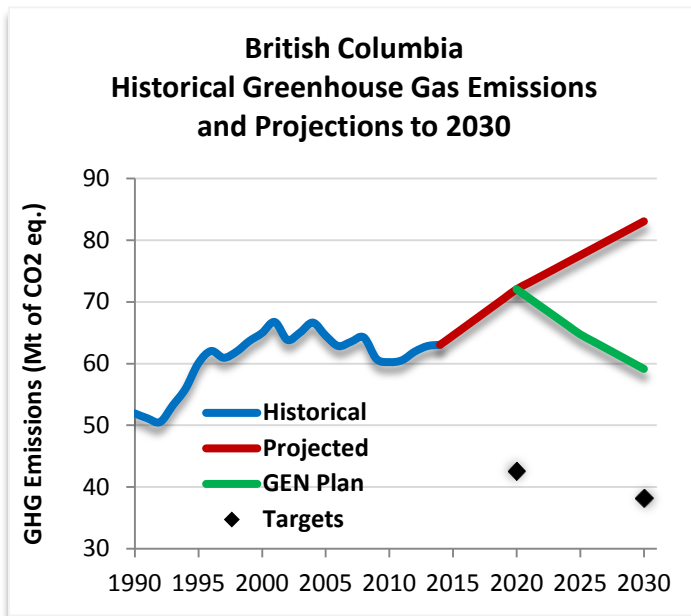


One Million Climate Jobs in Five Years: Public Transit, Renewable Energy, and Green Buildings

Green Economy Network Platform: A Roadmap Toward 135,128 Jobs for British Columbia



Source: Environment and Climate Change Canada¹

The Green Economy Network (GEN) has calculated that British Columbia could create over 135,000 person-years of employment over a five-year period through a total public investment of \$10.68 billion in public transit and high-speed rail, renewable energy, and energy efficiency and conservation. In addition, targeted public investment in these three priority areas will reduce BC's annual greenhouse gas (GHG) emissions by up to 12.9 megatonnes (Mt). This action plan will help to transition the province to a lower-carbon economy, create a healthier environment, and strengthen communities, while reducing poverty and inequality.²

Unemployment

In 2016, British Columbia had an annual average of 152,800 unemployed workers and an annual average unemployment rate of 6.0%, one of the lowest unemployment rates in Canada.³ However, BC also has one of the highest working poverty rates.⁴

Emissions

Total GHG emissions in British Columbia were 63 Mt in 2014, which represents 8.6% of total GHG emissions in the country.⁵ British Columbia has the fifth highest annual GHG emissions in Canada, and emissions have increased by 19% since 1990, due to increased natural gas production and processing and increased emissions from the transportation sector.⁶

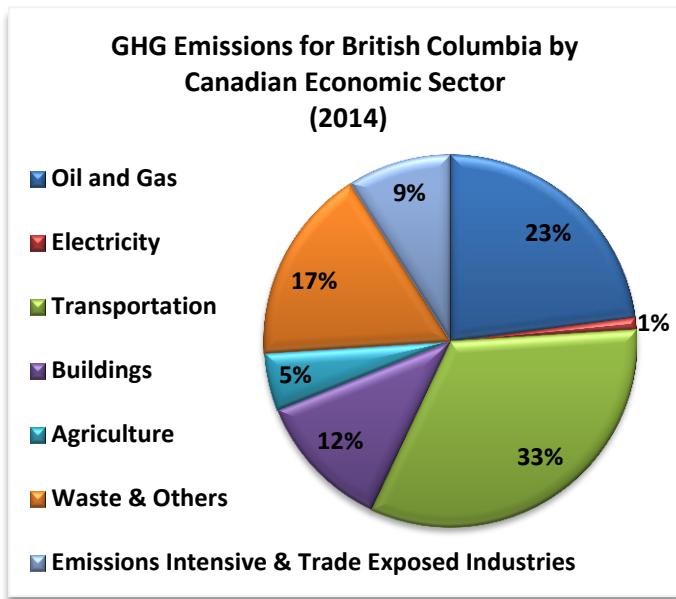
British Columbia has set a GHG reduction target to decrease GHG emissions by 80% below 2007 levels by 2050.⁷ The province's previous target was to reduce emissions by 33% below 2005 levels by 2020, but this target was bypassed in the release of BC's Climate Leadership Plan (2016).

