

Energy-related research and development expenditures, 2019 (final)

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Businesses increase spending on energy-related research and development (R&D)

In 2019, businesses spent \$1.7 billion on in-house energy-related R&D in Canada, virtually unchanged from 2018. Total in-house spending on R&D in Canada was \$21.7 billion.

Energy-related R&D is an important element towards the establishment of a low-carbon economy, to meet Canada's goals in confronting climate change, developing clean energy solutions, increasing energy access, reducing air pollution and approaching net-zero emissions. Energy-related and overall R&D expenditure in Canadian industry can be further explored using the interactive data visualization dashboard: [Characteristics of research and development in Canadian industry](#).

Since 2015, in-house energy-related R&D has grown 6%. However, its share of total in-house R&D has remained steady at around 8% to 9%, after dropping from a high of 12% in 2014. This was mainly due to the decline in fossil fuel R&D, which reflected the sharp drop in world oil prices.

Spending on fossil fuel technologies is stabilizing

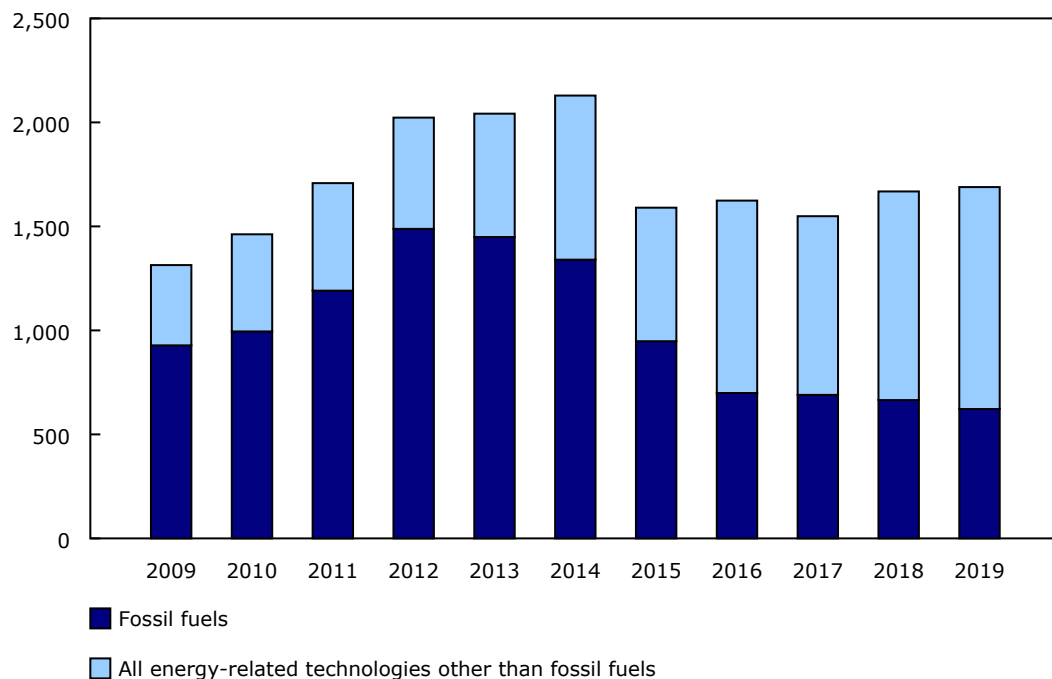
R&D spending on fossil fuel technologies in 2019 decreased by 6% to \$622 million from the previous year. Compared to the large declines in spending that occurred over the 2014-to-2016 period (a total drop of 48%), the overall spending from 2017 and onwards has been relatively stable.

Despite the decline in spending, fossil fuel R&D still represents the largest technology area, accounting for 37% of all energy-related R&D. This share is significantly down from 2012 when it represented almost three-quarters of all in-house energy-related R&D expenditures and occurred around when average annual world crude oil prices reached their peak.



Chart 1
In-house energy-related research and development expenditures by fossil fuels and all other energy-related areas of technology, 2009–2019

millions of dollars



Source(s): Table 27-10-0347-01 (2014-2019), table 27-10-0103-01 (2009-2013).

