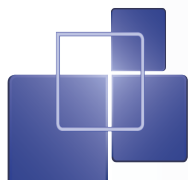




EVALUATING GOVERNMENT PLANS AND ACTIONS TO REDUCE GHG EMISSIONS IN CANADA:

Provincial and territorial progress through October 2016



ACW |

Adapting Canadian Work and Workplaces
to Respond to Climate Change



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Evaluating Government Plans and Actions to Reduce GHG Emissions in Canada: Provincial and territorial progress through October 2016

AS PART OF THE "EVALUATING GOVERNMENT PLANS AND ACTIONS TO REDUCE GHG EMISSIONS IN CANADA" ACW RESEARCH PROJECT.

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The project investigates how Canada’s diverse workplaces can best adapt work to mitigate greenhouse gases, and the changes needed in law and policy, work design, and business models for industry and services, to assist the “greening” of workplaces and work. Adapting Canadian Work and Workplaces to Respond to Climate Change: Canada in International Perspective (ACW).

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Foreword

This working paper is the second of three preliminary reports being produced for the ACW's Domestic Policy Working Group, which is investigating Canada's evolving domestic climate policy landscape. These three preliminary reports—addressing federal government action, provincial government action, and domestic labour policy in Canada—will be integrated into a final report in spring 2017.

The preliminary reports take as their starting point the working group's baseline report, which was completed in October 2015.¹ That report provides context on the current profile of greenhouse gas emissions in Canada as well as the suite of climate policies in place at the federal and provincial level through October 2015.

Introduction

Canada's federal Liberal government has made climate change a central issue since winning the 2015 election. In addition to symbolic and diplomatic measures, such as signing and ratifying the Paris Agreement, the Liberals have also committed significant resources to new infrastructure and clean technologies. Most recently, they have committed to imposing a rising carbon price on any province that fails to do so on its own. The federal government's continued support for proactive climate policy is not only welcome, but also necessary if Canada is to achieve greenhouse gas (GHG) emission reductions on any meaningful scale.

Historically, however, the federal government has done relatively little to support Canada's transition to a low-carbon economy. In comparison, the provinces and territories have made greater and more sustained efforts to reduce greenhouse gas emissions in Canada over the long term. Whereas the federal government has only recently begun to discuss climate change seriously, some sub-central governments have been publishing and implementing climate change action plans for decades. That leadership continues to this day, with some provincial and territorial governments forging ahead with ambitious new climate plans and commitments.

Success in actually reducing emissions has been mixed so far. Some provinces, such as Ontario, Nova Scotia and New Brunswick, have achieved significant emissions reductions through the gradual replacement of coal-fired electricity generation with non-emitting alternatives. Some provinces, such as Saskatchewan, have never taken the issue seriously and continue to increase total emissions. Others, such as British Columbia and Manitoba, have backtracked from their initial climate leadership in favour of other political priorities. Even where provinces have made and implemented relatively ambitious plans, such as Québec, greenhouse gas emissions are projected to increase for decades. Overall, the provinces' individual plans and actions do not go far enough to address the scale of the climate change challenge.

This working paper—the second in a series—builds on the preceding report by investigating in greater detail the specific positions of the provinces and territories heading into the final stages of the pan-Ca-

¹ Hadrian Mertins-Kirkwood, *Baseline Report on Domestic Policy*, Adapting Canadian Work and Workplaces to Respond to Climate Change, Canadian Centre for Policy Alternatives and York University, October 2015, <http://www.adaptingcanadianwork.ca/domestic-policy-baseline-report>.

nadian climate talks. The intended outcome of those negotiations, to be announced in December 2016, is a national strategy for reducing greenhouse gas emissions to be implemented beginning in 2017.

The first section of this paper discusses the provincial and territorial “state of play” using the latest available data. The second section assesses in more detail the new climate plans in Alberta, Manitoba, Ontario and British Columbia. The final section summarizes the paper’s findings.

Energy and emissions context for the provinces and territories

Canada is among the world’s top ten emitters of greenhouse gases and trails only Australia as the worst per capita emitter among major developed countries.² The two biggest sources of Canada’s emissions are oil and gas production, which accounts for 26% of Canada’s total, and transportation, which accounts for a further 23% (see Appendix A1).

There are major variations among the provinces and territories, which is partly what makes the creation of Canadian climate policy so challenging. Major emissions sources in some parts of the country, such as coal-fired power plants, do not exist elsewhere. Public perceptions of climate change and climate policy also differ widely. Understanding the similarities and differences between jurisdictions is essential for designing fair and effective pan-Canadian policy. For example, the variations between provinces are largely due to structural factors, such as electricity generation and legacy industries, that are beyond the control of individual households. A fair climate policy should not simply target the people who happen to live in climate-unfriendly jurisdictions.

Nevertheless, establishing a clear understanding of where Canada’s GHG emissions come from is a prerequisite for designing policies to reduce them. This section presents the provincial and territorial “state of play” on GHG emissions using three metrics: total emissions, per capita emissions, and emissions intensity. It also references some public opinion research to flesh out the differences in the climate policy landscape between jurisdictions.

Total GHG emissions

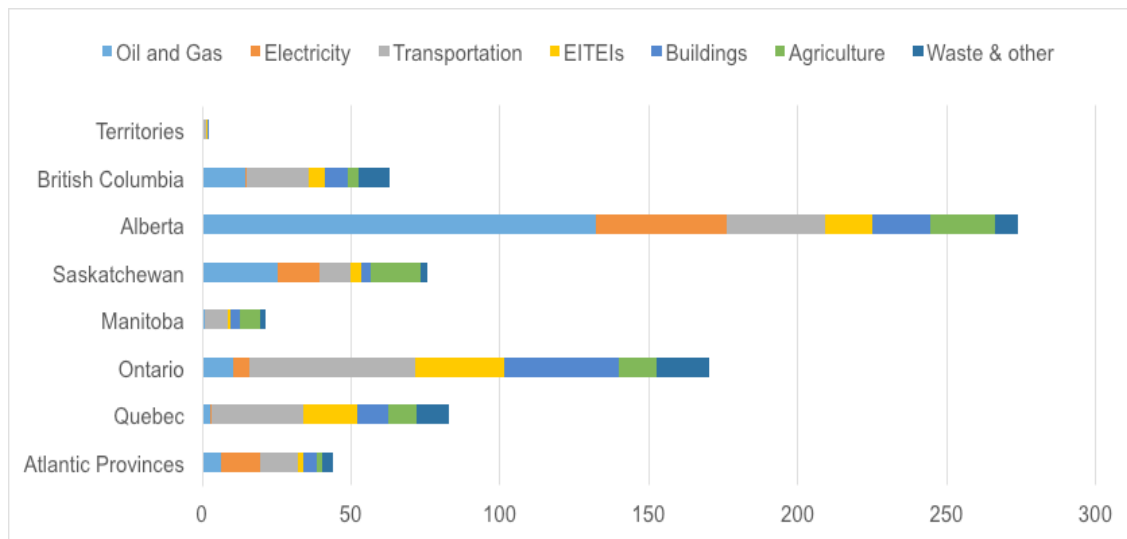
Among the provinces, resource extraction, fossil fuel-based electricity generation, and population size are the greatest predictors of total emissions (see Chart 1). Alberta alone produces 37% of Canada’s GHG emissions and 69% of Canada’s total emissions associated with oil and gas production. Alberta also produces more than half of Canada’s emissions from electricity generation, due to a reliance on coal combustion (most other provinces rely on hydro and/or nuclear power).

² Canada accounts for approximately 1.6% of global emissions. Per capita emissions are 20.6 tonnes CO₂e. Paul Boothe and Félix-A. Boudreault, *By The Numbers: Canada’s GHG Emissions*, Lawrence National Centre for Policy and Management, Ivey Business School at Western University, 2016, <http://www.ivey.uwo.ca/cmsmedia/2112500/4462-ghg-emissions-report-v03f.pdf>.

Chart 1: Greenhouse gas emissions in Canada by jurisdiction and source (Mt CO₂e) (2014)

Source: Environment and Climate Change Canada, *National Inventory Report 1990-2014* (2016)

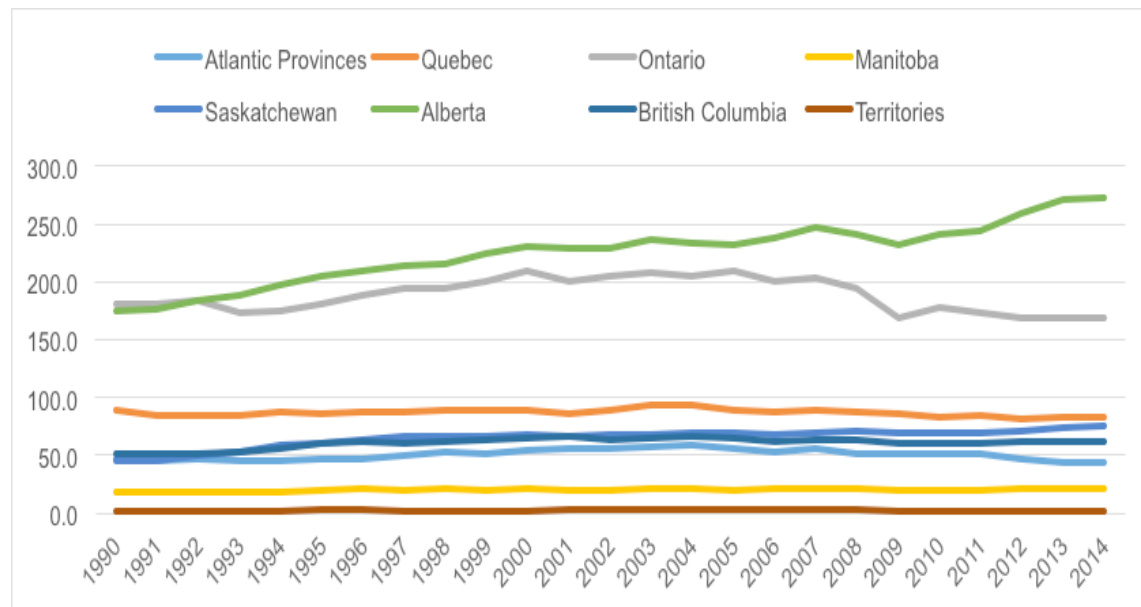
*EITEs = emissions-intensive and trade-exposed industries (e.g. cement, steel, pulp and paper)



Ontario, with its large population, is the second biggest emitter, accounting for 23% of Canadian GHG emissions. Ontario emits more from transportation, heavy industry, buildings and waste than any other province. Québec, Saskatchewan and British Columbia round out the top five provincial emitters today, although the relative contribution of each province has changed over time (see Chart 2). Notably, emissions in Alberta and Saskatchewan have increased steadily since 1990 while emissions in Ontario, Québec and the Atlantic provinces have plateaued or declined since peaking in the mid-2000s. The big reductions in those provinces are largely due to the phase out of coal-fired electricity generation.

Chart 2: Greenhouse gas emissions in Canada by jurisdiction, 1990-2014 (Mt CO₂e)

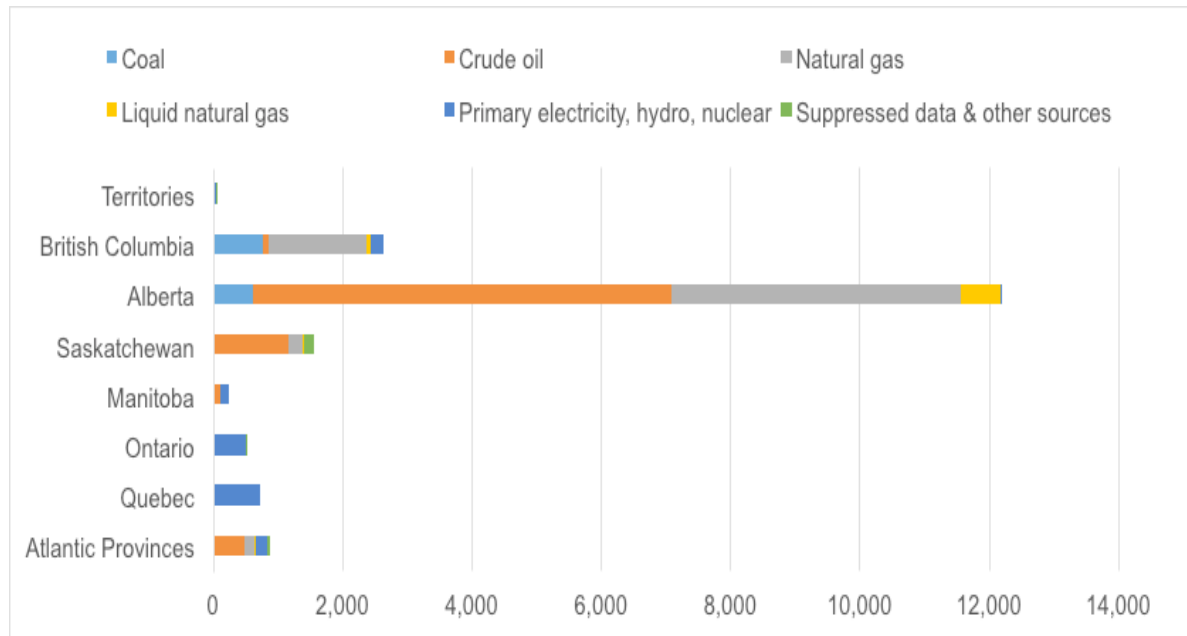
Source: Environment and Climate Change Canada, *National Inventory Report 1990-2014* (2016)



Indeed, total emissions in each province and territory are closely tied to how those jurisdictions produce and consume energy. Alberta produces a remarkable 65% of Canada's total primary energy today, mostly in the form of crude oil and natural gas (see Chart 3), which is directly responsible for nearly half of the province's emissions. Simply put, resource extraction is carbon-intensive. The Alberta oil sands alone—i.e. the extraction of sands oil, not its processing or consumption—account for 9% of Canada's overall GHG emissions. British Columbia and Saskatchewan are also major resource producers with correspondingly large GHG emissions profiles.

Chart 3: Primary energy production in Canada by jurisdiction and source (petajoules) (2014)

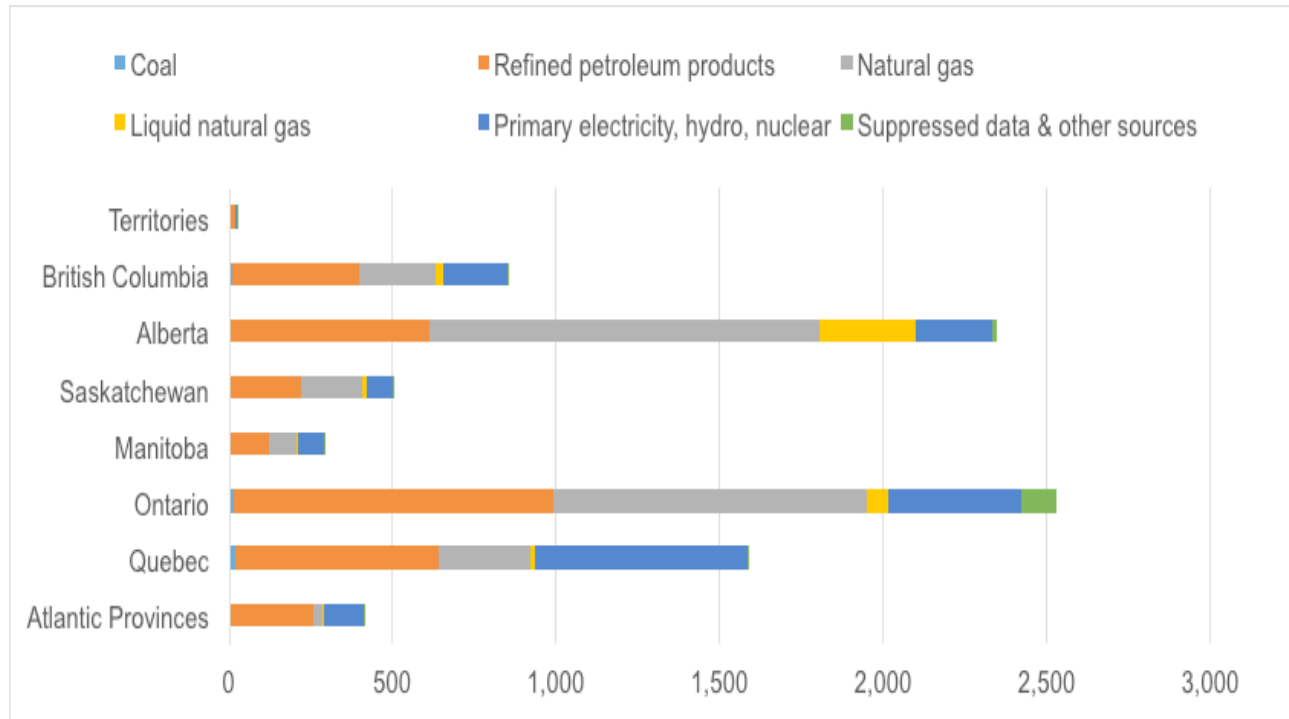
Source: Statistics Canada, CANSIM Table 128-0016 and author's estimates (see notes in appendices)



However, for most provinces, the majority of emissions come from the consumption of energy. Across the country, refined petroleum products such as gasoline are used to fuel vehicles and natural gas is used to heat buildings (see Chart 4). Independent of where those fossil fuels are produced and processed, they are consumed everywhere in Canada. That means even the jurisdictions with close to 100% non-emitting electricity, such as Ontario and Québec, are still significant emitters from fossil fuel consumption.