British Columbia has shown leadership by pricing carbon pollution since 2008, and BC currently has the highest carbon tax in North America. However, the province's revenue-neutral carbon tax was frozen in 2013 at \$30 per tonne for five years.⁸

Summary of Calculations for BC

	\$Billions Invested Over 5-Year Period	Total Person-Years of Employment Created	GHG Emission Reduction (Mt CO ₂ eq)
Renewable Energy	\$4.4	53,888	2.3 - 5.0
Energy Efficiency (incl. building retrofits)	\$2.7	39,420	2.8 - 5.0
Public Transit (improvements and expansion)	\$2.18	27,596	1.7 - 2.2
High-Speed Rail	\$1.4	14,224	0.5 - 0.7
5-Year TOTALS	\$10.68	135,128	7.3 - 12.9

One Million Climate Jobs in Five Years: Public Transit, Renewable Energy, and Green Buildings



Source: Natural Resources Canada⁹

Public Transit and High-Speed Rail

The transportation sector was responsible for one-third of British Columbia's GHG emissions in 2014. Encouraging greater energy efficiency for all forms of transportation and shifting more commuters from private automobiles to public transit would go a long way toward reducing transportation-related emissions.

Since 2006, more people in Vancouver have shifted to public transit as the way to get to work than in any other city in North America. Close to 20% of commuters in Vancouver use public transit, over 8% choose active transit, and over 70% commute by car, truck, or van. Victoria has similar levels of personal automobile use for commuting at just over 70%, while just over 11% take public transit, and more than 15% choose active transit. In Kelowna and Abbotsford-Mission, personal automobiles are used by approximately 90% of commuters, while only about 3% commute by public transit.¹⁰

Public transit is considered to be the largest clean transportation segment in terms of existing jobs in British Columbia and there is room for further growth. It is now the fourth most transit-oriented region on the continent. However, infrastructure is at its capacity, and new investments are urgently required.¹¹

Other than Ontario, BC has the longest commuting time out of all the provinces.¹² The Mayors' Council Transportation and Transit Plan is expected to shave 20-30 minutes off of commuting times, create thousands of jobs, reduce GHG emissions, and save money for families.¹³

Access to transportation is a concern for low-income residents, especially those who live outside of Metro Vancouver. Increasing transit fares, and the lack of service in the early morning, evenings, and weekends is also difficult for low-waged workers and people employed in the service industry and/or doing shift work.

Targeted investments in public transportation will introduce more comprehensive and accessible services to neighborhoods and make fares more affordable and accessible for low-income families. Implementing these priorities as part of a public transportation strategy will ensure that underserved communities and individuals – including (but not limited to) women, people of colour, Indigenous Peoples, youth and students, seniors, and persons with disabilities – will benefit from increased access to health services, education, recreation, and employment, including the employment opportunities that are created through the creation and expansion of transit services.

Investing in public transit is proven to create more jobs than investing in personal automobile transportation infrastructure, such as roads, bridges and highways, mainly because they are capital intensive. A typical set of transit investments in British Columbia creates 19% more jobs than the same amount spent on a typical set of road and bridge projects.¹⁴

British Columbia also has an enormous opportunity to benefit from a high-speed rail connection between Vancouver and Seattle. Currently, Canada is both the only G8 country without existing high-speed rail infrastructure and the only G20 country without official plans to construct high-speed lines in the coming decades.¹⁵ Developing cross-border high-speed

One Million Climate Jobs in Five Years: Public Transit, Renewable Energy, and Green Buildings

rail would relieve freight congestion, create jobs, and decrease greenhouse gas emissions as passengers shifted from personal automobiles and planes to electrified high-speed rail.

With an investment of \$3.58 billion in public transit and high-speed rail - including investments in transportation demand management¹⁶ - GEN has calculated that 41,820 person-years of employment would be created in British Columbia. Targeted public investment in public transit will also reduce BC's annual GHG emissions by up to 2.9 Mt, with the potential for greater emissions reductions over time.¹⁷

Complimentary policies and regulations to reduce emissions from freight transport will create additional employment opportunities and further reduce emissions from the transportation sector.

