Natural Gas Development (MNGD) and industry. Through the program, eight monitoring stations measure air pollutants commonly associated with oil and gas development.

Air quality in the region is monitored in order to make informed decisions about public health, pollution management and the protection of sensitive ecosystems. Through the project, three new stations were recently installed in Doig River, Farmington and Tomslake.



Mobile Air Monitoring

The CAMEL is a mobile unit equipped with a full suite of sensory equipment to measure air pollutants. It allows the Commission to respond to concerns around air quality in relation to oil and gas development, and is designed to measure air pollutants (particulate matter, ozone, carbon monoxide, nitrogen oxides, sulphur dioxide, total reduced sulphur, hydrocarbons and light scattering) and atmospheric conditions (temperature, wind speed and direction, solar radiation and rainfall).

Environmental Management Act Permits

The Commission administers Environmental Management Act (EMA) permits for B.C. oil and gas operations that are unique, complex or have variable technology, such as gas processing plants. EMA permits are accessible online [here](#)³. To access EMA permits the Commission administers select the following information:

- Authorization Type > Permit
- Waste Type > Air
- Region > Oil and Gas Commission

Note that before a search completes a date range of a year or less is required.

Oil and Gas Waste Regulation

B.C.'s [Oil and Gas Waste Regulation](#), administered by the Commission, places conditions on oil and gas operations that are smaller in size relative to facilities permitted under EMA.

To access air registrations enter the following after opening the [EMA Permit Site](#):

- Authorization site > Oil & Gas Waste Regulation (Facility Registration)
- Waste Type > Air
- Region > Oil and Gas Commission

Did you know...

Some oil and gas operations in northeast B.C. utilize the process of injecting hydrogen sulphide and CO₂ deep underground into disposal wells. This means these operations avoid flaring or venting emissions, and are safely contained in accordance with Commission requirements.

³ <https://j200.gov.bc.ca/pub/ams/default.aspx?possepresentation=documentsearch>

Flaring

Flaring is conducted in accordance with the [Flaring and Venting Reduction Guideline](#). The guideline provides regulatory guidance to operators for flaring, venting and incinerating at all wellsites, facilities and pipelines regulated under the [Oil and Gas Activities Act](#). Released in 2008, it is reviewed regularly and updated as required. The main purposes of the guideline are to:

- Reduce or eliminate flaring and venting.
- Outline flaring volume thresholds and time limits.
- Detail requirements for public notification.
- Outline requirements for flare stacks and incinerators.
- Outline documentation requirements.

What is Flaring?

Flaring is the burning of natural gas that cannot be processed or sold. It is a necessity for certain aspects of oil and gas production, and is primarily conducted to ensure the safe operation of facilities. All flaring in B.C. must be conducted in accordance with Commission regulations and government air quality objectives and standards.