Chart 4: Primary and secondary energy consumption in Canada by jurisdiction and source (petajoules) (2014)

Source: Statistics Canada CANSIM Table 128-0016 and author's estimates (see notes in appendices)



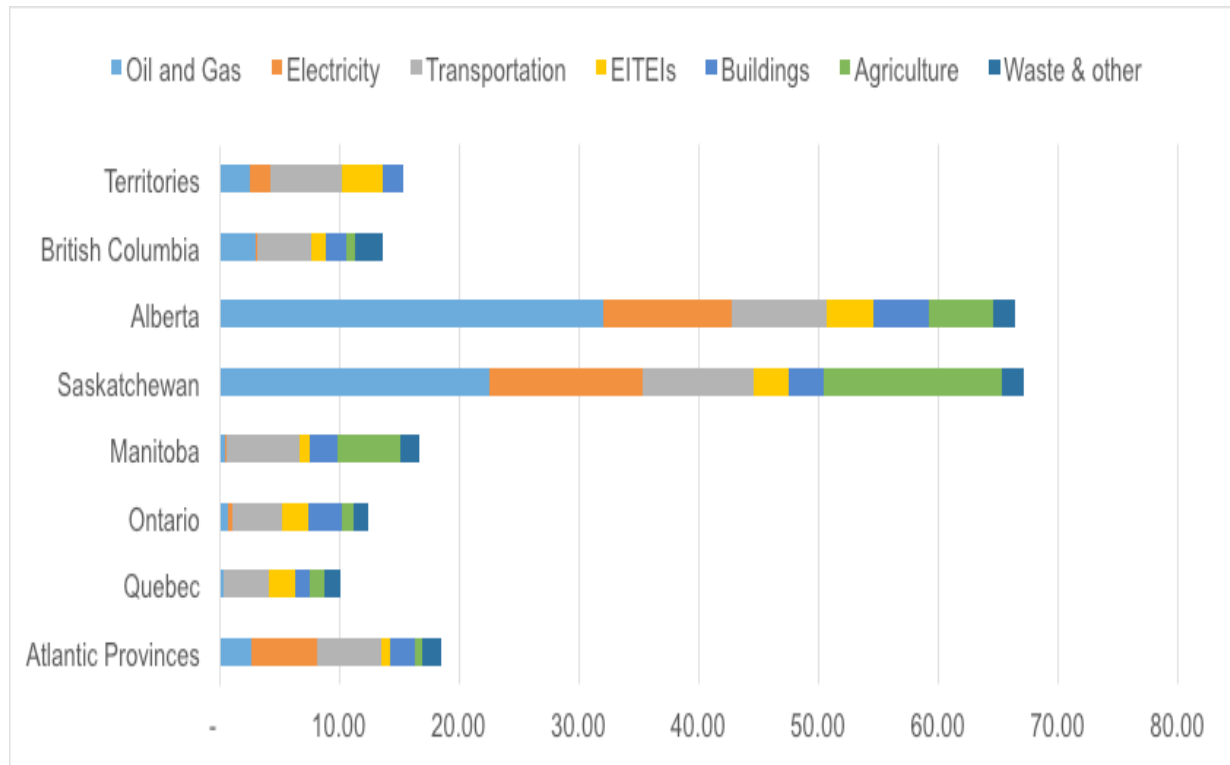
Overall, Canadian emissions are concentrated in two areas. First, in Alberta and its neighbours where most oil and gas production occurs. Second, in Ontario and Québec where most of the Canadian population lives (and consumes energy). If Canada is to reduce its total emissions fairly using total emissions as its metric of comparison, efforts to reduce energy production in Western Canada and to reduce energy consumption in Eastern Canada are obvious targets.

Per capita GHG emissions

The picture of fairness changes, however, if the provinces and territories are compared on a per capita basis. Although Ontario and Québec account for a significant proportion of total Canadian emissions, they actually have the lowest emissions relative to their population sizes (see Chart 5). Saskatchewan edges out Alberta as the worst per capita emitter in Canada, but both Western provinces emit significantly more per person than any other province (at the extreme, emissions per capita are nearly seven times higher in Saskatchewan than in Québec). The gap is due to emissions from oil and gas production, fossil fuel-based electricity generation and agriculture—none of which are very significant in Ontario and Québec. Per capita emissions related to transportation, industry, buildings and waste are relatively consistent across the country.

Chart 5: Per capita greenhouse gas emissions in Canada by jurisdiction and source (tonnes CO₂e per person) (2014)

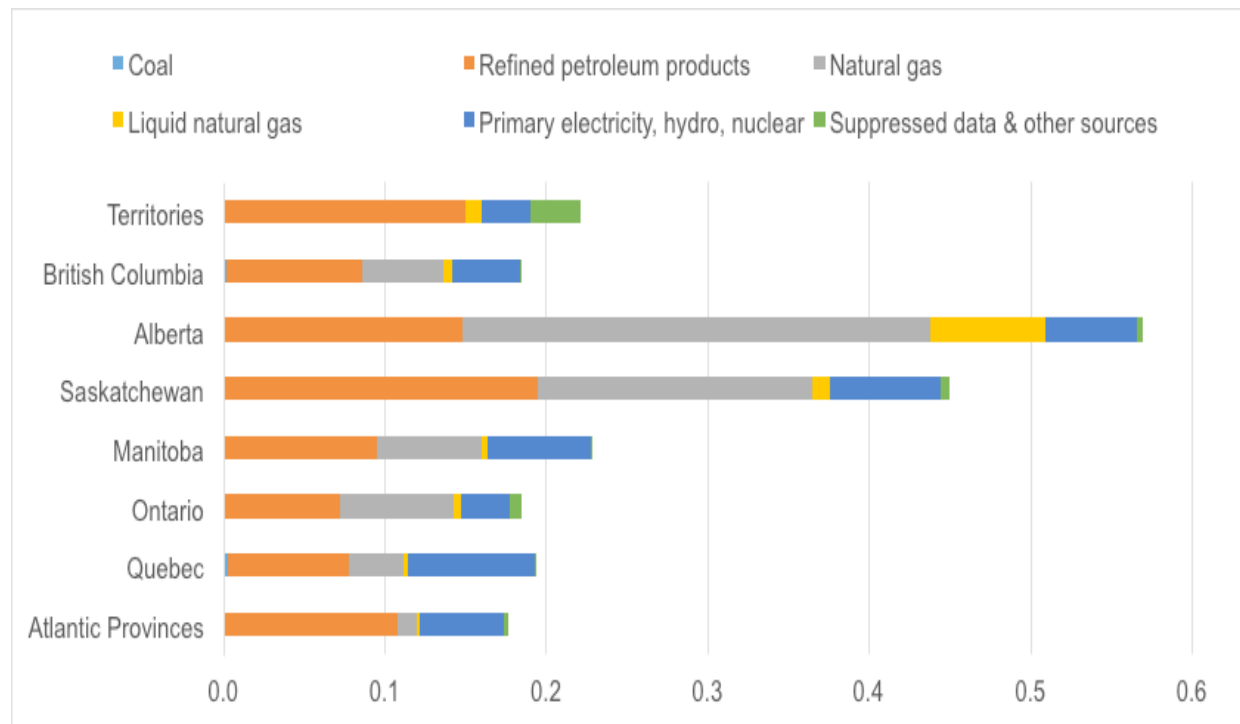
Source: Environment and Climate Change Canada, *National Inventory Report 1990-2014* (2016) and Statistics Canada, CANSIM Table 051-0001



Per capita energy consumption is more even across the country, but Alberta and Saskatchewan still stand out (see Chart 6). Per person, those two provinces use more oil and far more gas than anywhere else. Although Ontario and Québec have the lowest per capita emissions, their per capita energy consumption is on par with the rest of the country.

Chart 6: Per capita primary and secondary energy consumption in Canada by jurisdiction and source (petajoules per 1,000 population) (2014)

Source: Statistics Canada, CANSIM Table 128-0016 and author's estimates (see notes in appendices and Statistics Canada, CANSIM Table 051-0001)



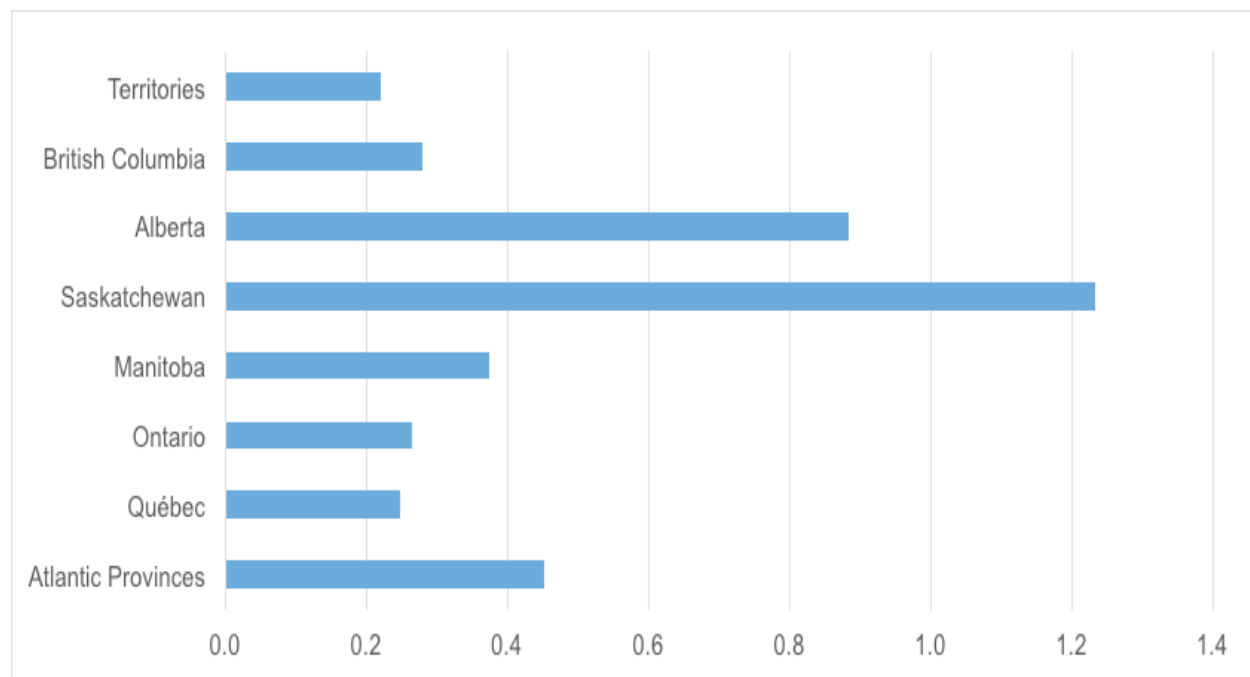
Policies designed to reduce emissions on a per capita basis will have a very uneven effect, as costs will be born disproportionately by Alberta and Saskatchewan.

Emissions intensity

If the provinces are compared on the basis of GHG emissions per unit of economic activity the picture looks basically the same as before (see Chart 7). Alberta and Saskatchewan emit far more GHG emissions in the production of economic growth than other provinces do. This is due to their reliance on oil and gas production as a major component of the economy. Emissions intensity in New Brunswick and Nova Scotia is also above average, due largely to fossil fuel-based transportation and electricity generation.

Chart 7: Greenhouse gas emissions intensity in Canada by jurisdiction (Mt CO₂e per \$1 billion of GDP) (2014)

Source: Environment and Climate Change Canada, National Inventory Report 1990-2014 (2016) and Statistics Canada, CANSIM Table 384-0038



At the national level, economic growth is slowly decoupling from emissions growth. Canada's overall emissions intensity was 0.42 Mt CO₂e per \$1 billion of GDP in 2014, down from 0.50 in 2005 and 0.62 in 1990. Some provinces, such as Alberta, advocate climate policies that are designed to further reduce emissions intensity. However, using emissions intensity as a target does not necessarily lead to a reduction in total emissions, which is the ultimate goal of climate policy. As long as the rate of economic growth exceeds energy efficiency improvements, total emissions will continue to rise. Notably, despite reducing emissions intensity by more than 30% between 1990 and 2014, Canada's total emissions still increased by 20%.

Public opinion of climate change and climate policy

Public opinion polling in Canada shows a growing popular consensus that climate change is real, that it is caused by human activity, and that government policy interventions are required to address it.³ A majority of Canadians agree that global warming is due at least in part to human activities. Recent polling suggests more than three quarters of Canadians also support, in principle, a national plan to reach Canada's climate change targets.⁴

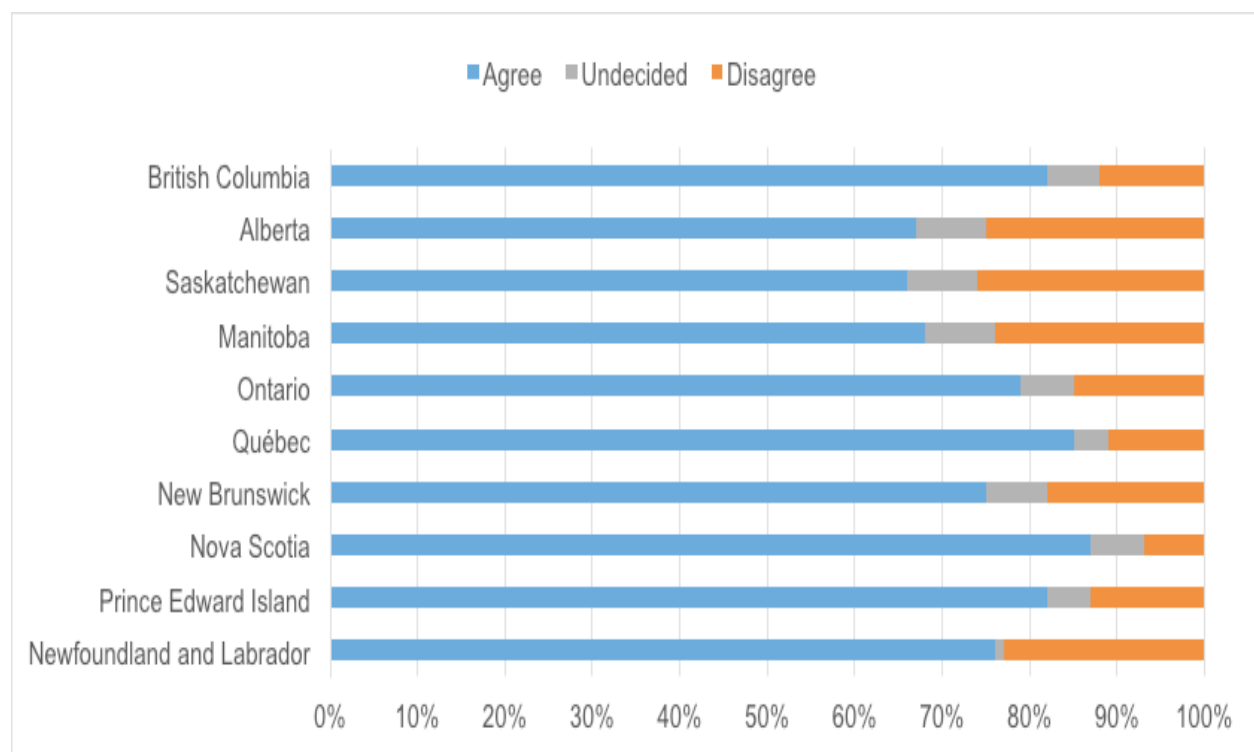
³ Campbell Clark, "Canadians back bold climate-change action, poll finds," *Globe and Mail*, November 27, 2015, <http://www.theglobeandmail.com/news/politics/canadians-back-bold-climate-change-action-poll-finds/article27518927>.

⁴ Clean Energy Canada, *Canadians' Opinions on Climate Policy and Federal Leadership*, Clean Energy Canada, Centre for Dialogue at Simon Fraser University, October 2016, <http://cleanenergycanada.org/wp-content/uploads/2016/09/Clean-Energy-Canada-Nanos-Climate-Policy-Polling-Report-Oct-2016.pdf>.

Less data is available at the provincial level, but a 2016 study by researchers in Canada and the United States estimates the provincial breakdown of opinion on climate change and climate policy. Their results, as with any public opinion polling, are not definitive, but they highlight some general differences within Canada. For example, according to the study, belief that the earth is warming is below 70% in Alberta, Saskatchewan and Manitoba, but above 85% in Québec and Nova Scotia (see Chart 8).

Chart 8: Percentage of Canadians who believe the earth is getting warmer (2011-2015)

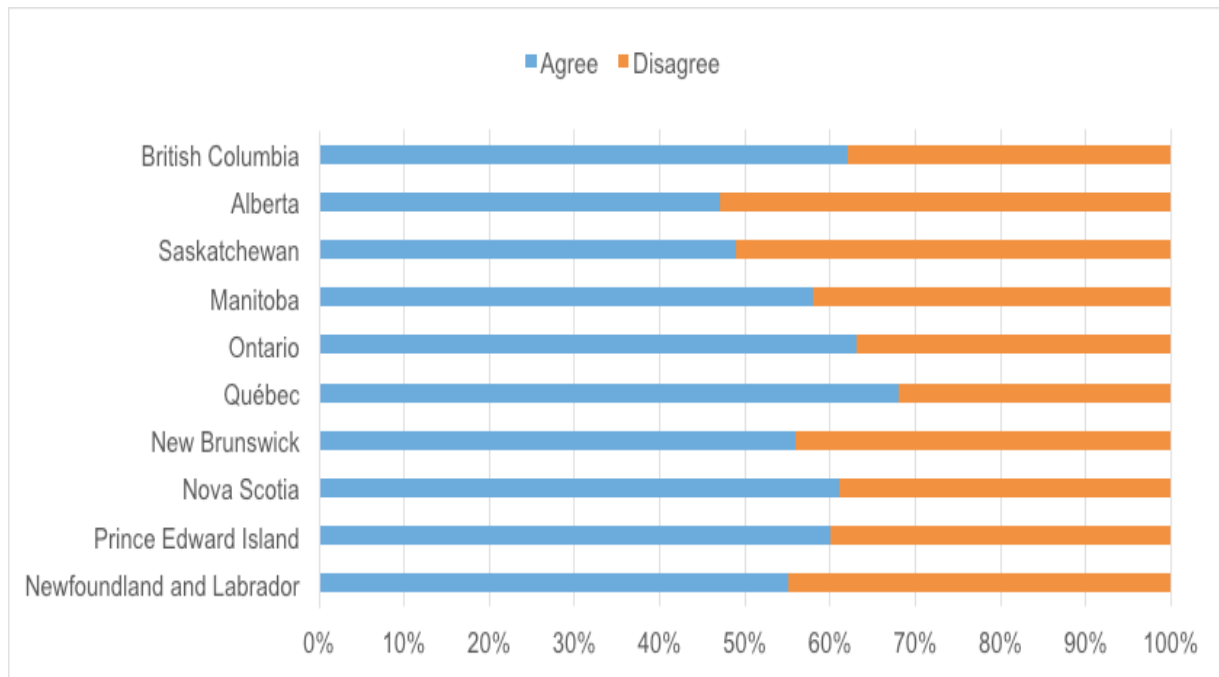
Source: Matto Mildener et al., "The Distribution of Climate Change Public Opinion in Canada," *PLoS One* (2016)



Similarly, belief that global warming is caused mostly or partly by human activity is lowest in the prairies and highest in central Canada (see Chart 9). Fewer than half of Albertans and Saskatchewanians who believe in global warming also believe that humans are to blame for rising temperatures, compared to 68% in Québec.