Types of Jobs in Public Transit and High-Speed Rail:

- | | | |
|-----------------------------------|---------------------------------|-------------------------------------|
| • Automotive Technician | • Construction Labourer | • Metal Fabricator |
| • Bus and Transit Driver | • Education and Health Services | • Office and Administrative Support |
| • Civil Engineer | • Electrician | • Rail-Track Layer |
| • Community and Social Services | • Industrial Engineer | • Service Industry Occupations |
| • Construction Equipment Operator | • Machinist | • Transportation Planner |
| | • Mechanic | • Urban Planner |
| | • Mechanical Engineer | • Welder |

Renewable Energy

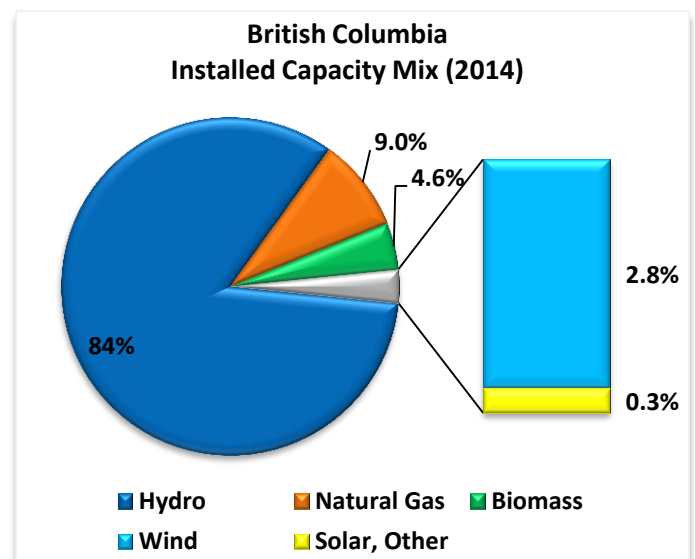
British Columbia has Canada's second highest installed renewable energy capacity in Canada, with over 90% of installed capacity mix coming from renewable sources.

The province has tremendous potential to develop additional renewable energy with the possibility to profit from additional energy exports. British Columbia has an extensive and very diverse portfolio of renewable energy sources, including offshore wind, hydroelectricity, tidal and wave, biomass, and geothermal.

British Columbia has the highest potential for tidal and wave energy in all of Canada totaling over 19.8 terrawatt-hours a year (TWh/yr).¹⁸ GEN has calculated that nearly 19,000 jobs can be created in the tidal and wave energy sector through this proposed investment.

BC also maintains significant potential for geothermal energy. Based on temperature depth profiles, the best geothermal prospects are located in Western Canada due to higher overall heat flow, especially areas in southern British Columbia, with regions of high geothermal energy content also located in northeastern BC.¹⁹

The province can also harness additional wind energy. Sites with strong and consistent winds can contribute to the province's electricity supply while also creating jobs for rural and First Nations communities. BC Hydro estimates that wind projects on the North Coast could generate over 8,000 gigawatt hours (GWh) per year, and an additional 5,000 GWh per year could be generated by projects in the Peace Region. This amount of wind power could generate enough power to supply 1,300,000 homes, equal to the number of homes in the Greater Vancouver Area and Vancouver Island.²⁰



Source: Natural Resources Canada²¹

Transitioning to a lower-carbon economy will require an increase in electrification. This electricity must be derived from renewable

One Million Climate Jobs in Five Years: Public Transit, Renewable Energy, and Green Buildings

sources to reach the level of decarbonization required for British Columbia to meet its emissions reduction targets. The transition to a renewable energy economy must be a Just Transition that respects the rights of Indigenous Peoples, revitalizes communities, and ensures that workers in carbon-intensive industries are protected and able to support their families.

With a total public investment of \$4.4 billion in renewable energy – including investments in modernizing electricity infrastructure, such as smart grids and microgrids, and large-scale and small-scale energy storage systems - GEN has calculated that 53,888 person-years of employment could be created over a five-year period. In addition, this investment will result in an annual GHG emission reduction of up to 5.0 Mt.

