Canada's Refining Industry 2016 Sector Performance Report



Canadian Fuels

ASSOCIATION canadienne des carburants





The Canadian Fuels Association represents the industry that produces, distributes and markets petroleum products in Canada – including 95 percent of the transportation fuels Canadians rely on to remain mobile and globally competitive.

The fuels sector contributes over \$5 billion to Canada's GDP each year and employs more than 116,000 Canadians at 15 refineries, 78 fuel distribution terminals and approximately 12,000 retail and commercial sites throughout Canada.





Note: Numbers may not add due to rounding.

- 15 refineries located in 7 provinces
- Total refining capacity, 2015: 1,873 kb/d
- Product demand, 2015: 1,799 kb/d
- GDP contribution, 2015: \$5.3 billion

- Refinery employment, 2015: 18,700
- Refined product exports, 2015: 27.8 billion litres
- Refined product imports, 2015: 13.9 billion litres
- Total annual investments, 2015: \$1.9 billion

Production

Canadians pump over 203 million litres of gasoline and diesel into their fuel tanks every day. To meet demand and to keep Canadians on the move, the country's 15 refineries operate 24/7 to produce over 108 billion litres of road, jet, rail and marine fuels, heating oil, lubricants and petro-chemicals.



Canadian supply and demand, 2015



Data: Statistics Canada, 2016.

Domestic sales by product (billions of litres), 2015



An increase in freight transport is driving growth in diesel demand.

*Other includes propane, butane, petro-chemical feedstocks, lubricating oils, petroleum coke, asphalt, etc. | Data: Statistics Canada, 2016. | Numbers may not add up due to rounding.

35 30 25 20 15 10 5 0 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015 CO2 2003 2004 2005 2006 2007 2008 2009 2010 2011 2012 2013 2014 2015

Canadian exports and imports of refined petroleum products

Refined petroleum products flow across both sides of the Canada – U.S. border, adjusting to demand and market conditions.

Data: Statistics Canada, 2016.

Safety

Refinery employees – Total recordable injury frequencies

Our member companies are leaders in industrial safety management, and have among the best safety records of any manufacturing industry in Canada.





Since 2000, total recordable injuries for refinery employees have decreased by 73%. The work doesn't stop here – we believe no one should ever get hurt, on or off the site.

Canadian Fuels Association members only.



Environmental performance

Canadian Fuels members' total environmental expenditures





Canadian Fuels members are working to get greener every year. Since 2000, our members have invested close to \$11 billion to improve the environmental performance of their refineries and the fuels they produce, including \$5 billion to significantly reduce sulphur in gasoline and diesel.

Canadian Fuels Association members only.



Surplus site remediation

Canadian Fuels and its members work closely with communities to help give surplus sites a second life. Since 2009, our members have remediated 1265 surplus sites, making them available for industrial, recreational, residential, or commercial use.

Canadian Fuels Association members only.

Greenhouse gas emissions



Total CO₂ emissions, Canadian refining industry

Canadians, as well as governments at all levels, are increasingly concerned by the challenge of mitigating climate change. Canada's refiners account for 2% of the country's total GHG emissions and are committed to doing their part to reduce them.





Our sector's carbon dioxide (CO₂) emissions have been reduced by 11% since 1990 – all while the refining process has become increasingly intensified to meet stringent fuel quality standards (see page 8).

Energy consumption of petroleum refineries



One way to reduce GHG emissions is to decrease energy use. Energy fuel consumption at Canadian refineries has decreased by 22% since 2008.

Data: Statistics Canada, 2016.

Air emissions

Canada's refining sector can help improve air quality on two fronts – decreasing emissions at refineries, and producing cleaner fuels (p. 8).



Refiners are continuously looking at ways to improve their processes – leading to significant improvements in air emissions at facilities.





Nitrogen oxides (NO_x) ▼41%



Total particulate matter (TPM) ▼43%







Benzene (**C**₆**H**₆) **▼**37%



Data: Environment and Climate Change Canada National Pollutant Release Inventory (NPRI), 2016.

Water

Years of commitment to continuous improvement in how we use water have paid off: refiners need less water to process a barrel of crude oil, and water is returned to the environment in a cleaner state.

Refinery water usage



Water intake is down 33% since 2005.





Canadian Fuels Association member refineries only.

Refinery effluent quality

% of allowable limits



*Total suspended solids. | Canadian Fuels Association members only. | 2015 data.



Effluent deposits from refineries

are well below federal maximum

allowable limits.

Fuel quality

Sulphur in gasoline*



Sulphur in diesel*



S

Fuels have changed significantly in the past decades. Lead was entirely phased out of gasoline and benzene was cut to less than 1% of volume. Refiners have invested over \$5 billion to cut sulphur to less than 30 ppm in gasoline and less than 15 ppm in diesel. The new regulation beginning in 2017 will further reduce sulphur in gasoline to 10 ppm.

Sulphur in Diesel Fuel Regulations implemented in 2006 cut sulphur in on-road diesel from 500 ppm to 15 ppm.

*Canadian Fuels Association members only (excluding Husky Energy Inc.) | Data includes imports. Quarterly volume-weighted averages are shown.

Benzene in gasoline



Benzene content is far below the maximum allowable.

Canadian Fuels Association members only (excluding Husky Energy Inc.) | Data includes imports. Volume-weighted averages are shown.

Refining sector economic indicators

A competitive refining sector is a key contributor to a strong Canadian economy, adding over \$5 billion to the country's GDP each year.

Refining sector investments (millions of Canadian dollars)

30,000 3,000 Annual investments, structures, 25,000 Investments, machinery and equipment 2,500 2,000 15,000 cumulative total 1,500 1,000 500 0 966 1998 2008 2009 2010 1999 2000 2006 1995 1997 993 994 2003 2004 991 992 2005 2007 200 2001 201. 201 201 201 201 Structures (left axis) Machinery and equipment (left axis) — Cumulative total (right axis)

Canadian refiners have invested nearly \$24 billion in structures, machinery and equipment since 1991. That's an average of more than \$2.1 billion a year over the last 10 years.

Data: Statistics Canada, The Conference Board of Canada, 2016.

120,000 100,000 Number of employees 80,000 60,000 40,000 20,000 0 2002 2003 2004 2005 2006 2008 2009 2010 2012 2013 2014 2007 ഹ 2001 2011 201

Downstream sector employment

Gasoline stations Petroleum terminals Petroleum refineries

Data: Statistics Canada, 2016.

Canada's fuel refining and distribution sector employs over 116,000 workers, including over 18,000 at refineries, more than 16,400 at fuel distribution terminals and over 81,000 at retail sites.