Chart 9: Percentage of Canadians who believe the earth is getting warmer due mostly or partly to human activities (2011-2015)

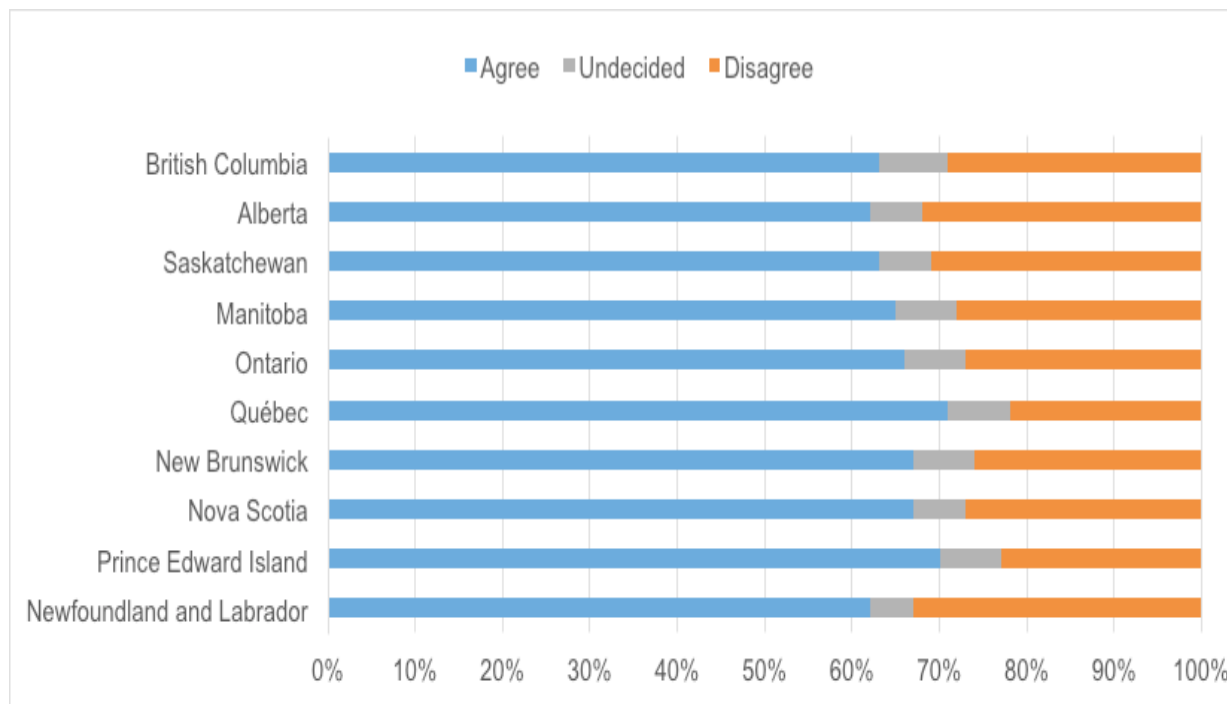
Source: Matto Mildenberger et al., "The Distribution of Climate Change Public Opinion in Canada," *PLoS One* (2016)



Interestingly, when asked about climate policy directly, provincial variation is much smaller. Majorities in every province support a cap-and-trade system for pricing emissions, ranging from 62% in Alberta and Newfoundland and Labrador to 71% in Québec (see Chart 10).

Chart 10: Percentage of Canadians support a cap-and-trade policy to put a price on GHG emissions (2011-2015)

Source: Matto Miltenberger et al., "The Distribution of Climate Change Public Opinion in Canada," *PLoS One* (2016)



Support for a carbon tax is generally lower across Canada (49% on average), but opinion is similarly consistent between provinces. The one outlier is British Columbia, the only province with an existing carbon tax, where support for the policy is 57% and opposition is just 36%.

Any public opinion polling should be taken with a grain of salt, but the data from this study suggest some general trends that are worth highlighting. Specifically, belief in the validity of climate science and the necessity of climate policy is lowest in provinces with the greatest reliance on fossil fuels. Public opinion is also strongly aligned with per capita GHG emissions. Climate-friendly public opinion is lowest in Alberta, Saskatchewan and Newfoundland and Labrador, which are also the three provinces that produce the most oil and gas and have the highest per capita emissions in the country.⁵ Effective climate policy is least likely to emerge organically from the jurisdictions with the lowest support for climate action, which means external political pressure may be necessary to get all provinces on the same policy page.

⁵ Overall belief in climate change and support for climate policy can be crudely calculated by averaging net support for the five questions included in the Miltenberger et al. analysis. Using this method, the provincial ranking of climate-friendly public opinion is as follows: Québec, British Columbia, Nova Scotia, Ontario, Prince Edward Island, New Brunswick, Manitoba, Newfoundland and Labrador, Saskatchewan, and Alberta.

Summary

Total greenhouse gas emissions are strongly correlated with oil and gas production, fossil fuel-based energy consumption (especially in transportation), and population size. Emissions are not clearly correlated with economic activity, since both “clean” and “dirty” industries can be economically productive.

By any measure, Alberta bears the greatest responsibility for Canada’s GHG emissions. Not only does the province create significant emissions as a by-product of oil and gas production, but it also uses fossil fuels extensively for electricity generation, transportation and in buildings. Ontario is the second biggest contributor to Canadian emissions, although its per capita emissions are better than average. In terms of emissions intensity and emissions per capita, Saskatchewan is implicated as the worst provincial emitter.

These differences are important when designing climate policies. Emissions mitigation policies that are applied equally across Canada will be disproportionately burdensome on the provinces with the most emissions-intensive economies, such as Alberta and Saskatchewan. Ontario, despite its large overall emissions, could more easily adapt to climate policies where costs are diffused amongst its large population.

These problems are exacerbated by differences in public opinion. Not only would Alberta and Saskatchewan be hit hardest by a stringent carbon tax or many other proposed climate policies, but people in those provinces are also the most skeptical of climate science. Nevertheless, there appears to be relatively consistent support across Canada for some form of carbon pricing, even in Alberta and Saskatchewan. Based on public opinion polling, well-designed policies that address citizens’ concerns could find majority support in every province. A climate justice lens is a productive approach to ensuring new climate policies produce equitable outcomes with broad-based support.⁶

Assessing provincial climate plans since November 2015⁷

Our baseline report, produced in fall 2015, summarized the climate plans and policies in place across Canada prior to the federal election. Major new plans have been announced since then in Manitoba, Alberta, Ontario and British Columbia. This section outlines each of these plans in turn.

MANITOBA

For a complete breakdown of Manitoba’s energy and emissions profile see Appendix A5.

Manitoba’s *Climate Change and Green Economy Action Plan* was published in December 2015.⁸ It is

⁶ The Canadian Centre for Policy Alternatives’ Climate Justice Project has produced a body of work dedicated to this issue, which is available at: <https://www.policyalternatives.ca/projects/climate-justice-project>.

⁷ Unless otherwise noted, sources for this section can be found in the Appendix to this report.

⁸ Government of Manitoba, *Manitoba’s Climate Change and Green Economy Action Plan*, 2015.

the latest in a series of plans released or updated by the province since 2002. The new plan introduces ambitious new GHG reduction targets and commits the province to a cap-and-trade system for large emitters. However, recent political developments have raised questions about the province's continued commitment to the plan.

Manitoba's 21 Mt of GHG emissions accounted for just 3% of Canada's total in 2014, while emissions per capita and emissions intensity were below the Canadian average. Like many provinces, transportation is the province's biggest source of emissions. Unlike most other provinces, the next biggest source of emissions is agriculture. The new plan does not focus on transportation or agriculture in particular, but those sectors would presumably be most affected by the proposed cap-and-trade system if and when it comes into effect.

Plan overview

The Manitoba plan creates a new Climate Change Action Fund, which will provide \$5 million over five years for heavy vehicle retrofits, sustainable agriculture investments, emissions data collection and reporting, and other minor green initiatives. In addition to this relatively modest funding, the plan establishes a new "Demand Side Management" (DSM) subsidiary of Manitoba Hydro tasked with designing more stringent energy efficiency standards for homes, buildings and products. Manitoba's Power Smart programs, now administered by DSM, have already led to significant energy savings.⁹ The plan also proposes changes to the Environment Act and Sustainable Development Act that would enshrine the UN's Sustainable Development goals in provincial law and create a new provincial oversight body for environmental values.

Given the modest funding and regulatory changes outlined in the plan, the most significant proposal in the long-term is likely the province's commitment to carbon pricing. Under the plan, Manitoba would adopt an interjurisdictional cap-and-trade scheme (likely the Western Climate Initiative), which would cover emissions from specified large emitters. Unfortunately, further details in the plan are sparse. It does not outline which sectors would be covered and how stringent the pricing mechanism would be. Furthermore, no timeline for implementation is provided in the plan.

Progress toward targets

The plan includes a new set of GHG reduction targets. Using 2005 as a baseline, Manitoba has promised GHG emission reductions of one third by 2030 and one half by 2050. By 2080, the province aims to be carbon neutral. These are the first new emissions targets the province has made since failing to meet its 2012 goal.

Whether the new plan actually puts Manitoba on a path to meeting these commitments, however, is unclear. The plan does not specify how emissions are expected to change due to the proposed actions. Energy efficiency programs, for example, may not go far enough to offset new emissions from economic and population growth. In theory, a cap-and-trade system could ensure the province meets its targets, but only if the program covers a large enough share of emissions and the cap is lowered quickly enough. Based on Environment and Climate Change Canada's forecasts from September 2015,

⁹ Manitoba Hydro, "Demand side management (DSM)," accessed October 5, 2016, https://www.hydro.mb.ca/corporate/dsm_power_smart.shtml.

Manitoba is on track to emit 24 Mt CO₂e in 2030—a 12% increase above 2014 levels—which is well above its 2030 target of 13.8 Mt. Bridging that gap will require either very stringent carbon pricing or more ambitious funding and regulatory initiatives than have been introduced so far.

Unfortunately, the political will appears to be receding. Manitoba elected a new government in spring 2016 that is skeptical of climate science and more reticent on climate policy than its predecessor.¹⁰ In fall 2016, the government stated that it would not follow through on the province's earlier commitment to implement a cap-and-trade system under the climate plan, but that it would instead pursue a "made in Manitoba" solution to reducing emissions.¹¹ The legislative changes described in the new climate plan have also been shelved. Although the new government has not abandoned climate policy completely, Manitoba will almost certainly miss its future emissions targets if aggressive policies are not quickly introduced.

ALBERTA

For a complete breakdown of Alberta's energy and emissions profile see Appendix A3.

In the wake of a major regime change in the province's spring 2015 election, the government of Alberta commissioned a Climate Leadership Panel to recommend an ambitious new climate policy framework for the province. After widespread public consultations, the panel produced a comprehensive climate change report in November 2015.¹² The plan included 20 policy recommendations centred on a broad-based carbon tax. It also included ambitious targeted measures, including an accelerated coal phase-out.

The government implemented the majority of its *Climate Leadership Plan* through the 2016 provincial budget in April.¹³ Unlike in British Columbia (see below), the government accepted most of the climate panel's recommendations in full or in part. Most importantly, Budget 2016 created an economy-wide carbon "levy" (tax) of \$20 per tonne.

Alberta is responsible for more than a third of Canada's emissions—its 274 Mt of GHG emissions in 2014 accounted for 37% of the national total—so its climate policies have major implications for the country as a whole. Notably, nearly half of the province's emissions come from oil and gas production. Electricity generation, which is based heavily on coal and other fossil fuels, is the next biggest source of provincial emissions. The new climate plan specifically aims to reduce emissions from the coal sector in the short-term, with a longer-term strategy for the oil sands.

Plan overview

The new Alberta plan has four central components. The first and most significant is an economy-wide carbon tax of \$20 per tonne starting in 2017 and rising to \$30 per tonne in 2018, which builds on Alberta's existing Specified Gas Emitters Regulation. The new tax will raise an estimated \$9.6 billion in additional government revenues over five years, but unlike the British Columbia carbon tax the Alberta

¹⁰ Steve Lambert, "Tories hedge on cause of climate change after talking carbon tax with feds," *Winnipeg Sun*, May 26, 2016, <http://www.winnipegsun.com/2016/05/26/feds-talk-carbon-pricing-with-manitoba-sustainable-development-minister>.

¹¹ Mia Rabson and Larry Kusch, "Pallister pulls plug on NDP's carbon cap-and-trade plan," *Winnipeg Free Press*, October 3, 2016, <http://www.winnipegfreepress.com/local/pallister-pulls-plug-on-ndps-carbon-cap-and-trade-plan-395729621.html>.

¹² Alberta Climate Leadership Panel, *Climate Leadership: Report to Minister*, Government of Alberta, 2015.

¹³ Alberta Finance, *Budget 2016: The Alberta Jobs Plan*, Government of Alberta, 2016.

levy will not be revenue neutral. To offset higher transportation and home heating costs, a portion of the revenues (approximately 26%) will go towards consumer adjustments such as an energy rebate for low-income households. Another portion of revenues (approximately 9%) will pay for a small business tax cut. However, the majority of carbon tax revenues will be invested into green infrastructure, energy efficiency programs, and other climate change initiatives. Although details are not provided in the budget, those initiatives will include large scale renewable energy projects and subsidies for technological innovation.

In addition to the carbon tax, the new Alberta plan includes three major regulatory components. First, the new plan promises to completely phase out coal-fired electricity generation by 2030 in favour of large- and small-scale renewable energy production. Second, the plan commits the province to a 45% reduction in methane emissions by 2025. Third, the plan promises to legislate a cap on emissions from oil sands production of 100 Mt CO₂e.

Progress toward targets

Although the Alberta plan includes sector-specific targets related to coal-fired electricity generation, methane emissions, and oil sands emissions, it does not set any economy-wide GHG emissions reduction targets. In fact, Alberta is the only province with no clear emissions goals.

In its latest forecast, Environment and Climate Change Canada predicted Alberta's emissions would rise to 297 Mt by 2020 (8% above 2014 levels) and to 320 Mt by 2030 (17%). The new Alberta climate plan will likely change this trajectory. Eliminating coal-fired electricity generation in the province would reduce emissions by 41 Mt.¹⁴ The carbon tax will also lead to an estimated reduction of 50 Mt below business-as-usual levels by 2030. On the other hand, the 100 Mt cap on oil sands emissions permits an additional 32 Mt of new emissions above current levels,¹⁵ which the oil industry is eager to fill.¹⁶

Overall, the Climate Leadership Panel claims that their comprehensive package of climate policy recommendations, if fully implemented, would serve to stabilize emissions at current levels (approximately 270 Mt) by 2030.¹⁷ In other words, Alberta is unlikely to reduce total GHG emissions by 2030 even in the most optimistic scenario. For context, Canada's overall emissions target for 2030 is just 523 Mt, so Alberta has already laid claim to half of Canada's future emissions capacity.

With the carbon tax in place, Alberta has a tool that can be leveraged for much greater emission reductions in the long term, provided the political will exists to raise the price to an adequate level. Unfortunately, Albertans are already among the most climate skeptical Canadians and dissatisfaction with the Alberta climate plan is mounting.¹⁸ It is also possible that new federal regulations and infrastructure investment could contribute to reducing emissions in the province, but the scope of those plans is still murky. If Albertans' enthusiasm for climate policy wanes and the federal government fails to intervene, it will have serious repercussions for the country's climate goals.

¹⁴ Emissions from coal combustion for electricity generation in Alberta were 41.4 Mt in 2014 (see National Inventory Report Table A13-10).

¹⁵ Upstream oil sands emissions in Alberta were 65.6 Mt in 2014 (see National Inventory Report Table A12-9).

¹⁶ Kenneth P. Green and Taylor Jackson, *How Alberta's Carbon Emission Cap Will Reduce Oil Sands Growth*, Fraser Institute, August 2016.

¹⁷ Alberta Climate Leadership Panel, *Report to Minister*, p. 40.

¹⁸ Dave Dormer, "63% of Albertans oppose NDP carbon tax, poll suggests," CBC News Calgary, September 29, 2016, <http://www.cbc.ca/news/canada/calgary/thinkhq-poll-climate-leadership-plan-carbon-tax-1.3784326>.

ONTARIO

For a complete breakdown of Ontario's energy and emissions profile see Appendix A6.

Ontario released its latest *Five Year Climate Change Action Plan* in June 2016.¹⁹ The province previously published climate change plans in 2007 and 2011 in addition to two long term energy strategies published in 2010 and 2013. The new four-year plan, which is expected to cost between \$5.9 billion and \$8.3 billion, includes 28 initiatives designed to gradually electrify the transportation system, improve building efficiency, and ultimately to reduce Ontario's total GHG emissions by 9.8 Mt in 2020. The plan is bolstered by a cap-and-trade system that is scheduled to come into effect in 2017.

Ontario produced 170 Mt of GHG emissions in 2014, due mostly to the province's large population which accounted for 23% of Canada's total. Ontario doesn't produce or process significant amounts of fossil fuels, but it consumes more energy than any other province, especially in the form of refined oil for transportation and natural gas for home heating. Ontario's new climate plan includes regulations and standards directly designed to tackle emissions in these areas.

Plan overview

The centrepiece of Ontario's climate change strategy is participation in the Western Climate Initiative's cap-and-trade system, which already includes California and Québec. By Ontario's own estimates, the cap-and-trade system will put a price on GHG emissions of approximately \$18 per tonne. The cost will be borne by industries and consumers (the average household will pay an extra \$13 per month in home heating and transportation costs).²⁰ This is expected to translate into \$1.8 to \$1.9 billion per year in additional government revenues.