Types of Jobs in Renewable Energy:

- Boilermaker
- Community and Social Services
- Construction Worker
- Drilling Equipment Operator
- Education and Health Services
- Electrician
- Engineer
- Excavator
- Heavy Equipment Operator
- Ironworker
- Land Surveyor
- Machinist
- Mechanic
- Office and Administrative Support
- Pipefitter
- Plumber
- Service Industry Occupations
- Scientist
- Sheet Metal Worker
- Steelworker
- Surveyor
- Welder

Energy Efficiency and Conservation

Energy efficiency and conservation are our cleanest, cheapest and most productive methods for reducing GHGs, yet the vast majority of buildings in British Columbia have not been retrofitted. Energy efficiency is a smart investment that can be started immediately, using existing skills and technologies, to create jobs and save money. The cost of these mitigation strategies is offset by lower energy bills, resulting in homeowners and businesses saving money in the long term.

Buildings are one of the largest users of energy and one of the most significant contributors to

British Columbia's GHG inventory, accounting for 12% of the province's emissions.

In terms of household energy use, British Columbia had some of the lowest consumption levels in Canada (98 GJ).²² However, there are major energy efficiency gains that can be made from retrofitting the province's older building stock. Almost 45% of BC's housing stock was built before 1983, with 12% of homes built before 1960.²³ Retrofitting these homes should be a top priority because homes built before 1980 have a higher energy use per household and emit more GHG emissions than newer homes.²⁴

Energy efficiency retrofits can also alleviate energy poverty. Investing in energy efficiency and retrofitting programs can reduce energy poverty by lowering utility bills in response to energy savings, freeing up capital and discretionary income.

Low-income families are more likely to live in multi-unit buildings and spend a greater share of their income on energy. These issues have yet to be adequately addressed. Almost 31% of BC's multi-unit buildings were built between 1960 and 1980. While the tenants of these buildings would benefit immensely from energy efficiency retrofits, multi-unit buildings have generally been excluded from BC's energy efficiency upgrade programs.²⁵

B.C.'s government has been offering energy efficiency programs, such as their LiveSmart Efficiency Incentive Program that assisted BC residents with the upfront capital costs of upgrading their homes by providing energy retrofitting, energy auditing, and equipment rebates. However, nearly 83% of the province's housing stock is in need of retrofits.²⁶ This includes new insulation, heating, ventilation or cooling equipment, and improvements to doors, windows, exterior siding and caulking. Over 64% of these homes in need of retrofits were built before 1980, which means a significant amount of energy can be saved by investing in retrofitting the province's older housing stock.

One Million Climate Jobs in Five Years: Public Transit, Renewable Energy, and Green Buildings

In addition to improved energy efficiency in British Columbia's housing stock, there are major financial and social gains to be made by retrofitting the province's industrial, commercial, and public buildings. Investing in building retrofits will save a significant amount of energy, reduce GHG emissions, create opportunities to complete apprenticeships, and generate employment.

Targeted public investment of \$2.7 billion in energy efficiency and conservation over a five-year period, in combination with complementary workforce development policies, could generate 39,420 person-years of employment in British Columbia and reduce annual GHG emissions by up to 5 Mt.

Types of Jobs in Energy Efficiency and Conservation:

- Architect
- Boilermaker
- Carpenter
- Civil Structural Engineer
- Community and Social Services
- Construction Equipment Operator
- Construction Labourer
- Education and Health Services
- Electrical Engineer
- Electrician
- Energy Efficiency Auditor
- HVAC Installer
- HVAC Technician
- Ironworker
- Office and Administrative Support
- Pipefitter
- Plumber
- Roofer
- Service Industry Occupations
- Steelworker
- Weatherization Installer/Technician