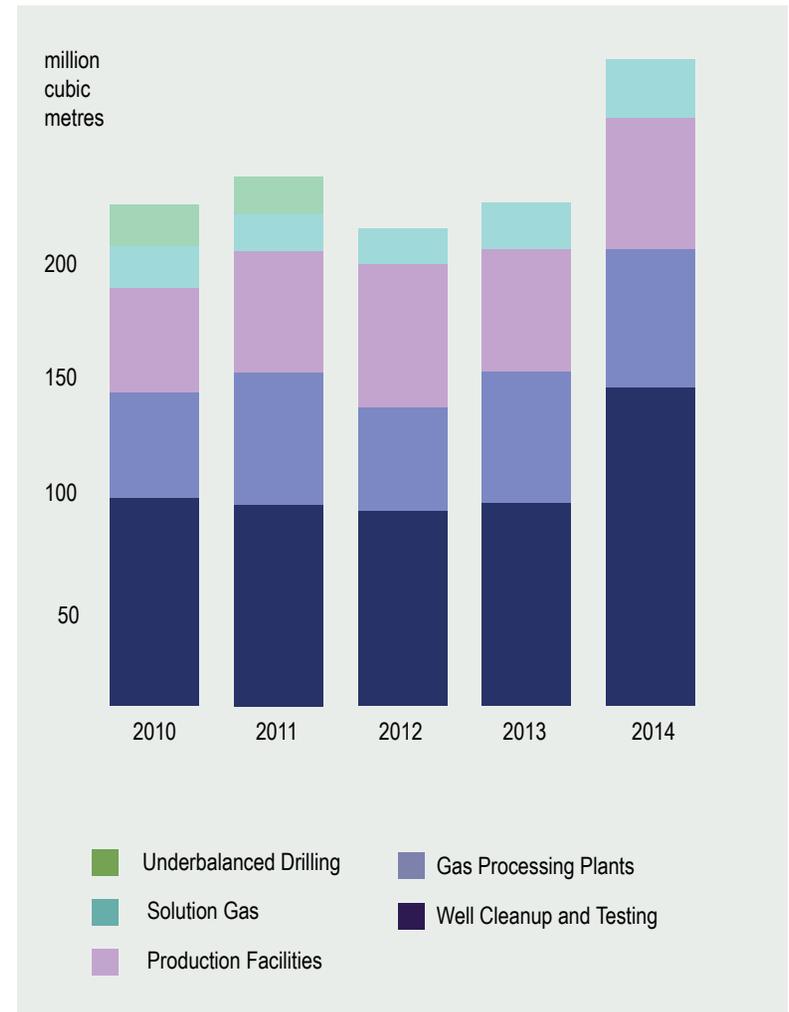
Summary of Flared Volumes

Overall, flaring levels in 2014 increased 22 per cent over 2013 levels, due primarily to increased exploratory drilling and well testing. The five sources of flaring are broken down in Table 1 and Figure 1. Data for flared volumes from 1996-2014 is in Appendices 1 and 2.

Table 1 – Flared volumes by source 2010-2014 (million cubic metres)

Source	2010	2011	2012	2013	2014
Well Cleanup and Testing	75.9	73.5	71.3	74.2	116.3
Gas Processing Plants	38.8	48.3	37.7	47.8	50.8
Production Facilities	37.9	44.3	52.7	45.1	47.7
Solution Gas	15.5	13.8	12.8	16.8	21.5
Underbalanced Drilling	15	13.6	0.1	0	0
Total	183.1	193.5	174.6	183.9	236.3
Solution Gas Production	472	426	469	477	583
Solution Gas Flared	15.5	13.8	12.8	16.8	23.3
% Conserved	97%	97%	97%	96%	96%

Figure 1 – Flared volumes broken down by source 2010-2014



Sources of Flared Volumes

Flared volumes from year to year are dependent primarily on activity levels, but also types of recovery techniques used and locations of oil and gas activities. Due to flaring reduction efforts, levels have declined significantly since 1996. Fluctuations in flaring levels in recent years are mainly attributed to increases or decreases in production. The following is a breakdown of 2014 flaring sources.

Production

Production Facilities: Production flaring occurs at production facilities during underbalanced drilling, for well cleanup and testing and for solution gas disposal.

Underbalanced Drilling: This drilling procedure is used to drill natural gas wells wherein wellbore pressure is kept lower than fluid pressure in the formation being drilled. There was no flaring from underbalanced drilling in 2014.

Well Cleanup and Testing: These are conducted once a well has completed drilling and prior to placing it into production. Well cleanup flaring ensures sufficient contaminants have been removed from the gas stream to allow the well to produce safely, and well testing involves flowing a well so pressure and flow data can be collected.

Flaring from these sources increased 36 per cent between 2013 and 2014, largely due to an increase in exploration in the North Montney. Flaring volumes are anticipated to decrease as infrastructure is built to gather and process gas.

Solution Gas: This occurs at oil producing wells and batteries. Operators are required to conserve solution gas that meets an economic threshold as defined in the [Flaring Venting and Reduction Guideline](#). There was a 22 per cent increase in solution gas flaring between 2013 and 2014, due to low gas prices making some gas conservation uneconomical.