Revenues from the carbon price will be reinvested into climate change initiatives, many of which centre around electrifying the province's vehicle fleet. Ontario's electric vehicle incentive of up to \$14,000 is maintained under the new plan while a new \$1,000 incentive for home charging stations is created (plus free overnight vehicle charging). The plan also provides funding for new and improved green transportation infrastructure, including cycling and walking paths, electric vehicle charging stations, and an expanded GO rail network. Altogether, more than \$1.6 billion is allocated over four years to reducing emissions from the transportation sector, which currently accounts for 33% of the province's emissions.

Even more money is allocated to reducing emissions from buildings, which currently account for 22% of Ontario's emissions. As much as \$3 billion will be spent over four years on rebates and subsidies for energy efficiency upgrades and renewable energy improvements to homes, businesses, and public buildings. This funding is complemented by regulatory changes; in particular, an updated provincial building code will require new buildings to have net zero carbon emissions by 2030.

Other major initiatives include \$1 billion in subsidies and incentives for businesses to adopt low-carbon technologies. The plan also includes a variety of rebates and tax breaks for low-income households to offset increased energy costs and encourage the adoption of electric vehicles. The plan sets a prov-

¹⁹ Government of Ontario, *Ontario's Five Year Climate Change Action Plan 2016-2020*, 2016.

²⁰ Dave Sawyer, Jotham Peters and Seton Stiebert, *Impact Modelling and Analysis of Ontario's Proposed Cap and Trade Program*, EnviroEconomics, Navius Research and Dillon Consulting, May 27, 2016.

ince-wide target of 5% electric vehicle sales by 2020.

Progress toward targets

Using 1990 as a baseline, Ontario has set emission reduction targets of 6% by 2014, 15% by 2020, 37% by 2030 and 80% by 2050. To its credit, Ontario met the 2014 target and overall emissions have declined by 19% since 2005—an achievement matched only by Nova Scotia and New Brunswick. Recent reductions are due mostly to the province's phase-out of coal-fired electricity generation, which the government proudly claims was the "one of the single largest greenhouse gas reduction actions implemented to date in North America."

Nevertheless, based on recent projections published by Environment and Climate Change Canada, Ontario is on track to miss its future targets by a substantial margin. Notably, ECCC forecasts Ontario's emissions to be 11% higher than the intended target in 2020 and 60% higher than the intended target in 2030 (see Table A6.2). The new Ontario plan is unlikely to bridge those gaps. At best, the plan hopes to reduce emissions by just 9.8 Mt by 2020, which would leave the province approximately 7 Mt short of its short-term goal.

As in Manitoba, the emissions cap can in theory be lowered every year to make sure Ontario meets its short- and long-term emissions targets. However, if the cap is lowered at the rate required to meet its targets, the cost to businesses and consumers will be much higher than currently claimed. It will require significant political will to hold the line on a carbon price that actually reduces emissions on the scale required. Two thirds of Ontarians support cap-and-trade in principle, which may encourage sustained support for a more stringent carbon pricing policy in the future, but there is no guarantee that support will survive a steep price increase.

BRITISH COLUMBIA

For a complete breakdown of British Columbia's energy and emissions profile see Appendix A2.

British Columbia has historically been viewed as a climate leader due to its ground-breaking carbon tax, which was implemented in 2008 and is now priced at \$30 per tonne of CO₂e. The government of British Columbia appointed a Climate Leadership Team (CLT) in May 2015 to provide advice and recommendations on how the province could continue to lead on climate policy. The team produced a report in October 2015 with 32 recommendations, which were to become the basis for an updated provincial climate plan.²¹ Chief among those recommendations was a \$10 per year increase to the existing carbon tax and a series of ambitious new emissions targets.

After months of delays, BC's updated *Climate Leadership Plan* was published in August 2016.²² Remarkably, and in stark contrast to the Alberta government's approach, the new plan addressed only 18 of the CLT's recommendations and implemented none of them in full.²³ Instead of a large-scale strategy, the 21 initiatives outlined in the plan focus on "targeted, coordinated, sector-specific actions" which fail to include meaningful new funding or serious new regulations. Notably absent from the plan are

²¹ Climate Leadership Team, *Climate Leadership Team: Recommendations to Government*, Government of British Columbia, October 2015.

²² Government of British Columbia, *Climate Leadership Plan*, August 2016.

²³ Elizabeth McSheffrey, "New B.C. climate plan 'full of holes,' say environmentalists," National Observer, August 19, 2016, <http://www.nationalobserver.com/2016/08/19/news/new-bc-climate-plan-full-holes-say-environmentalists>.

changes to the carbon tax.

British Columbia currently accounts for 9% of Canada's emissions—it produced 63 Mt of GHG emissions in 2014—although it is well below average in terms of emissions per capita and emissions intensity. Most of the province's emissions come from transportation, buildings, and oil and gas production. The new climate plan includes measures aimed directly at these sectors, although planned expansions to BC's liquid natural gas industry threaten to prevent the province from meeting its legislated GHG reduction targets in the long term.

Plan overview

The new BC climate plan tweaks energy efficiency strategies to achieve modest emission reductions from vehicles, buildings and industry. Altogether, these measures are expected to reduce the province's emissions by 25 Mt by 2050.

The plan encourages cleaner natural gas production through, among other initiatives, new funding for the electrification of natural gas processing. On transportation, the plan increases the low carbon fuel standard from 10% to 15%. It also encourages marine vessels and commercial trucking fleets to use more natural gas in place of traditional fuels through a series of planned incentives. Unfortunately, many of the plan's actions, including the proposed incentives for natural gas in transportation and a promise to support electric vehicle charging stations, are not backed by dollar figures or tangible regulations.

Perhaps unsurprisingly given the ephemeral commitments made in most areas, the greatest emission reductions in the plan (12 Mt) actually come from the forestry sector. Through a new Forest Carbon Initiative, the province hopes to "enhance" the carbon storage potential of forests. Mostly, this involves more intensive replanting of forests on the order of 20,000 hectares per year, but few details are provided and previous experience with forestry offsets suggests caution when it comes to calculating emissions reductions.²⁴

Progress toward targets

Using 2007 as a baseline, British Columbia has legislated emissions reduction targets of 33% by 2020 and 80% by 2050. Based on current policies, BC will miss both those targets by a wide margin. Using Environment and Climate Change Canada's latest forecasts, the province will exceed its 2020 target by 29 Mt (67%) (see Table A2.2). Even if the new plan succeeds in reducing emissions by 25 Mt by 2050—and contrary to any reasonable expectation BC experiences no new emissions growth between now and then—the province's emissions will still be double the legislated target.

Both the government and the Climate Leadership Team acknowledge that the 2020 target is unachievable at this point. They differ in their commitment to the 2050 target. If the CLT's recommendations are implemented, especially their proposed increases to the carbon tax, it is still possible for BC to meet its long-term goal. The actions outlined in BC's latest climate plan, on the other hand, are destined to fall short.

²⁴ Marc Lee, "Will offsets be the 'indulgences' for our LNG sins?" *Policy Note*, July 18, 2014, <http://www.policynote.ca/will-offsets-be-the-indulgences-for-our-lng-sins>.

Moreover, the government's support for new liquid natural gas projects threatens to undo much of the province's progress on emission reductions to date. If the proposed projects go ahead, they will add approximately 10 Mt to BC's emissions, which does not include the downstream emissions from burning that gas in BC and other jurisdictions.²⁵ The government's climate commitments and economic strategy are increasingly difficult to reconcile.

Conclusion

The overall energy and emissions picture in Canada has not changed significantly since our baseline report was published one year ago. Emissions continue to rise across the country due to a deep reliance on fossil fuels for transportation, electricity generation, and home heating. In addition, the production of fossil fuels in only a few provinces continues to be one of the largest contributors to Canada's overall emissions profile.

Politically, the winds are beginning to shift. The election of a climate-conscious federal government has encouraged some provinces to push ahead with new plans of their own. Four provinces representing 72% of Canada's emissions published new climate policies in the past 12 months. Notably, Ontario and Alberta, the two largest provincial emitters, committed to economy-wide carbon pricing in addition to major investments in climate infrastructure.

Yet the new plans do not put any of the provinces—and consequently the country as a whole—on a path to meeting their GHG emission reduction targets. Far more ambitious policies, in terms of either scope or stringency, are necessary, and the longer Canadian governments wait to pursue them, the more expensive those policies become.

²⁵ Marc Lee, "Petronas' Pacific NorthWest LNG: Profile of a Carbon Bomb," *Behind the Numbers*, February 25, 2016, <http://behindthenumbers.ca/2016/02/25/petronas-pacific-northwest-lng-profile-of-a-carbon-bomb>.

Appendices

All data in the appendices come from the following sources unless otherwise indicated.

Historical GHG emissions and GHG emissions by economic sector

Tables A12-1 through A12-14 in Environment and Climate Change Canada, *National Inventory Report 1990-2014: Greenhouse Gas Sources and Sinks in Canada*, 2016.

Environment and Climate Change Canada, "National and Provincial/Territorial Greenhouse Gas Emission Tables," *Environment Canada Data*, last modified May 4, 2016.

For the sake of brevity, historical data is only included for the years 1990, 2005 and 2014. The first two are the most common baseline years for federal, provincial and territorial GHG emissions reduction targets. The year 1990 is also (not coincidentally) the baseline for the Kyoto Protocol while 2005 is the baseline year for the Copenhagen Accord. 2014 is the latest year for which enough data is available to make comparisons (unless otherwise indicated).

Projected GHG emissions

Table A24 in Environment and Climate Change Canada, *Canada's Second Biennial Report on Climate Change*, Government of Canada, 2016.

Projections in this report are based on government measures announced through September 2015, which does not account for the new climate plans announced in BC, Alberta, Manitoba and Ontario.

Population (to calculate per capita emissions)

Statistics Canada, "Table 051-0001: Estimates of population, by age group and sex for July 1, Canada, provinces and territories," *CANSIM*, last updated September 29, 2015.

Projected population (to calculate future per capita emissions)

Statistics Canada, "Table 052-0005: Projected population, by projection scenario, age and sex, as of July 1, Canada, provinces and territories," *CANSIM*, last updated September 17, 2014.

GDP (to calculate emissions intensity)

Statistics Canada, "Table 384-0038: Gross domestic product, expenditure-based, provincial and territorial," *CANSIM*, last updated November 10, 2015.

Energy production and consumption

Statistics Canada, "Table 128-0016: Supply and demand of primary and secondary energy in terajoules," *CANSIM*, last updated December 10, 2015.

Where the 2014 data for a category is suppressed but the 2013 data for the same category is available, an estimate for 2014 is calculated based on the 2013 share of total energy.

Public opinion estimates

Matto Mildenerberger et al., "The Distribution of Climate Change Public Opinion in Canada," *PLoS ONE* 11(8), 2016.

Appendix A1: Canada

TABLE A1.1: HISTORICAL AND PROJECTED GREENHOUSE GAS EMISSIONS

Year	1990	2005	2014	2020	2030
GHG emissions (Mt CO ₂ e)	613	747	732	768	815
GHG emissions per capita (tonnes CO ₂ e)	22.1	23.2	20.6	20.4	19.8
GHG intensity (Mt CO ₂ e per \$billion GDP)	0.62	0.50	0.42	n/a	n/a

TABLE A1.2: GREENHOUSE GAS EMISSIONS REDUCTION TARGETS

Canada set its federal target for 2020 in accordance with the 2009 Copenhagen Accord. Canada set its target for 2030 as its intended nationally-determined contribution under the 2015 Paris Agreement.

Baseline year & emissions level	2005 (747 Mt CO ₂ e)	
Target year	2020	2030
Target reduction from baseline (%)	17%	30%
Target GHG emissions level	620 Mt	523 Mt
Gap between target and projection	148 Mt (24%)	292 Mt (56%)

TABLE A1.3: GREENHOUSE GAS EMISSIONS BY ECONOMIC SECTOR, IN MEGATONNES CO₂E (2014)

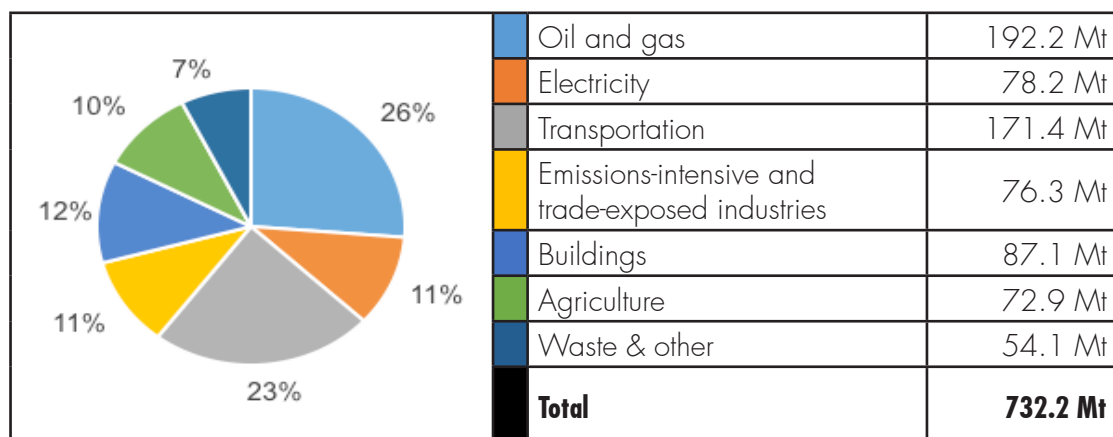


TABLE A1.4: PRIMARY ENERGY SUPPLY (I.E. PRODUCTION) BY SOURCE, IN TERAJOULES (2014)

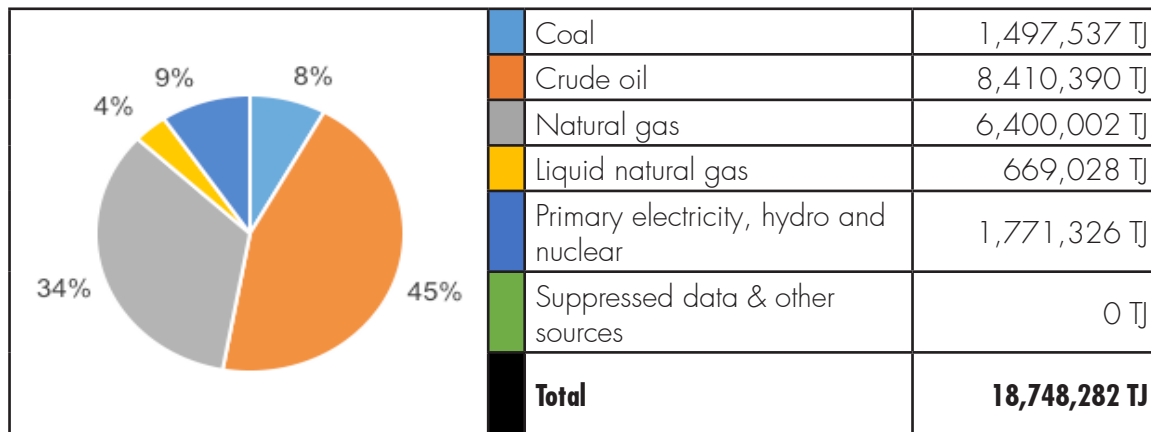


TABLE A1.5: FINAL ENERGY DEMAND (I.E. CONSUMPTION) BY SOURCE, IN TERAJOULES (2014)

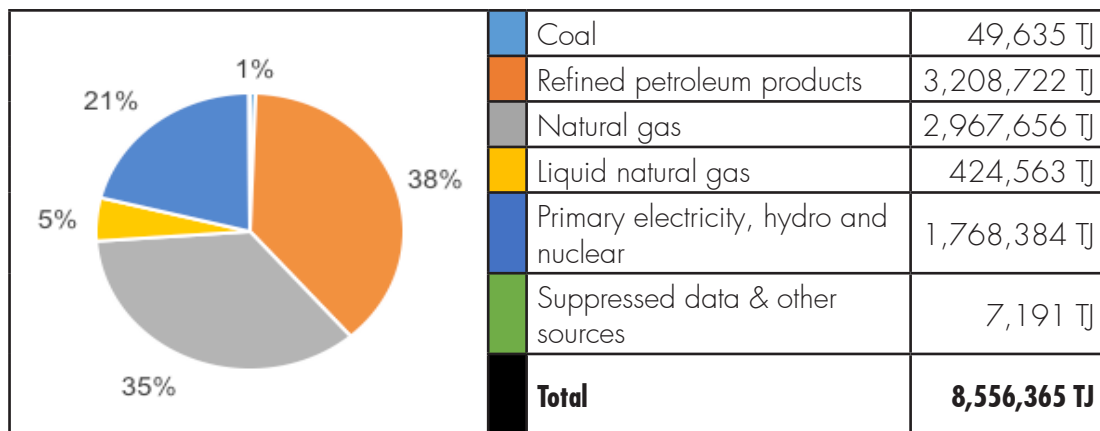


TABLE A1.6: PUBLIC OPINION ON CLIMATE CHANGE AND CLIMATE POLICY (2016 ESTIMATES)

Share of the population that...	Yes	No	Difference
Believes the earth is getting warmer	79%	16%	+63%
Believes the earth is getting warmer <i>partly</i> or <i>mostly</i> because of human activities	61%	39%	+22%
Believes the earth is getting warmer <i>mostly</i> because of human activities	44%	39%	+5%
Supports a cap-and-trade system	66%	27%	+39%
Supports a carbon tax	49%	44%	+5%

Appendix A2: British Columbia

TABLE A2.1: HISTORICAL AND PROJECTED GREENHOUSE GAS EMISSIONS

Year	1990	2005	2014	2020	2030
GHG emissions (Mt CO ₂ e)	52.9	65.2	62.9	72	83
GHG emissions per capita (tonnes CO ₂ e)	16.1	15.5	13.6	14.5	15.2
GHG intensity (Mt CO ₂ e per \$billion GDP)	0.44	0.35	0.28	n/a	n/a

TABLE A2.2: GREENHOUSE GAS EMISSIONS REDUCTION TARGETS

BC legislated its emissions targets through the 2007 *Greenhouse Gas Reduction Targets Act*.