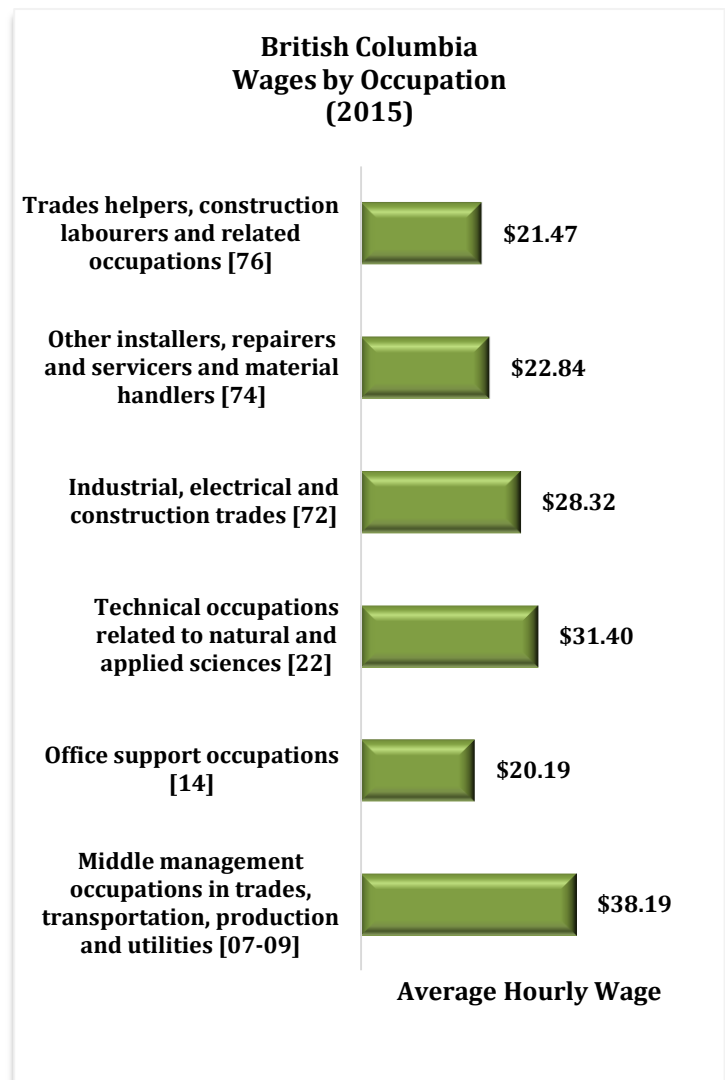
135,138 Climate Jobs in BC

The transition to a low-carbon economy in British Columbia could create 135,138 person-years of employment over five years while reducing annual GHG emissions by up to 12.9 Mt. The jobs that will be created from this transition are good jobs with good wages, across many sectors. The average hourly wage for a sample of these occupations is outlined in the graph to the right.

The proposals for public investment outlined in this plan must be complemented by a suite of policies aimed at reducing emissions and creating jobs. These policies should include

targets for investment, GHG reductions, and job creation, and increase in ambition over time.²⁷

The transition to a green economy in British Columbia will require significant investments in major infrastructure projects. To ensure that the economic, environmental, and social benefits from investments in major infrastructure projects are accrued locally, Community Benefits Agreements (CBAs) should be included as part of all significant infrastructure projects. Depending on the infrastructure project, CBAs can provide benefits including employment, training, apprenticeships, local supplier and social procurement opportunities, neighbourhood improvement, and affordable housing.²⁸



Source: CANSIM 282-0152

One Million Climate Jobs in Five Years: Public Transit, Renewable Energy, and Green Buildings

This plan for BC lays the foundation for tackling climate change while creating jobs. It also provides a strategy to address poverty and inequality. The proposals outlined in this plan will not only serve displaced workers from polluting industries, but will also create opportunities for workers from industries suffering the impacts of climate change, the unemployed, the working poor, as well as Indigenous Peoples, racialized communities, women, youth, LGBTI individuals, and persons with disabilities. Let's act now to make this plan for British Columbia a reality, get people back to work, and give our children the future that they deserve.

¹ Environment and Climate Change Canada (2015). *British Columbia: Environment Profile* <https://www.canada.ca/en/environment-climate-change/briefing/british-columbia-environment-profile.html>;

Environment and Climate Change Canada (2016). Canada's Second Biennial Report on Climate Change <https://www.ec.gc.ca/GES-GHG/default.asp?lang=En&n=02D095CB-1#BR-Sec5-1>; and

Environment and Climate Change Canada (2016). Greenhouse Gas Emissions by Province and Territory <https://www.ec.gc.ca/indicateurs-indicators/default.asp?lang=en&n=18F3BB9C-1>

² One person-year of employment is the equivalent of one full-time job for one year.