Processing

Gas processing plants: Flaring occurs at gas processing plants primarily for safety reasons. Reduction efforts focus on conservation as a priority during the application review stage. Flaring from provincially-regulated gas processing plants increased six per cent between 2013 and 2014.

The Commission continues to work to reduce other sources of flaring including temporary flares, flaring required for safe operations and the flaring of gas not economical to conserve.



Did you know...
Inline well testing requirements ensure operators test wells without utilizing flaring when possible.

Summary

A key role of the Commission is to closely review and monitor all of B.C.'s oil and gas operations, and ensure measures are in place to minimize air emissions. This process begins with the [B.C. Energy Plan](#) and [Flaring and Venting Reduction Guideline](#), and continues with close scrutiny through the review and permitting stages. After a project becomes operational, compliance is ensured through inspections and enforcement, when necessary.

Priority is placed on reducing GHGs and minimizing and/or eliminating emissions where possible. With flaring, when elimination is not possible (for instance, if there is a lack of available infrastructure such as pipelines and facilities due to remoteness) focus is placed on reducing flaring and/or improving system efficiencies.

The Commission regularly reviews the [Flaring and Venting Reduction Guideline](#) and updates are made as required. Methods such as CO₂ injection and inline well testing ensure there are no emissions during certain practices.

In 2010, the [B.C. Energy Plan](#) target of eliminating all routine associated gas flaring was achieved. Routine associated gas flaring is defined as the continuous flaring of solution gas that is economical to conserve. Associated (solution) gas is produced from a well during oil production.

The Commission intends to expand future versions of this summary to include air quality monitoring results and relevant greenhouse gas or air pollution topics.

Did you know...

The Commission is expanding its air monitoring tools with the Roaming Air Monitor (RAM), a new van capable of recording air quality levels while being driven or parked.