Baseline year & emissions level	2007 (64.3 Mt CO ₂ e)	
Target year	2020	2050
Target reduction from baseline (%)	33%	80%
Target GHG emissions level	43.1 Mt	12.9 Mt
Gap between target and projection	28.9 Mt (67%)	n/a

TABLE A2.3: GREENHOUSE GAS EMISSIONS BY ECONOMIC SECTOR, IN MEGATONNES CO₂E (2014)

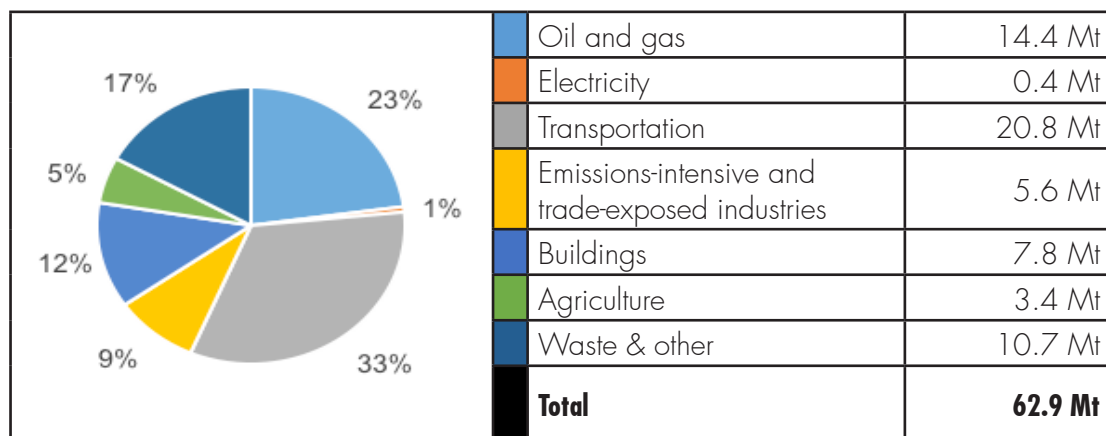


TABLE A2.4: PRIMARY ENERGY SUPPLY (I.E. PRODUCTION) BY SOURCE, IN TERAJOULES (2014)

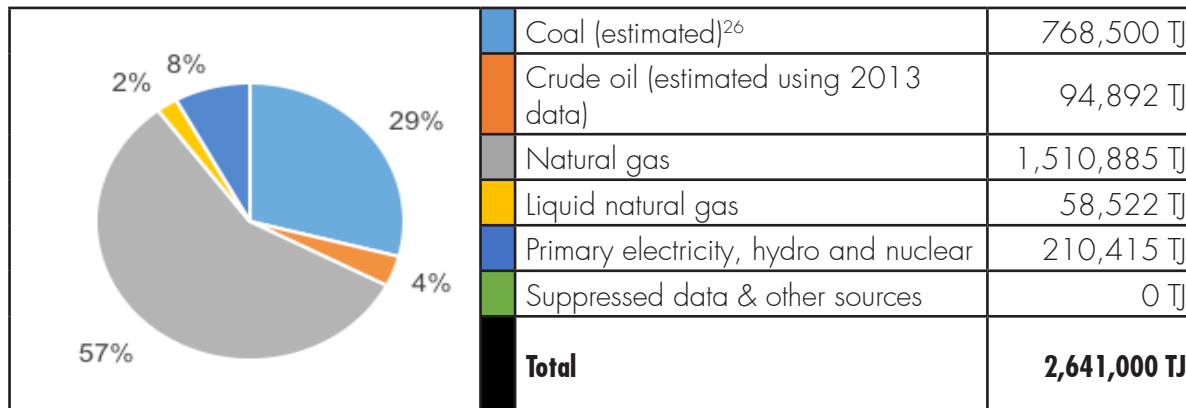


Table A2.5: Final energy demand (i.e. consumption) by source, in terajoules (2014)

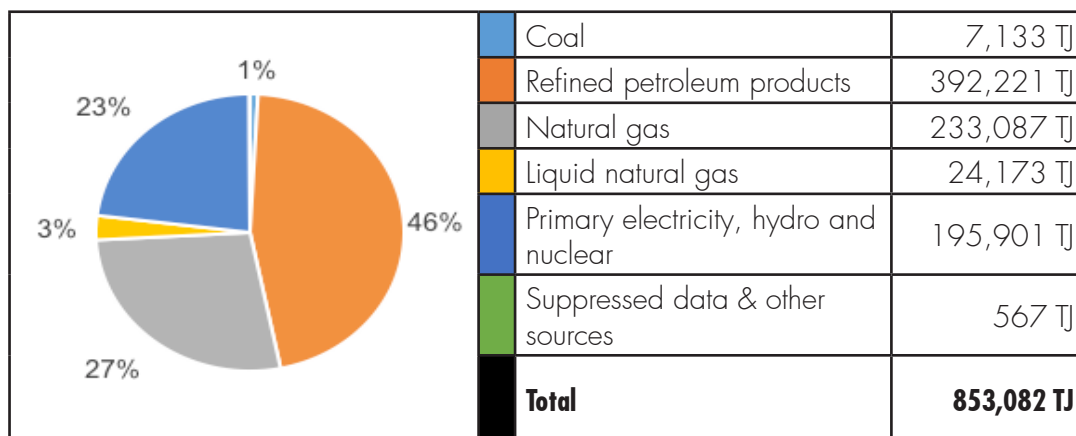


TABLE A2.6: PUBLIC OPINION ON CLIMATE CHANGE AND CLIMATE POLICY (2016 ESTIMATES)

Share of the population that...	Yes	No	Difference
Believes the earth is getting warmer	82%	12%	+70%
Believes the earth is getting warmer <i>partly</i> or <i>mostly</i> because of human activities	62%	38%	+24%
Believes the earth is getting warmer <i>mostly</i> because of human activities	42%	38%	+4%
Supports a cap-and-trade system	63%	29%	+34%
Supports a carbon tax	57%	36%	+21%

²⁶ Total coal production is suppressed in the Statistics Canada data. The figure presented here is calculated using provincial government sources, which claim 26.5 million tonnes of coal production in 2014. One tonne of coal equals approximately 0.029 terajoules. See British Columbia Geological Survey, *British Columbia Coal Industry Overview 2015*, British Columbia Ministry of Energy and Mines, 2016.

Appendix A3: Alberta

TABLE A3.1: HISTORICAL AND PROJECTED GREENHOUSE GAS EMISSIONS

Year	1990	2005	2014	2020	2030
GHG emissions (Mt CO ₂ e)	175.2	233.0	273.8	297	320
GHG emissions per capita (tonnes CO ₂ e)	68.8	70.1	66.4	64.4	58.2
GHG intensity (Mt CO ₂ e per \$billion GDP)	1.31	0.96	0.88	n/a	n/a

Greenhouse gas emissions reduction targets

In 2008, the province's Climate Change Strategy included a commitment to stabilize emissions by 2020 and reduce emissions by 50% below "business as usual" levels by 2050, which the province estimated at a 200 Mt reduction or the equivalent of a 14% absolute reduction below 2005 levels. However, Alberta's 2015 Climate Leadership Report dismissed these targets as requiring "policies outside the scope of stringency that we are prepared to recommend." When the province implemented its latest climate plan in the 2016 provincial budget, it did not include any comprehensive GHG targets.

TABLE A3.2: GREENHOUSE GAS EMISSIONS BY ECONOMIC SECTOR, IN MEGA-TONNES CO₂E (2014)

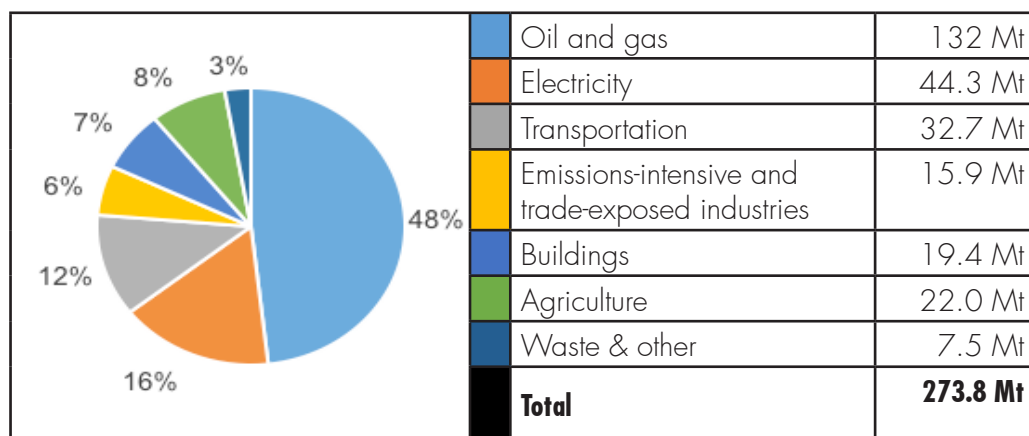


TABLE A3.3: PRIMARY ENERGY SUPPLY (I.E. PRODUCTION) BY SOURCE, IN TERAJOULES (2014)

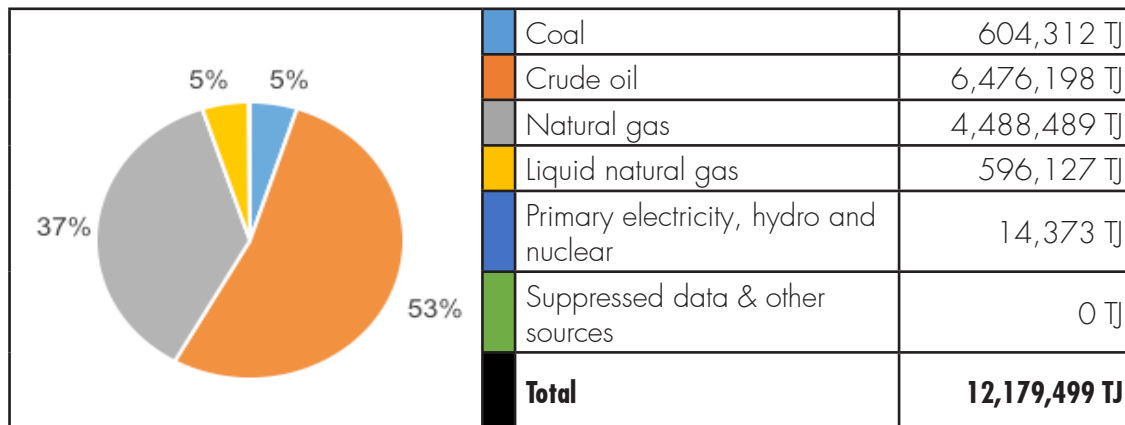


TABLE A3.4: FINAL ENERGY DEMAND (I.E. CONSUMPTION) BY SOURCE, IN TERAJOULES (2014)

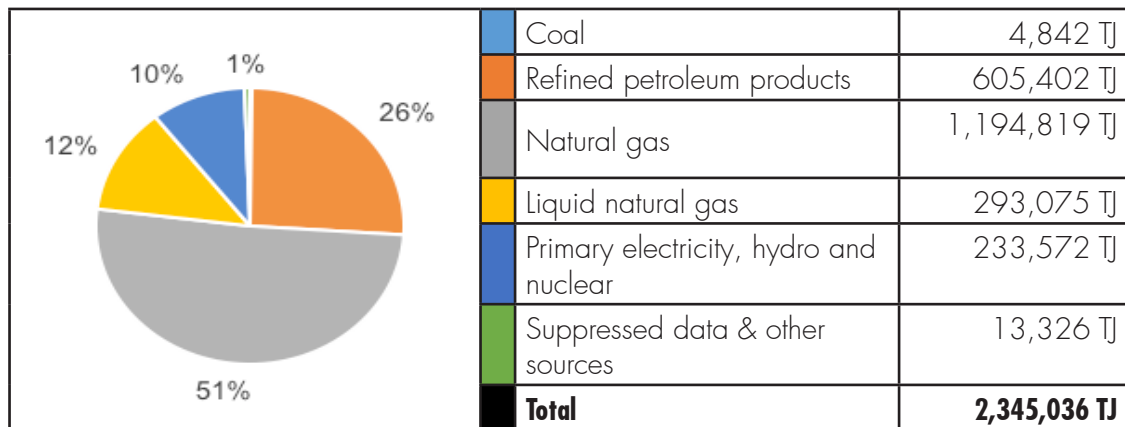


TABLE A3.5: PUBLIC OPINION ON CLIMATE CHANGE AND CLIMATE POLICY (2016 ESTIMATES)

Share of the population that...	Yes	No	Difference
Believes the earth is getting warmer	67%	25%	+42%
Believes the earth is getting warmer <i>partly</i> or <i>mostly</i> because of human activities	47%	53%	-6%
Believes the earth is getting warmer <i>mostly</i> because of human activities	28%	53%	-25%
Supports a cap-and-trade system	62%	32%	+30%
Supports a carbon tax	44%	49%	-5%

Appendix A4: Saskatchewan

TABLE A4.1: HISTORICAL AND PROJECTED GREENHOUSE GAS EMISSIONS

Year	1990	2005	2014	2020	2030
GHG emissions (Mt CO ₂ e)	45.1	69.6	75.5	75	73
GHG emissions per capita (tonnes CO ₂ e)	44.8	70.1	67.3	63.9	57.8
GHG intensity (Mt CO ₂ e per \$billion GDP)	1.19	1.33	1.23	n/a	n/a

TABLE A4.2: GREENHOUSE GAS EMISSIONS REDUCTION TARGETS

Saskatchewan's 2020 GHG target was proposed in a draft regulation under the 2009 *Management and Reduction of Greenhouse Gases Act*, although it was never formally adopted.

Baseline year & emissions level	2006 (70.0 Mt CO ₂ e)
Target year	2020
Target reduction from baseline (%)	20%
Target GHG emissions level	56.0 Mt
Gap between target and projection	19.0 Mt (34%)

TABLE A4.3: GREENHOUSE GAS EMISSIONS BY ECONOMIC SECTOR, IN MEGA-TONNES CO₂E (2014)

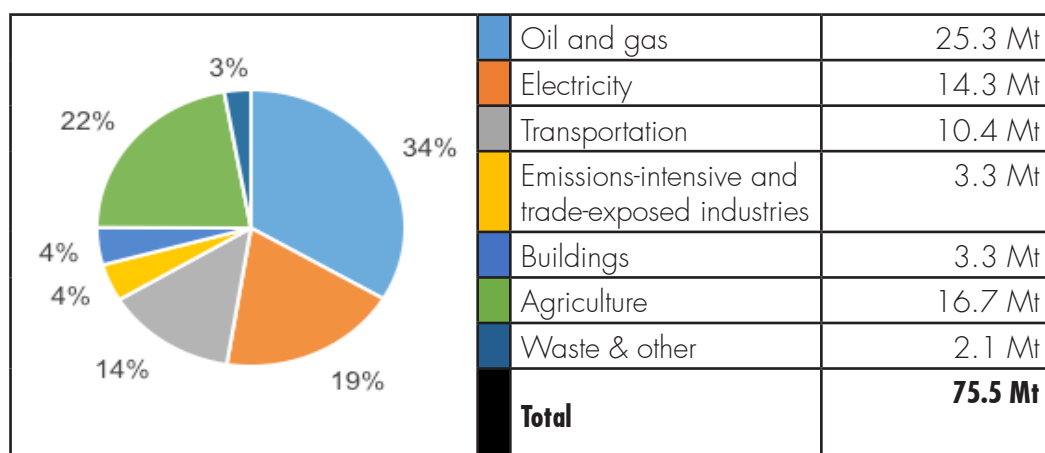


TABLE A4.4: PRIMARY ENERGY SUPPLY (I.E. PRODUCTION) BY SOURCE, IN TERAJOULES (2014)

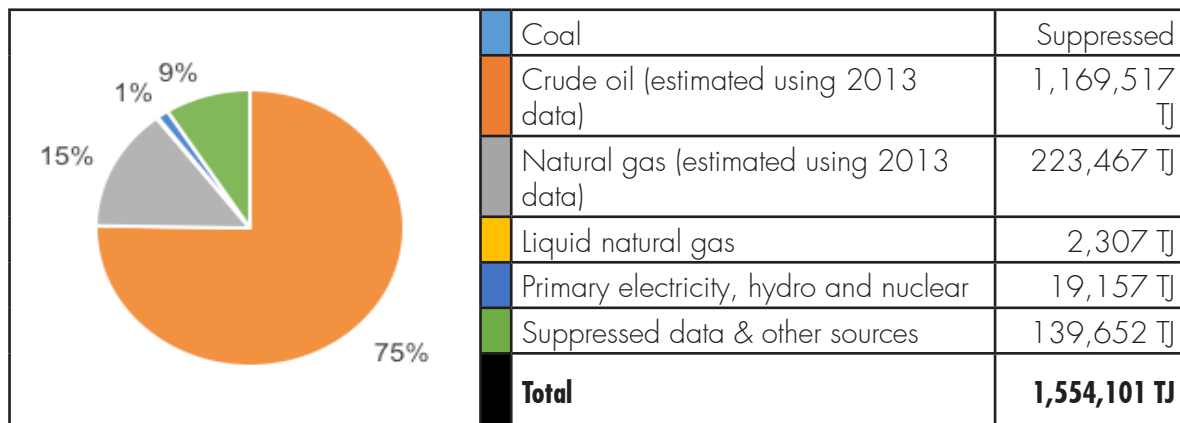


TABLE A4.5: FINAL ENERGY DEMAND (I.E. CONSUMPTION) BY SOURCE, IN TERAJOULES (2014)

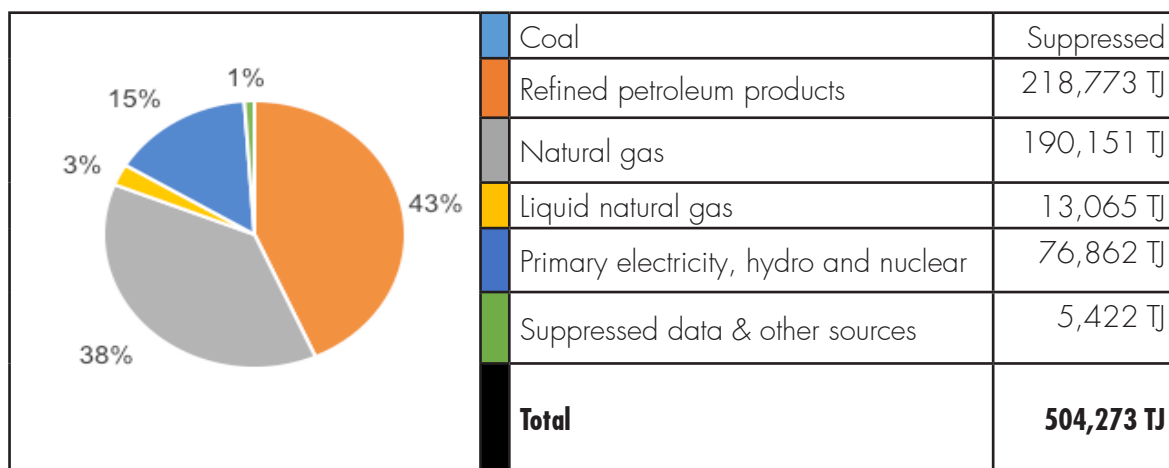


TABLE A4.6: PUBLIC OPINION ON CLIMATE CHANGE AND CLIMATE POLICY (2016 ESTIMATES)

Share of the population that...	Yes	No	Difference
Believes the earth is getting warmer	66%	26%	+40%
Believes the earth is getting warmer <i>partly</i> or <i>mostly</i> because of human activities	49%	51%	-2%
Believes the earth is getting warmer <i>mostly</i> because of human activities	33%	51%	-18%
Supports a cap-and-trade system	63%	31%	+32%
Supports a carbon tax	44%	49%	-5%

Appendix A5: Manitoba

TABLE A5.1: HISTORICAL AND PROJECTED GREENHOUSE GAS EMISSIONS

Year	1990	2005	2014	2020	2030
GHG emissions (Mt CO ₂ e)	18.7	20.7	21.5	22	24
GHG emissions per capita (tonnes CO ₂ e)	16.9	17.6	16.8	16.1	15.9
GHG intensity (Mt CO ₂ e per \$billion GDP)	0.52	0.44	0.37	n/a	n/a

TABLE A5.2: GREENHOUSE GAS EMISSIONS REDUCTION TARGETS

Manitoba set its 2030, 2050 and 2080 GHG targets in 2015 as part of the province's *Climate Change and Green Economy Action Plan*.