These are direct, indirect and induced jobs. The method for calculating job creation is based on the formula developed at the Center for American Progress, outlined in "Green Recovery: A Program to Create Good Jobs and Start Building a Low-Carbon Economy," [September, 2008]. The formula encompasses jobs created in three categories for each \$ one billion of investment: [i] direct employment in primary industries; [ii] indirect employment in secondary industries and suppliers; and [iii] induced employment in retail and service industries.

The investment of \$10.68 billion comes from a regional breakdown of the national One Million Climate Jobs Campaign, which is a total investment of \$80.9 billion over five years. The \$10.68 billion over five years (\$2.14 billion/year) cited for British Columbia is the allocation of funding required for BC alone in relation to the total pan-Canadian investment. Green Economy Network has proposed that the annual investments be split 50/40/10 among federal, provincial, and municipal governments. The investment required for each province was calculated starting with the population as a base model and then adjusting the investment for each pillar (energy efficiency, renewable energy, and public transportation) based on regional differences.

Calculating GHG reductions is a work in progress. The calculations cited here [Mt = one million tonnes] are based on the formula used by federal government departments for every \$ one billion of public investment. Each calculation includes two figures. The first figure is based on observable evidence of GHG reductions resulting from these types of public investments so far, while the second figure is based on calculated predictions for GHG reductions in year 5 of the projects and beyond, taking into consideration numerous variables. Citing the low and the high of GHG reductions shows what could be anticipated.

³ Statistics Canada (2017). *Average Annual Unemployment Rate Canada and Provinces 1976-2016* <http://www.stats.gov.nl.ca/statistics/Labour/PDF/UnempRate.pdf>; and

Statistics Canada (2017). *Labour force, employment and unemployment, levels and rates, by province* CANSIM, table 282-0002 <http://www.statcan.gc.ca/tables-tableaux/sum-som/l01/cst01/labor07a-eng.htm>

⁴ Ivanova, I. (2016). *Working Poverty in Metro Vancouver* Canadian Centre for Policy Alternatives https://www.policyalternatives.ca/sites/default/files/uploads/publications/BC%20office/2016/06/CCPA_Working_poverty_full.pdf

⁵ Environment and Climate Change Canada (2016) National Inventory Report 1990–2014: Greenhouse Gas Sources and Sinks in Canada.

⁶ Environment and Climate Change Canada (2016). *National Inventory Report 1990-2014: Greenhouse Gas Sources and Sinks in Canada*, Canada's Submission to the United Nations Framework Convention on Climate Change, Section 3.

⁷ Government of British Columbia (2016). *Climate Leadership Plan*

⁸ Government of British Columbia (2016). *Climate Leadership Plan*

One Million Climate Jobs in Five Years: Public Transit, Renewable Energy, and Green Buildings

⁹ Natural Resources Canada (2016). *British Columbia's Electric Reliability Framework* <http://www.nrcan.gc.ca/energy/electricity-infrastructure/18828>

¹⁰ Statistics Canada (2011) Table 1.a Proportion of workers commuting to work by car, truck or van, by public transit, on foot, or by bicycle, census metropolitan areas.

¹¹ City of Vancouver Department of Transportation. "Regional Transportation Investment and the Broadway Subway". Presentation to the Vancouver Board of Trade, January 17, 2014.

¹² Fraser Institute (2013) Transportation Performance of the Canadian Provinces. Retrieved from: <https://www.fraserinstitute.org/sites/default/files/TransportationPerformancePart2.pdf>

¹³ Green Jobs BC (n.d.). *Better Transit* http://www.greenjobsbc.org/better_transit

¹⁴ Victoria Transport Policy Institute (2016) "Evaluating Public Transit Benefits and Costs" p.63

¹⁵ For more details, see Ryan Katz-Rosene, 'Moving Towards Canada's Green Economy: Investments in Public Transit and Intercity Rail,' a background paper prepared for the Canadian Labour Congress and the Green Economy Network, September 2010.

¹⁶ The use of policies, programs, services and products to influence whether, why, when, where and how people travel. TDM measures help shape the economic and social factors behind personal travel decisions.