Energy efficiency and electric power in-house R&D spending continue to grow

In-house R&D expenditures on energy efficiency have more than tripled since 2014, while expenditures on electric power (comprising electricity transmission, distribution and storage; electric power generation in the utility sector; and combined heat and power in industry buildings) have more than doubled.

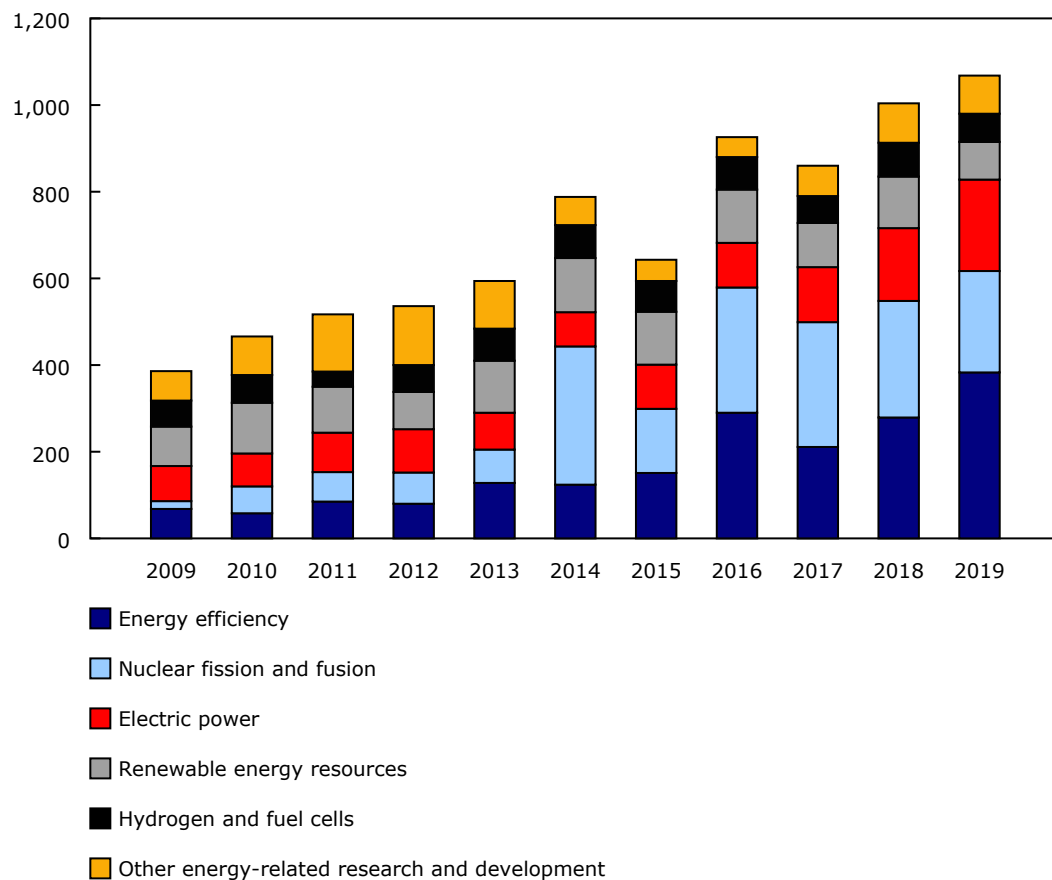
In 2019, in-house R&D spending on energy efficiency technologies rose 37% to \$383 million, making it the second-largest source of energy-related R&D for the second year in a row. The rise was mainly due to increased spending by the mining, quarrying, and oil and gas extraction industries (+\$67 million) and the manufacturing industries, particularly computer and electric product manufacturing (+\$30 million).

The increased spending in energy efficiency correlates to findings released in the 2019 Survey of Innovation and Business Strategy. Results from the survey showed that, of the companies that reported using clean technologies, the percentage of companies that used clean technologies for energy management and efficiency improvements increased in both the mining, quarrying, and oil and gas extraction industries from 29% in 2017 to 44% in 2019, and in the computer and electric product manufacturing industries from 35% in 2017 to 58% in 2019.

Spending on electric power R&D also increased in 2019, rising by 26% to \$211 million. This gain was primarily due to a \$56 million increase by the electric power generation, transmission and distribution industry.