Baseline year & emissions level	2005 (20.7 Mt CO ₂ e)		
Target year	2030	2050	2080
Target reduction from baseline (%)	33%	50%	100%
Target GHG emissions level	13.8 Mt	10.4 Mt	0 Mt
Gap between target and projection	10.2 Mt (74%)	n/a	n/a

TABLE A5.3: GREENHOUSE GAS EMISSIONS BY ECONOMIC SECTOR, IN MEGATONNES CO₂E (2014)

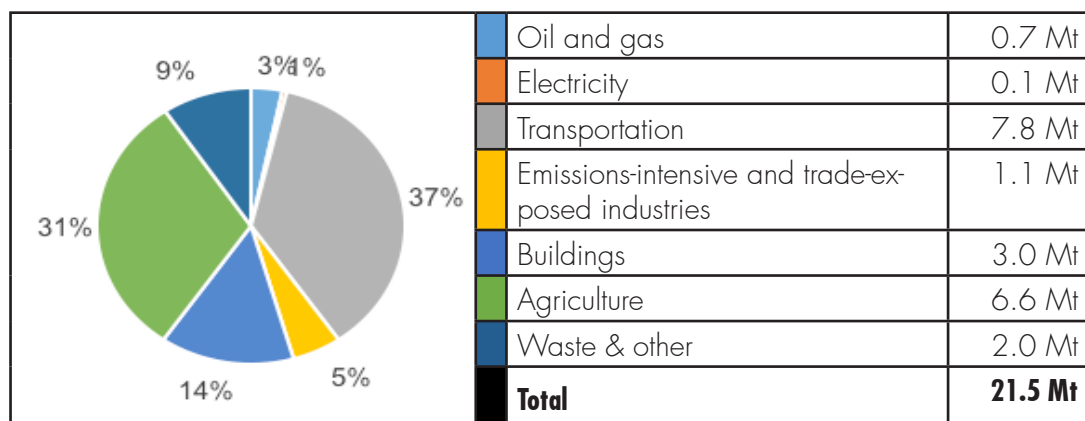


TABLE A5.4: PRIMARY ENERGY SUPPLY (I.E. PRODUCTION) BY SOURCE, IN TERAJOULES (2014)

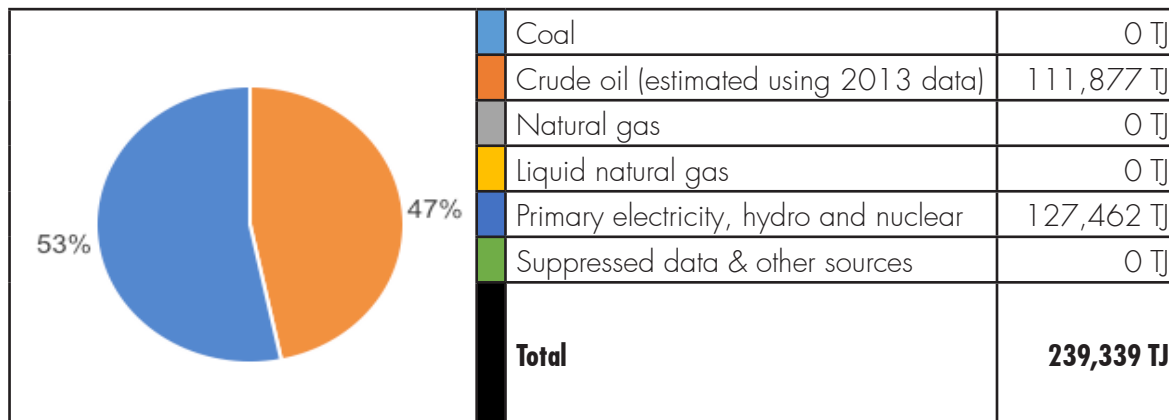


TABLE A5.5: FINAL ENERGY DEMAND (I.E. CONSUMPTION) BY SOURCE, IN TERAJOULES (2014)

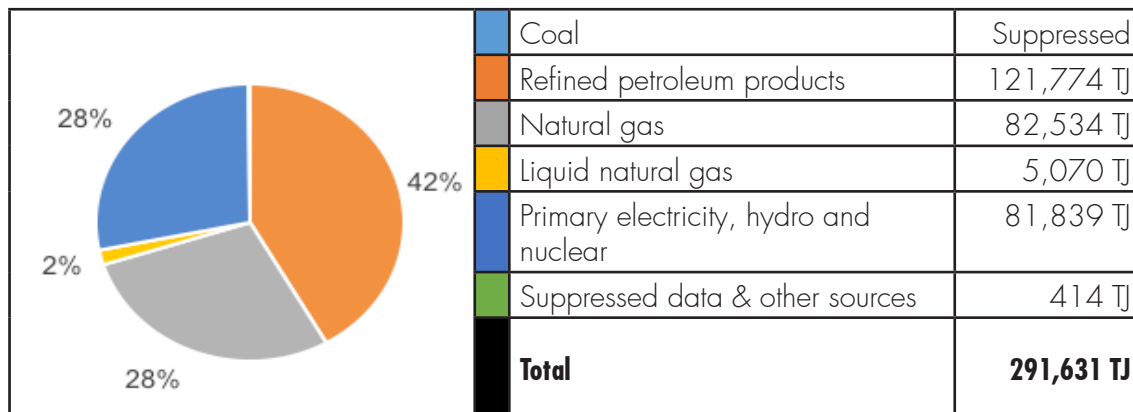


TABLE A5.6: PUBLIC OPINION ON CLIMATE CHANGE AND CLIMATE POLICY (2016 ESTIMATES)

Share of the population that...	Yes	No	Difference
Believes the earth is getting warmer	68%	24%	+44%
Believes the earth is getting warmer <i>partly</i> or <i>mostly</i> because of human activities	58%	42%	+16%
Believes the earth is getting warmer <i>mostly</i> because of human activities	42%	42%	0%
Supports a cap-and-trade system	65%	28%	+37%
Supports a carbon tax	50%	42%	+8%

Appendix A6: Ontario

TABLE A6.1: HISTORICAL AND PROJECTED GREENHOUSE GAS EMISSIONS

Year	1990	2005	2014	2020	2030
GHG emissions (Mt CO ₂ e)	181.8	210.6	170.2	171	181
GHG emissions per capita (tonnes CO ₂ e)	17.7	16.8	12.4	11.8	11.5
GHG intensity (Mt CO ₂ e per \$billion GDP)	0.48	0.36	0.26	n/a	n/a

TABLE A6.2: GREENHOUSE GAS EMISSIONS REDUCTION TARGETS

Ontario adopted its 2020 and 2050 climate targets as part of the 2007 *Action Plan on Climate Change*. In 2015, the province announced an additional, mid-term target for 2030.

Baseline year & emissions level	1990 (181.8 Mt CO ₂ e)		
Target year	2020	2030	2050
Target reduction from baseline (%)	15%	37%	80%
Target GHG emissions level	154.5 Mt	114.5 Mt	36.4 Mt
Gap between target and projection	16.5 Mt (11%)	66.5 Mt (58%)	n/a

TABLE A6.3: GREENHOUSE GAS EMISSIONS BY ECONOMIC SECTOR, IN MEGATONNES CO₂E (2014)

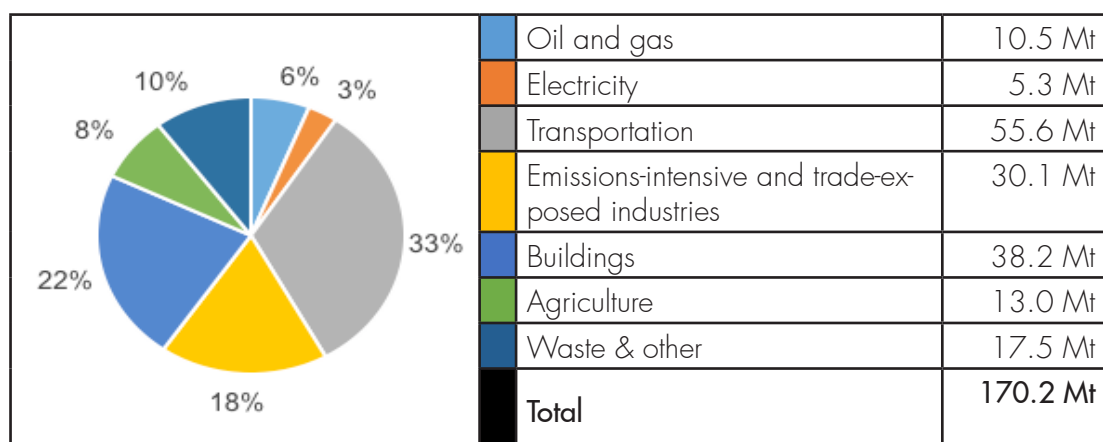


TABLE A6.4: PRIMARY ENERGY SUPPLY (I.E. PRODUCTION) BY SOURCE, IN TERAJOULES (2014)

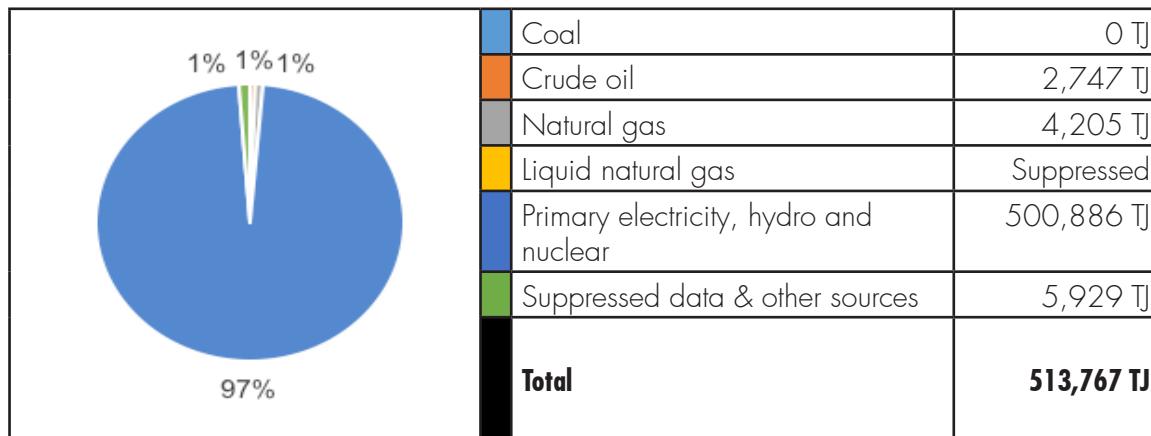


TABLE A6.5: FINAL ENERGY DEMAND (I.E. CONSUMPTION) BY SOURCE, IN TERAJOULES (2014)

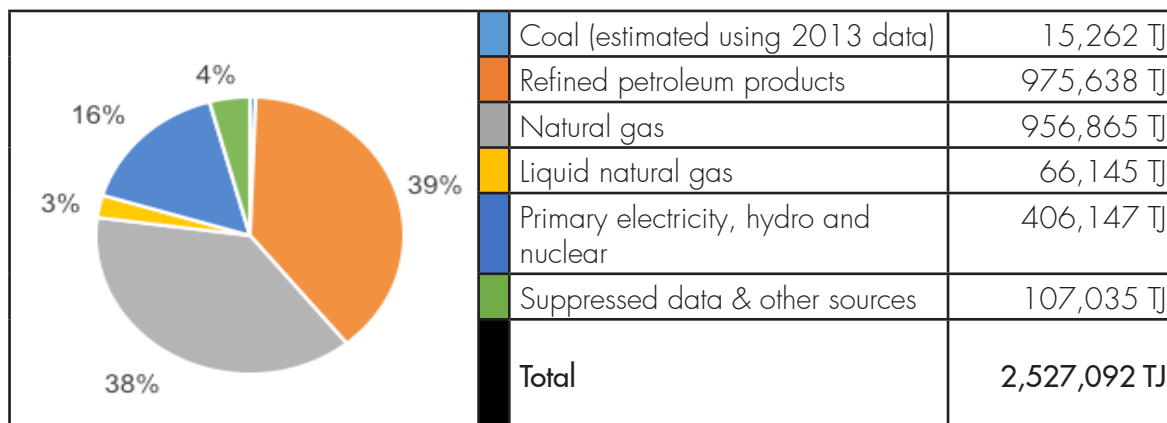


TABLE A6.6: PUBLIC OPINION ON CLIMATE CHANGE AND CLIMATE POLICY (2016 ESTIMATES)

Share of the population that...	Yes	No	Difference
Believes the earth is getting warmer	79%	15%	+64%
Believes the earth is getting warmer <i>partly</i> or <i>mostly</i> because of human activities	63%	37%	+26%
Believes the earth is getting warmer <i>mostly</i> because of human activities	46%	37%	+9%
Supports a cap-and-trade system	66%	27%	+39%
Supports a carbon tax	49%	44%	+5%

Appendix A7: Québec

TABLE A7.1: HISTORICAL AND PROJECTED GREENHOUSE GAS EMISSIONS

Year	1990	2005	2014	2020	2030
GHG emissions (Mt CO ₂ e)	89.1	89.7	82.7	85	90
GHG emissions per capita (tonnes CO ₂ e)	12.7	11.8	10.1	9.9	9.9
GHG intensity (Mt CO ₂ e per \$billion GDP)	0.42	0.30	0.25	n/a	n/a

TABLE A7.2: GREENHOUSE GAS EMISSIONS REDUCTION TARGETS

Québec adopted its 2020 target as part of the 2012 *Climate Change Action Plan*. In 2015, the province announced an additional target for 2030 to align with the New England Governors and Eastern Canadian Premiers' regional target of 35-45% below 1990 levels by 2030.

Baseline year & emissions level	1990 (89.1 Mt CO ₂ e)	
Target year	2020	2030
Target reduction from baseline (%)	20%	38%
Target GHG emissions level	71.3 Mt	55.7 Mt
Gap between target and projection	13.7 Mt (19%)	34.3 Mt (62%)

TABLE A7.3: GREENHOUSE GAS EMISSIONS BY ECONOMIC SECTOR, IN MEGA-TONNES CO₂E (2014)

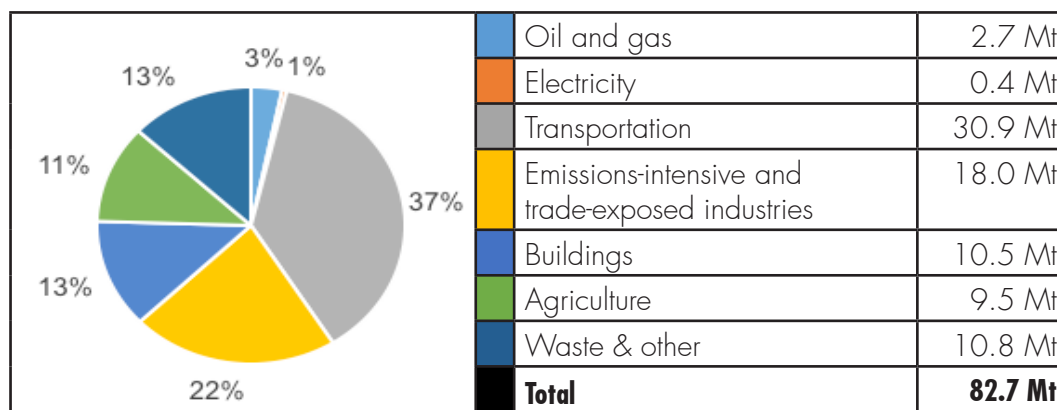


TABLE A7.4: PRIMARY ENERGY SUPPLY (I.E. PRODUCTION) BY SOURCE, IN TERAJOULES (2014)