Transport Canada (2011). *Transportation Demand Management for Canadian Communities: A Guide to Understanding, Planning and Delivering TDM Programs* https://www.fcm.ca/Documents/tools/GMF/Transport_Canada/TDMCanComm_EN.pdf; and

Federation of Canadian Municipalities (2008). *Improving Travel Options with Transportation Demand Management (TDM)* https://www.fcm.ca/Documents/tools/GMF/Improving_Travel_Options_with_Transportation_Demand_Management_EN.pdf

¹⁷ The emissions reductions cited here are the direct reductions. Indirect reductions from the promotion of compact development and an increase in urban density will result in up to four times the GHG reductions in the long-term

¹⁸ Natural Resources Canada (2009). *Wind Technology Roadmap Summary Report* <http://www.nrcan.gc.ca/energy/renewable-electricity/wind/7323>

¹⁹ Grasby, S. E., Allen, D. M., Bell, S., Chen, Z., Ferguson, G., Jessop, A., Therrien, R. (2012). *Geothermal Energy Resource Potential of Canada*. Natural Resources Canada: Geological Survey of Canada http://ftp.maps.canada.ca/pub/nrcan_rncan/publications/ess_sst/291/291488/of_6914.pdf

²⁰ Pembina Institute (2006). *Renewable and Alternative Energy Options for British Columbia* https://www.pembina.org/reports/BC_oilgas08.pdf

²¹ Natural Resources Canada (2016). *British Columbia's Electric Reliability Framework* <http://www.nrcan.gc.ca/energy/electricity-infrastructure/18828>

²² Statistics Canada (2011) Households and the Environment: Energy Use, p. 18

²³ Canadian Centre for Policy Alternatives (CCPA) (2011) Fighting Energy Poverty in the Transition to Zero-Emission Housing: A Framework for BC, P. 31; CMHC, adapted from Statistics Canada (Census of Canada and National Household Survey)

²⁴ Natural Resources Canada, Survey of Energy Household Use, 2011, Residential Sector.

²⁵ Statistics Canada (2011). *National Household Survey* Catalogue no. 99-014-X2011026

²⁶ Statistics Canada (2012). Households and the Environment: Energy Use <http://www.statcan.gc.ca/pub/11-526-s/11-526-s2013002-eng.pdf>; and

Canada Mortgage and Housing Corporation (2012). *Dwelling Condition by Tenure and Period of Construction, Canada, Provinces, Territories, and Metropolitan Areas, 2001, 2006, 2011* https://www.cmhc-schl.gc.ca/en/hoficlincl/homain/stda/data/data_008.cfm

²⁷ For policy recommendation see:

Canadian Labour Congress (2016). *Green Jobs for Tomorrow*, Submission by the CLC to the Working Group on Clean Technology, Innovation and Jobs https://d3n8a8pro7vhm.cloudfront.net/broadbent/pages/5454/attachments/original/1480433751/Green_Jobs_For_Tomorrow_Report.pdf?1480433751;

Green Economy Network (2016). *Making the Shift to a Green Economy: A Common Platform of the Green Economy Network* <http://greeneconomynet.ca/wp-content/uploads/sites/43/2014/07/GEN-Common-Platform-2016-EN1.pdf>;

Green Economy Network (2016). *One Million Climate Jobs: A Plan for a Sustainable and Equitable Economy*, Submission to the Working Group on Clean Technology, Innovation and Jobs <http://greeneconomynet.ca/wp-content/uploads/sites/43/2016/07/GEN-Submission-Working-Group-on-Clean-Technology-Innovation-and-Jobs-July-2016.pdf>; and

Green Jobs BC (2015). *Submission to the Province of British Columbia's Climate Leadership Plan Discussion Paper* https://d3n8a8pro7vhm.cloudfront.net/greenjobsbc/pages/39/attachments/original/1467762949/Green_Jobs_BC_Climate_Leadership_Plan_Submission_September_15.pdf?1467762949

²⁸ For more information on CBAs, see:

A. Galley (Mowat Centre, August 2015). *Community Benefits Agreements* <https://mowatcentre.ca/community-benefits-agreements/>

Toronto Community Benefits Network (2013). *Jobs and Opportunities through Community Investment* <http://www.communitybenefits.ca/>