More Information

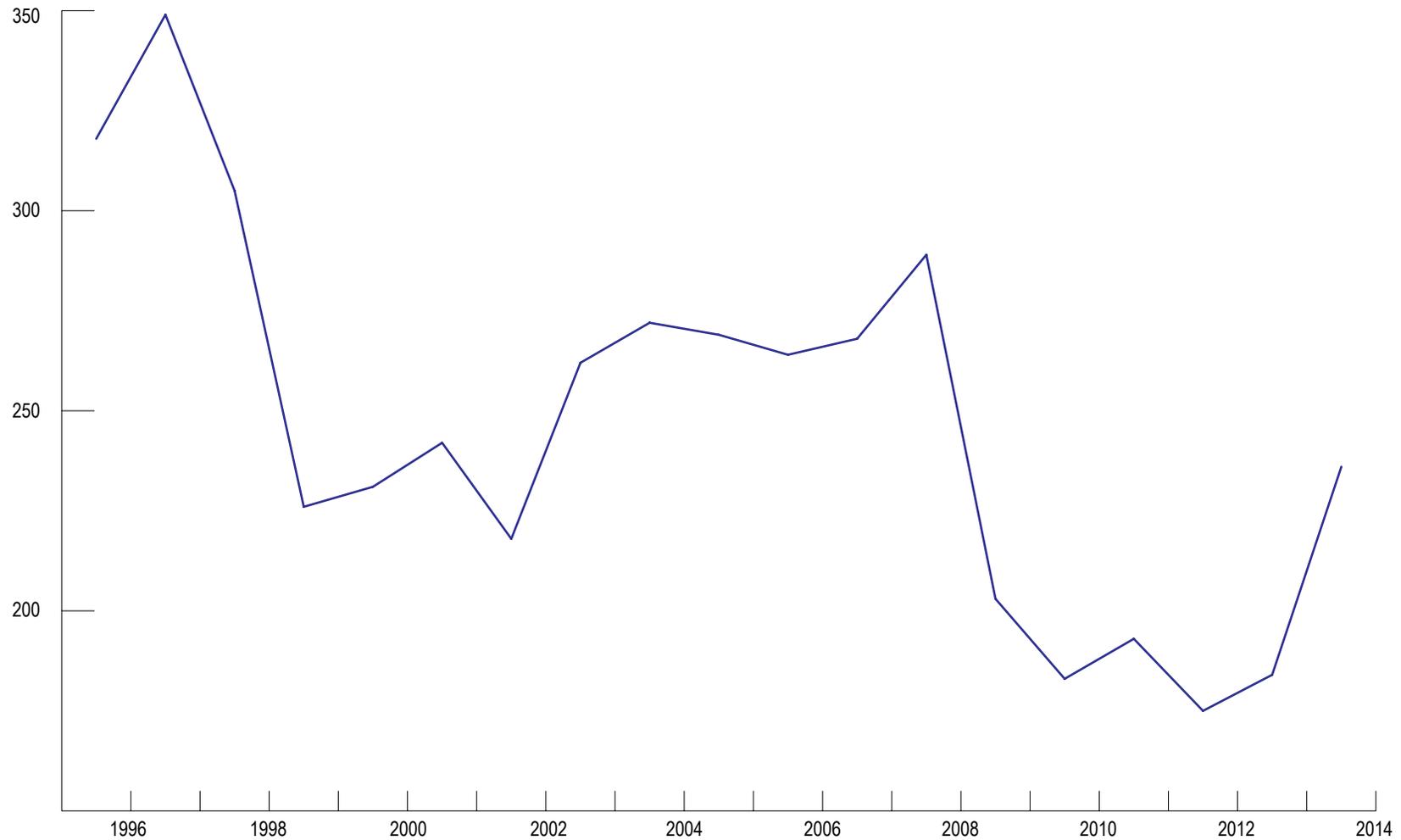
www.bcogc.ca

This summary was published in November 2015 and is updated annually. Previous annual flaring technical reports can be found [here](#). For more information see our [poster](#) on managing air emissions. For specific questions regarding this document please contact: ogc.communications@bcogc.ca.



Appendix 1 – Total flared volumes 1996-2014 (million cubic metres)

Year	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Volume	318	349	305	226	231	242	218	262	272	269	264	268	289	203	183	193	175	184	236



Appendix 2 – Breakdown of flared volumes 1996-2013 (million cubic metres)

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Well Cleanup and Testing	69.8	89	96	82.7	90	91.7	67.6	72.9	83.4	91.7	107	101.9	128.5	92.7	75.9	73.5	71.3	74.2	116.3
Gas Processing Plants	22.7	29	35.7	33.7	30.6	35.4	35.7	31	35	45.7	39	38	48.8	51.7	38.8	48.3	37.7	47.8	50.8
Production Facilities	40.9	26.9	24.3	21.3	24.8	28.4	25.3	21.8	25.7	27.4	25.9	37.9	37.5	35.9	37.9	44.3	52.7	45.1	47.7
Solution Gas	182.9	199.5	146.4	88.1	75	59.8	50.3	48.9	33.9	33	36.1	30.9	26.5	15.9	15.5	13.8	12.8	16.8	21.5
Underbalanced Drilling	1.4	4.5	3.1	0.1	11	26.4	38.9	87.3	94.1	71.5	55.6	59.2	47.4	7	15	13.6	0.1	0	0
Total	317.7	348.9	305.5	225.9	231.4	241.7	218	261.9	272.1	269.3	263.6	267.9	288.7	203.2	183	193	175	184	236.3
Solution Gas Production	1,424	1,681	1,700	1,629	1,655	1,659	1,368	1,137	976	861	830	747	669	490	472	426	469	477	583
Solution Gas Flared	182.9	199.5	146.4	88.1	75	59.8	50.3	48.9	33.9	33	36.1	30.9	26.5	15.9	15.5	13.8	12.8	16.8	23.3
% Conserved	87%	88%	91%	95%	95%	96%	96%	96%	97%	96%	96%	96%	96%	97%	97%	97%	97%	96%	96