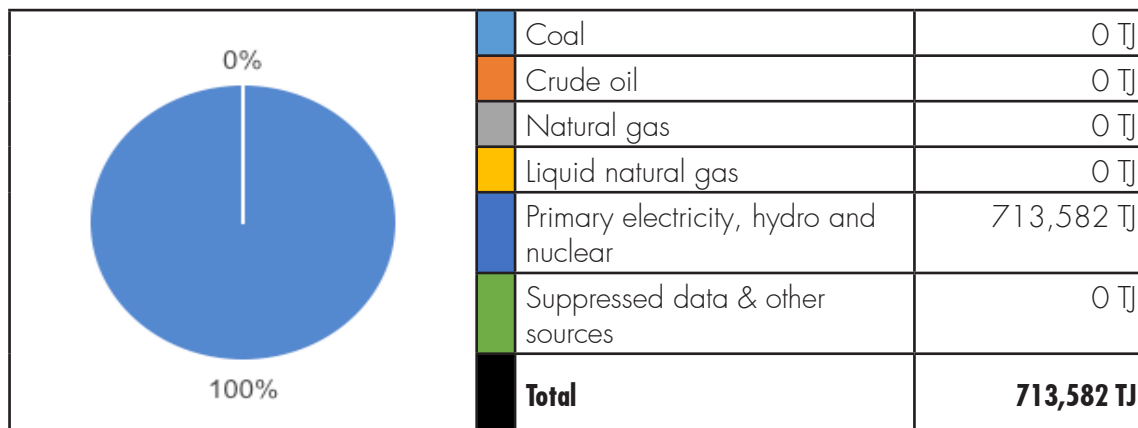


TABLE A7.5: FINAL ENERGY DEMAND (I.E. CONSUMPTION) BY SOURCE, IN TERAJOULES (2014)

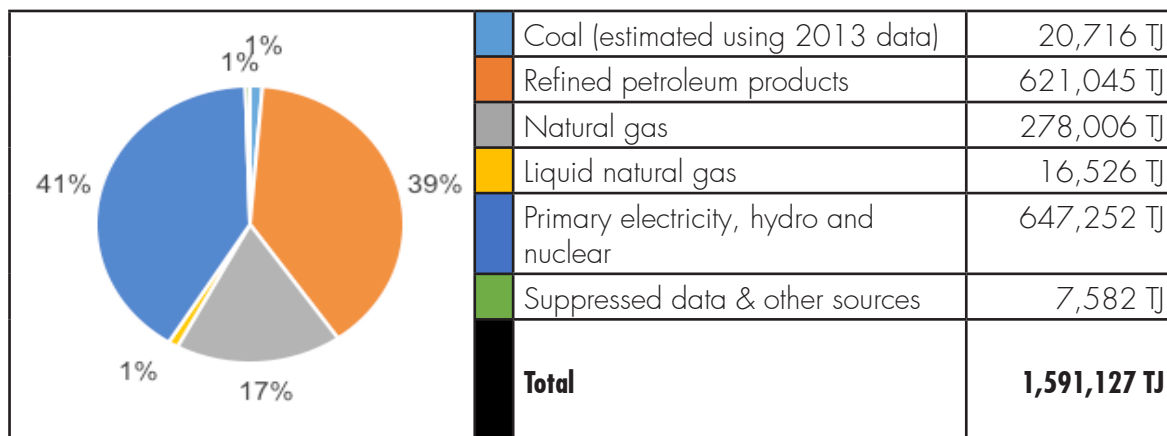


TABLE A7.6: PUBLIC OPINION ON CLIMATE CHANGE AND CLIMATE POLICY (2016 ESTIMATES)

Share of the population that...	Yes	No	Difference
Believes the earth is getting warmer	85%	11%	+74%
Believes the earth is getting warmer <i>partly</i> or <i>mostly</i> because of human activities	68%	32%	+36%
Believes the earth is getting warmer <i>mostly</i> because of human activities	53%	32%	+21%
Supports a cap-and-trade system	71%	22%	+49%
Supports a carbon tax	49%	45%	+4%

Appendix A8: New Brunswick

Table A8.1: Historical and projected greenhouse gas emissions

Year	1990	2005	2014	2020	2030
GHG emissions (Mt CO ₂ e)	16.4	20.5	14.9	17	16
GHG emissions per capita (tonnes CO ₂ e)	22.2	27.4	19.7	22.2	20.9
GHG intensity (Mt CO ₂ e per \$billion GDP)	0.84	0.74	0.53	n/a	n/a

Table A8.2: Greenhouse gas emissions reduction targets

New Brunswick's provincial emissions targets align with the regional targets set by the New England Governors and Eastern Canadian Premiers in the 2001 *Climate Change Action Plan* and 2015 *Resolution Concerning Climate Change*.

Baseline year & emissions level	1990 (16.4 Mt CO ₂ e)		2001 (23.0 Mt CO ₂ e)
Target year	2020	2030	2050
Target reduction from baseline (%)	10%	35-45%	75-85%
Target GHG emissions level	14.8 Mt	9.0-10.7 Mt	3.5-5.8 Mt
Gap between target and projection	2.2 Mt (15%)	5.3-7.0 Mt (50-77%)	n/a

Table A8.3: Greenhouse gas emissions by economic sector, in megatonnes CO₂e (2014)

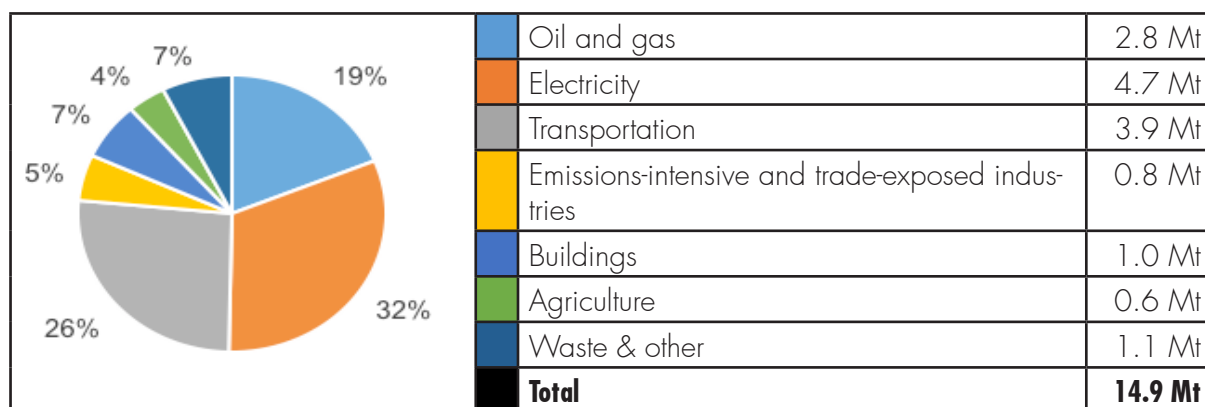


Table A8.4: Primary energy supply (i.e. production) by source, in terajoules (2014)

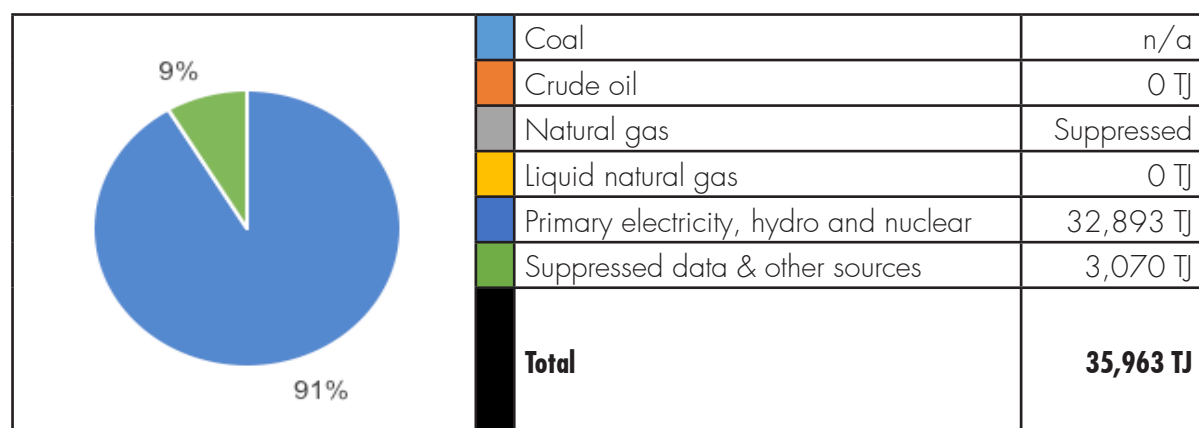


Table A8.5: Final energy demand (i.e. consumption) by source, in terajoules (2014)

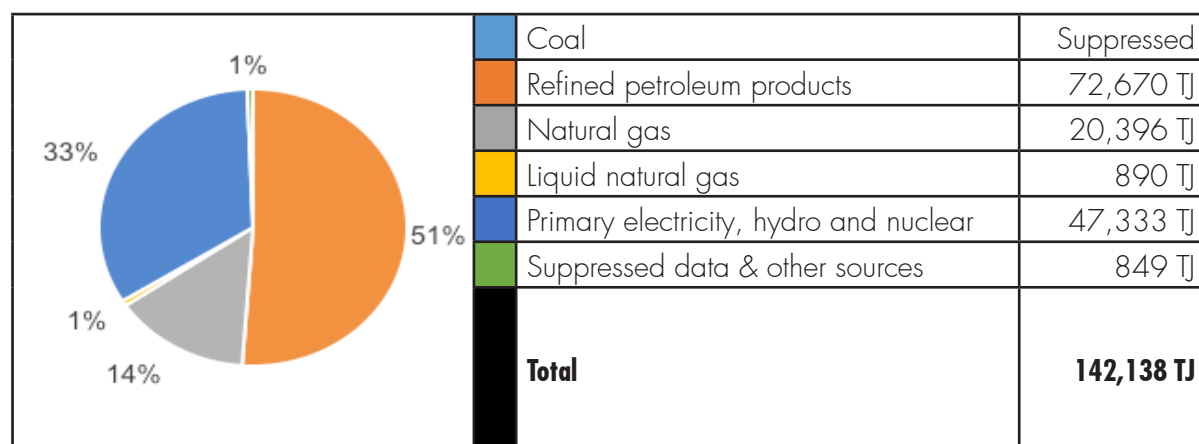


Table A8.6: Public opinion on climate change and climate policy (2016 estimates)

Share of the population that...	Yes	No	Difference
Believes the earth is getting warmer	75%	18%	+57%
Believes the earth is getting warmer <i>partly</i> or <i>mostly</i> because of human activities	56%	44%	+12%
Believes the earth is getting warmer <i>mostly</i> because of human activities	42%	44%	-2%
Supports a cap-and-trade system	67%	26%	+41%
Supports a carbon tax	46%	48%	-2%

Appendix A9: Nova Scotia

Table A9.1: Historical and projected greenhouse gas emissions

Year	1990	2005	2014	2020	2030
GHG emissions (Mt CO ₂ e)	20.0	23.5	16.6	15	14
GHG emissions per capita (tonnes CO ₂ e)	22.0	25.1	17.6	15.8	14.7
GHG intensity (Mt CO ₂ e per \$billion GDP)	0.78	0.70	0.46	n/a	n/a

Table A9.2: Greenhouse gas emissions reduction targets

Nova Scotia's provincial emissions targets align with the regional targets set by the New England Governors and Eastern Canadian Premiers in the 2001 *Climate Change Action Plan* and 2015 *Resolution Concerning Climate Change*. Nova Scotia legislated its 2020 emissions target under the 2007 *Environmental Goals and Sustainable Prosperity Act*.

Baseline year & emissions level	1990 (20.0 Mt CO ₂ e)		2001 (21.5 Mt CO ₂ e)
Target year	2020	2030	2050
Target reduction from baseline (%)	10%	35-45%	75-85%
Target GHG emissions level	18.0 Mt	11.0-13.0 Mt	3.2-5.4 Mt
Gap between target and projection	-3.0 Mt (-17%)	1.0-3.0 Mt (8-27%)	n/a

Table A9.3: Greenhouse gas emissions by economic sector, in megatonnes CO₂e (2014)

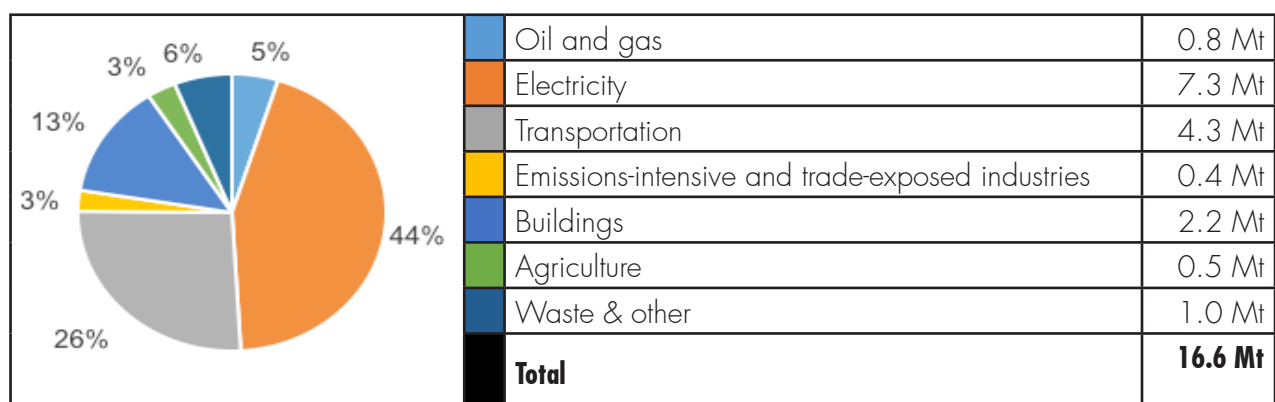


Table A9.4: Primary energy supply (i.e. production) by source, in terajoules (2014)

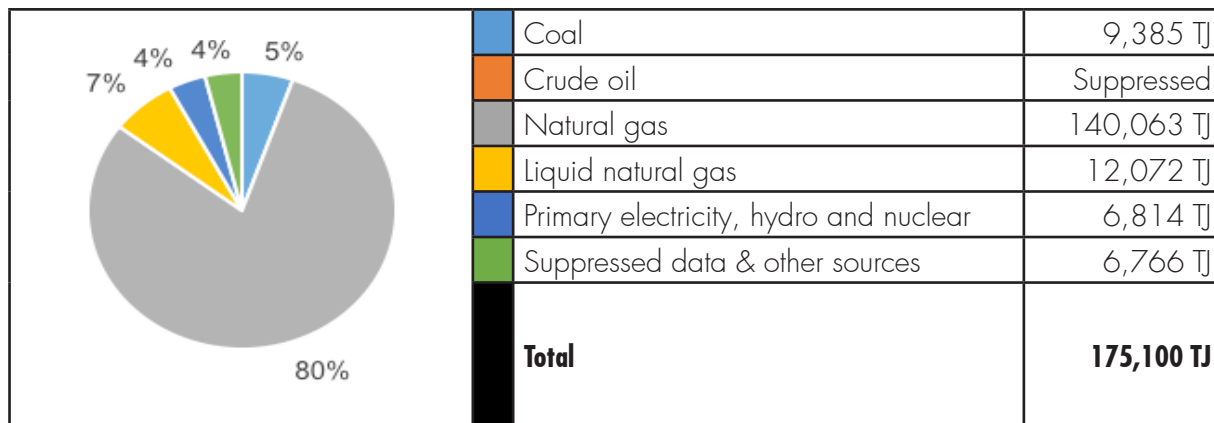


Table A9.5: Final energy demand (i.e. consumption) by source, in terajoules (2014)

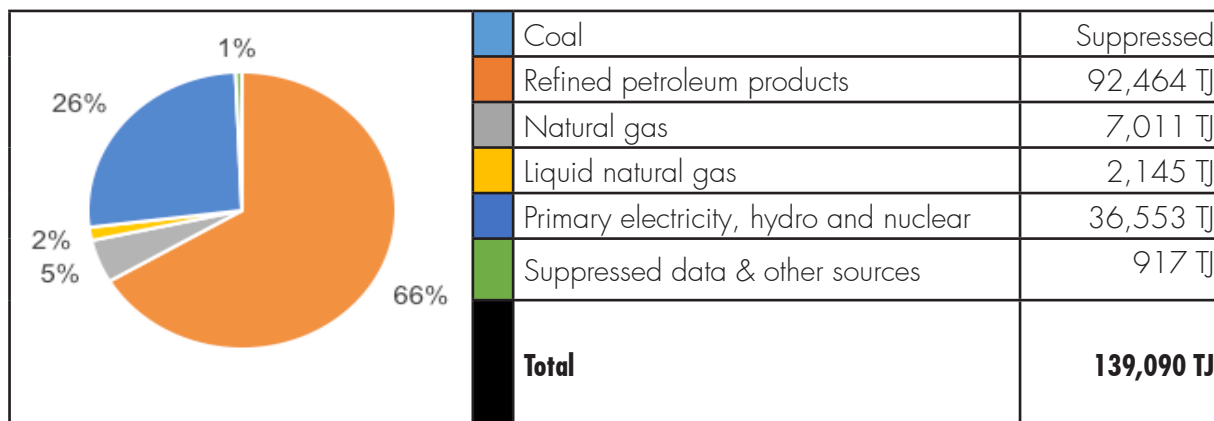


Table A9.6: Public opinion on climate change and climate policy (2016 estimates)

Share of the population that...	Yes	No	Difference
Believes the earth is getting warmer	87%	7%	+80%
Believes the earth is getting warmer partly or mostly because of human activities	61%	39%	+22%
Believes the earth is getting warmer mostly because of human activities	45%	39%	+6%
Supports a cap-and-trade system	67%	27%	+40%
Supports a carbon tax	49%	45%	+4%

Appendix A10: Prince Edward Island

Table A10.1: Historical and projected greenhouse gas emissions

Year	1990	2005	2014	2020	2030
GHG emissions (Mt CO ₂ e)	2.0	2.1	1.8	2	2
GHG emissions per capita (tonnes CO ₂ e)	15.3	15.2	12.3	12.9	11.9
GHG intensity (Mt CO ₂ e per \$billion GDP)	0.67	0.47	0.35	n/a	n/a

Table A10.2: Greenhouse gas emissions reduction targets

Prince Edward Island's provincial emissions targets align with the regional targets set by the New England Governors and Eastern Canadian Premiers in the 2001 *Climate Change Action Plan* and 2015 *Resolution Concerning Climate Change*.