Chart 2
In-house energy-related research and development expenditures by energy-related technologies other than fossil fuels, 2009–2019

millions of dollars



Source(s): Table 27-10-0347-01 (2014-2019), and table 27-10-0103-01 (2009-2013).

Domestic funding for in-house energy-related R&D rises

Domestic sources of funds for in-house energy-related R&D rose in 2019, while foreign funding declined by \$70 million. Self-funding by businesses continued to be the dominant source of funds for energy-related R&D at \$1.4 billion. Over the 2015-to-2019 period, funds from provincial and federal governments more than doubled, rising from \$45 million in 2015 to \$126 million in 2019.

The increase in government-related funding is in line with Canada's participation in [Mission Innovation](#), a global initiative of 22 member countries and the European Commission representing the EU, to accelerate progress towards the Paris Agreement's goals and pathways to net zero emissions through research, development and demonstration (RD&D). Through its participation, Canada aimed to double federal investment in clean energy RD&D between 2014-2015 and 2019-2020, a goal that was exceeded, and encourage private sector investment in early-stage clean energy innovation companies.

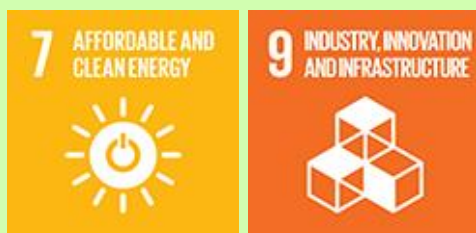
Outsourced energy-related R&D spending increases due to fossil fuel R&D

Outsourced energy-related R&D spending increased by \$49 million to \$254 million in 2019, primarily due to an increase in outsourced fossil fuel R&D spending, which rose from \$44 million to \$180 million. All other areas of technology saw small year-over-year increases in outsourced R&D spending, with the exception of electric power, which decreased from \$11 million to \$4 million, and energy efficiency which remained relatively stable, going from \$34 million to \$32 million.

Sustainable Development Goals

On January 1, 2016, the world officially began implementing the [2030 Agenda for Sustainable Development](#)—the United Nation's transformative plan of action that addresses urgent global challenges over the next 15 years. The plan is based on 17 specific sustainable development goals.

Data on energy-related research and development expenditures by area of technology are an example of how Statistics Canada supports the reporting on the Global Goals for Sustainable Development. This release will be used in helping to measure the following goals:



Note to readers

Energy-related technologies

Energy-related technologies include fossil fuels, renewable energy resources, nuclear fission and fusion, electric power, hydrogen and fuel cells, energy efficiency, and other energy-related technologies.

Data collection

The Energy Research and Development Expenditures by Area of Technology survey data are collected as part of the Annual Survey of Research and Development in Canadian Industry.

Random Tabular Adjustment

The Annual Survey of Research and Development in Canadian Industry and the associated Energy Research and Development Expenditures by Area of Technology survey, 2018, are the first annual surveys at Statistics Canada to use the Random Tabular Adjustment (RTA) technique, which aims to increase the amount of data made available to users while protecting the confidentiality of respondents.

Statistics Canada typically uses suppression techniques to protect sensitive statistical information. These techniques involve suppressing data points that can directly or indirectly reveal information about a respondent. This can often lead to the suppression of a large number of data points and significantly reduce the amount of available data.

Using RTA, Statistics Canada can identify sensitive estimates and randomly adjust their value rather than suppress them. The size of the adjustment is calculated to protect respondent confidentiality. After adjusting the value, the agency assigns a quality measure (A, B, C, D, or E) to the estimate to indicate the degree of confidence that users can have in its accuracy. Quality measures account for uncertainty related to sampling, non-response and RTA, when applied.

For more information on RTA, please refer to the blog article "[Random Tabular Adjustment is here!](#)" available as part of the StatCan Blog.

Available tables: table [27-10-0347-01](#).

Definitions, data sources and methods: survey number [4205](#).

The new interactive dashboard, "[Characteristics of research and development in Canadian industry](#)" ([71-607-X](#)), is now available.

For more information, or to enquire about the concepts, methods or data quality of this release, contact us (toll-free 1-800-263-1136; 514-283-8300; STATCAN.infostats-infostats.STATCAN@canada.ca) or Media Relations (613-951-4636; STATCAN.mediahotline-ligneinfomedias.STATCAN@canada.ca).