Baseline year & emissions level	1990 (2.0 Mt CO ₂ e)		2001 (2.0 Mt CO ₂ e)
Target year	2020	2030	2050
Target reduction from baseline (%)	10%	35-45%	75-85%
Target GHG emissions level	1.8 Mt	1.1-1.3 Mt	0.3-0.5 Mt
Gap between target and projection	0.2 Mt (11%)	0.7-0.9 Mt (54-82%)	n/a

Table A10.3: Greenhouse gas emissions by economic sector, in megatonnes CO₂e (2014)

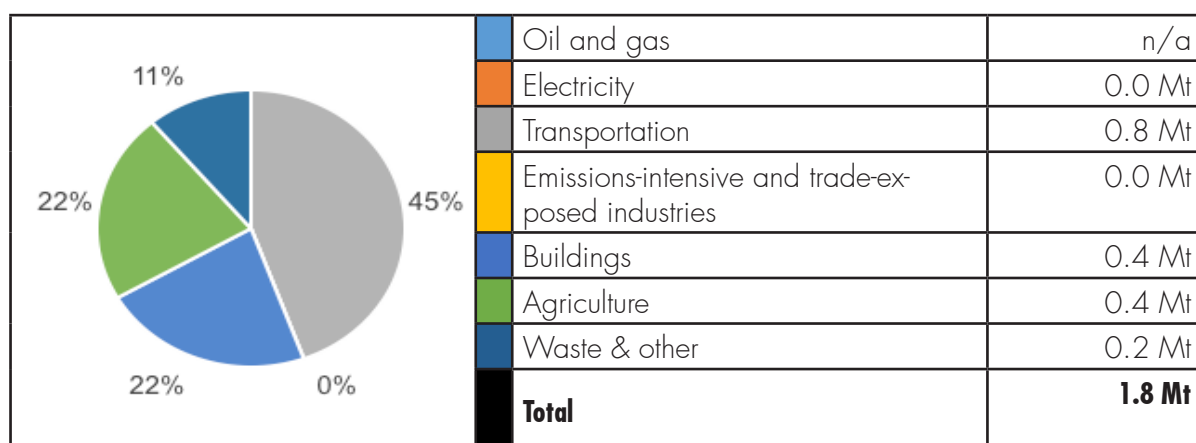


Table A10.4: Primary energy supply (i.e. production) by source, in terajoules (2014)

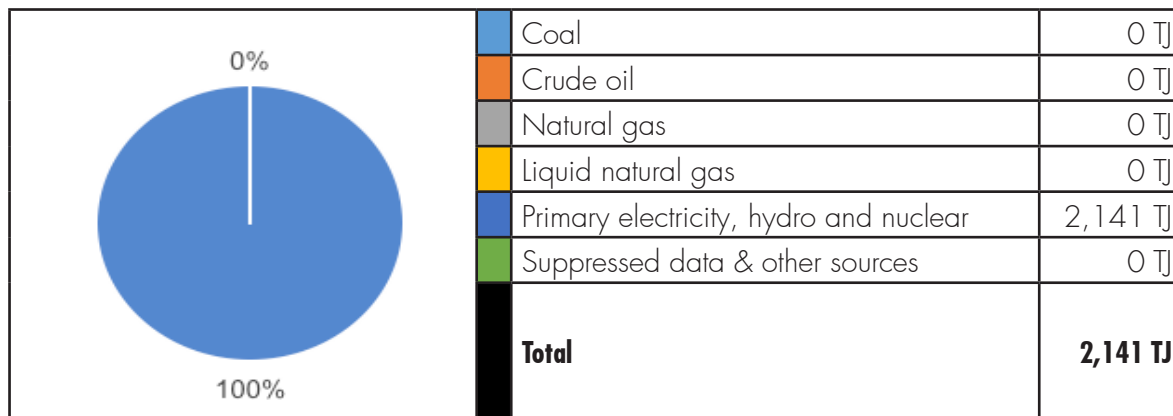


Table A10.5: Final energy demand (i.e. consumption) by source, in terajoules (2014)

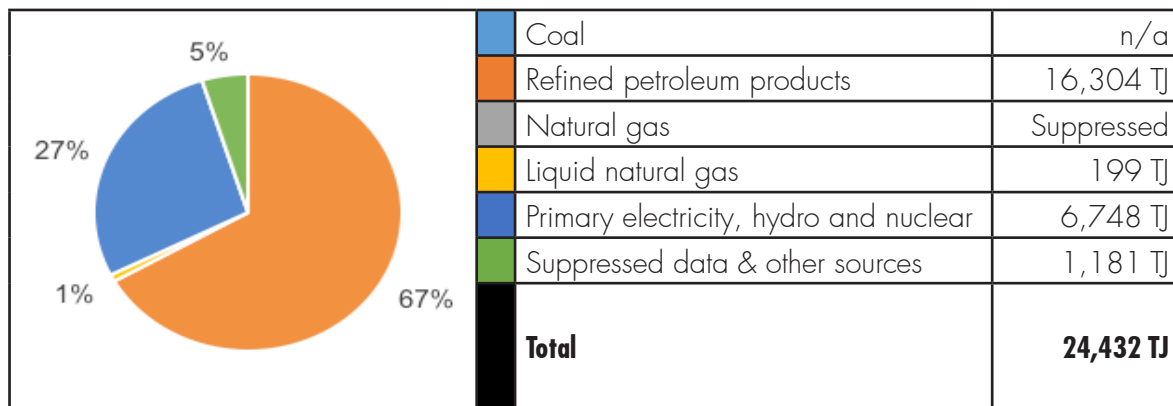


Table A10.6: Public opinion on climate change and climate policy (2016 estimates)

Share of the population that...	Yes	No	Difference
Believes the earth is getting warmer	82%	13%	+69%
Believes the earth is getting warmer <i>partly</i> or <i>mostly</i> because of human activities	60%	40%	+20%
Believes the earth is getting warmer <i>mostly</i> because of human activities	41%	40%	+1%
Supports a cap-and-trade system	70%	23%	+47%
Supports a carbon tax	46%	47%	-1%

Appendix A11: Newfoundland and Labrador

Table A11.1: Historical and projected greenhouse gas emissions

Year	1990	2005	2014	2020	2030
GHG emissions (Mt CO ₂ e)	9.6	10.2	10.6	9	8
GHG emissions per capita (tonnes CO ₂ e)	16.6	19.8	20.0	17.5	16.3
GHG intensity (Mt CO ₂ e per \$billion GDP)	0.55	0.39	0.38	n/a	n/a

Table A11.2: Greenhouse gas emissions reduction targets

Newfoundland and Labrador's provincial emissions targets align with the regional targets set by the New England Governors and Eastern Canadian Premiers in the 2001 *Climate Change Action Plan* and 2015 *Resolution Concerning Climate Change*.

Baseline year & emissions level	1990 (9.6 Mt CO ₂ e)		2001 (9.8 Mt CO ₂ e)
Target year	2020	2030	2050
Target reduction from baseline (%)	10%	35-45%	75-85%
Target GHG emissions level	8.6 Mt	5.3-6.2 Mt	1.5-2.5 Mt
Gap between target and projection	0.4 Mt (4%)	1.8-2.7 Mt (28-52%)	n/a

Table A11.3: Greenhouse gas emissions by economic sector, in megatonnes CO₂e (2014)

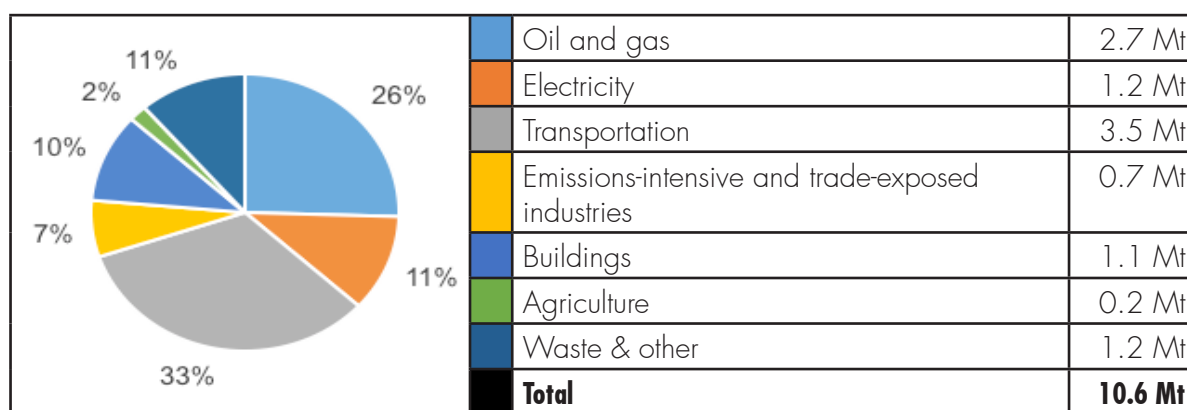


Table A11.4: Primary energy supply (i.e. production) by source, in terajoules (2014)

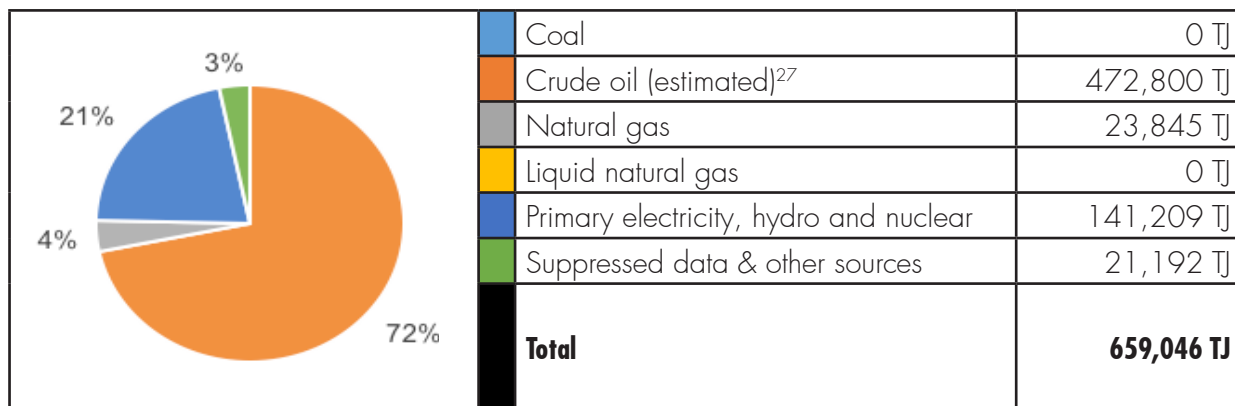


Table A11.5: Final energy demand (i.e. consumption) by source, in terajoules (2014)

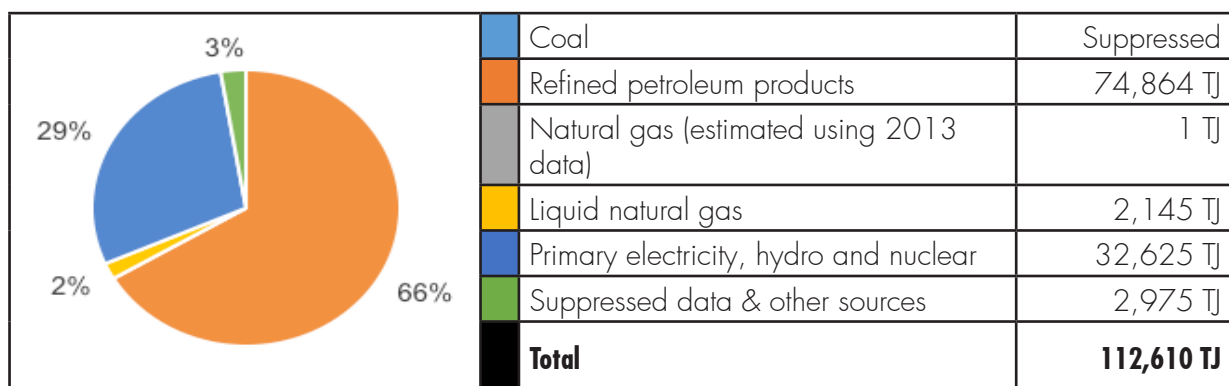


Table A11.6: Public opinion on climate change and climate policy (2016 estimates)

Share of the population that...	Yes	No	Difference
Believes the earth is getting warmer	76%	23%	+53%
Believes the earth is getting warmer partly or mostly because of human activities	55%	45%	+10%
Believes the earth is getting warmer mostly because of human activities	46%	45%	+1%
Supports a cap-and-trade system	62%	33%	+29%
Supports a carbon tax	45%	50%	-5%

²⁷ Total crude oil production is suppressed in the Statistics Canada data. The figure presented here is calculated using provincial government sources, which claim 78.8 million barrels of oil production in 2014. One barrel equals approximately 0.006 terajoules. See: Economics and Statistics Branch, *Total Oil Production, Barrels*, Newfoundland & Labrador Statistics Agency, August 4, 2016.

Appendix A12: Yukon, Northwest Territories and Nunavut

Table A12.1: Historical and projected greenhouse gas emissions

Year	1990	2005	2014	2020	2030
GHG emissions (Mt CO ₂ e)	2.0	2.3	1.8	3	3
GHG emissions per capita (tonnes CO ₂ e)	23.0	21.8	15.4	24.4	22.8
GHG intensity (Mt CO ₂ e per \$billion GDP)	0.47	0.34	0.22	n/a	n/a

Greenhouse gas emissions reduction targets

Among the territories, only the Northwest Territories has set clear territorial emissions targets with the long term goal of maintaining emissions as 2005 levels. There are no overarching regional targets.

Table A12.2: Greenhouse gas emissions by economic sector, in megatonnes CO₂e (2014)

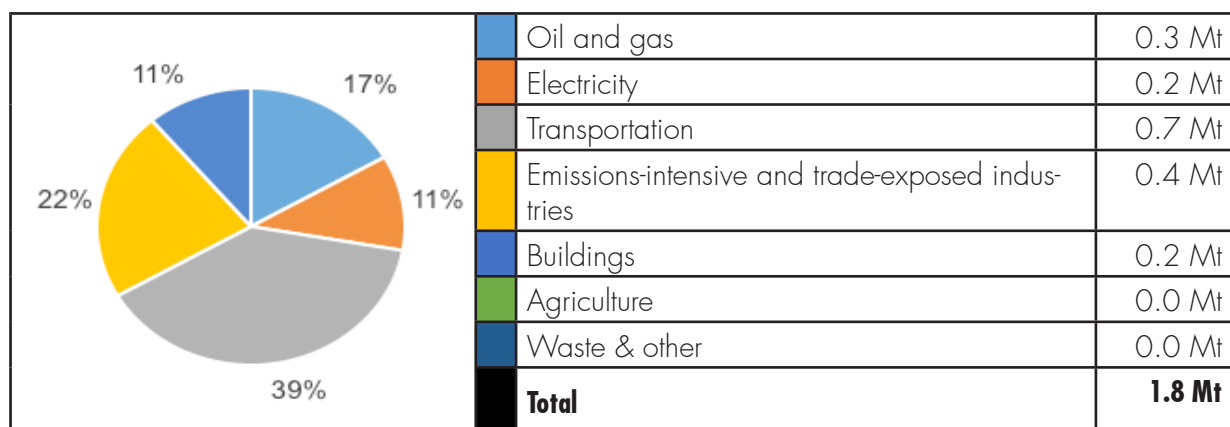


Table A12.3: Primary energy supply (i.e. production) by source, in terajoules (2014)

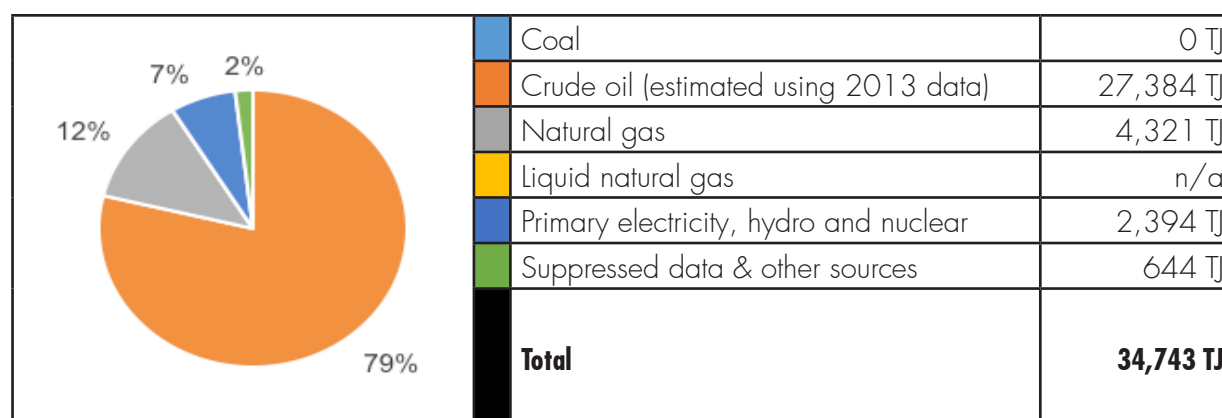
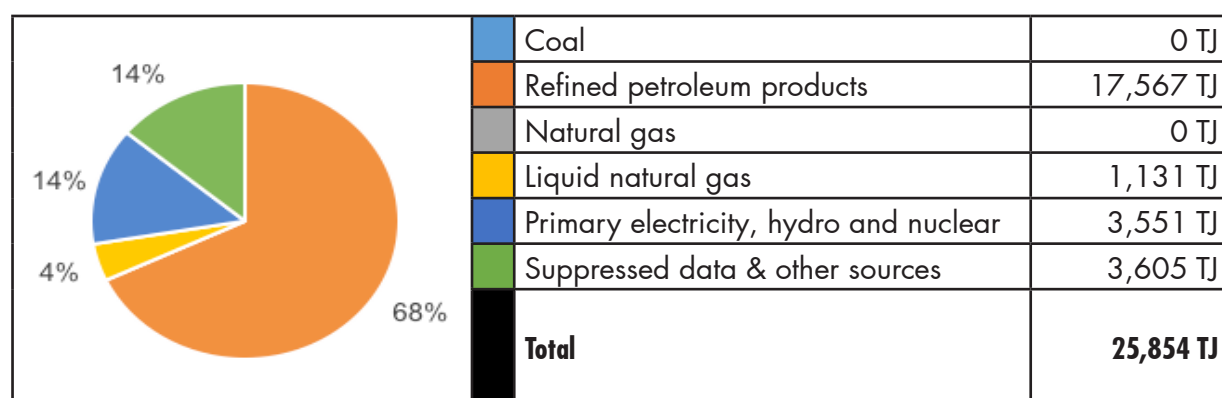


Table A12.4: Final energy demand (i.e. consumption) by source, in terajoules (2014)





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