

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

Green Economy Network Platform: A Roadmap Toward 141,046 Jobs for Alberta

Nearly half of Alberta's GHG emissions come from the oil and gas sector. Alberta has legislated an emissions cap of 100 Mt for the oil sands, allowing emissions to grow by over 42% from current levels.⁶

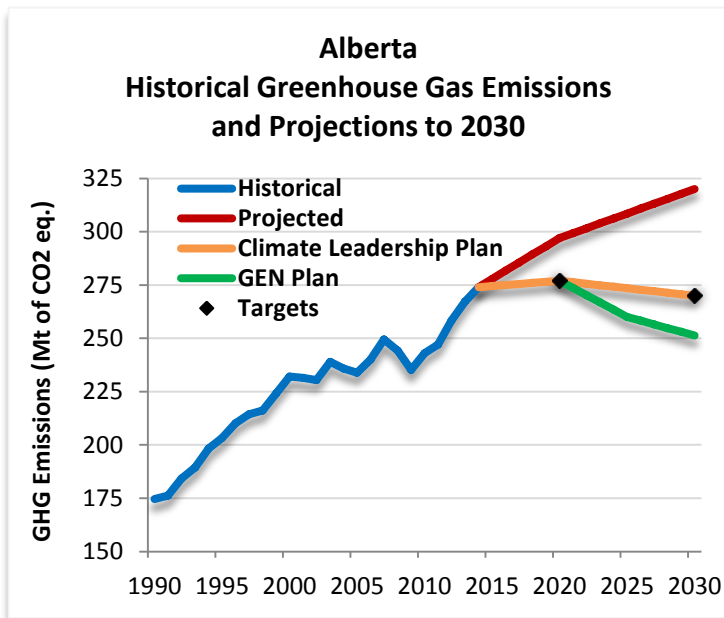
Alberta has shown climate leadership by introducing a carbon levy that commenced on January 1, 2017. The levy is applied to fuels at a rate of \$20/tonne. The levy will increase to \$30/tonne in 2018. Revenues will be used for renewable energy, green infrastructure, energy efficiency, a rebate for low- and middle-income families, and help for businesses, coal communities, and Indigenous communities, among other priorities.⁷

Unemployment

In 2016, Alberta had an annual average of **200,800 unemployed workers and a total average unemployment rate of 8.1%**. Alberta's average annual unemployment rate has risen from 6.0% in 2015 and more than doubled since the recession.⁸

Summary of Calculations for Alberta

	\$Billions Invested Over 5-Year Period	Total Person-Years Created	GHG Emission Reduction (Mt CO2eq)
Renewable Energy	\$ 3.1	38,004	10.3 - 14.7
Energy Efficiency (incl. building retrofits)	\$ 4.5	65,700	4.8 - 8.3
Public Transit (improvements and expansion)	\$ 1.58	20,070	1.4 - 1.8
High-Speed Rail	\$ 1.7	17,272	0.5 - 0.9
5-Year TOTALS	\$ 10.89	141,046	17.0 - 25.7



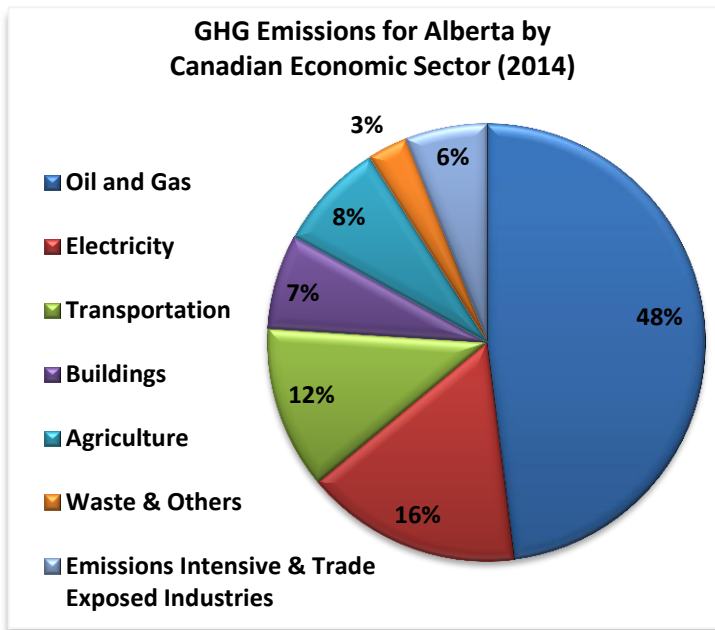
Source: Environment and Climate Change Canada¹

The Green Economy Network (GEN) has calculated that Alberta could create 141,046 person-years of employment over five years through a total public investment of \$10.89 billion in energy efficiency and conservation, renewable energy, and public transit and high-speed rail. In addition, targeted public investment in these three priority areas will reduce Alberta's annual greenhouse gas (GHG) emissions by up to 25.7 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

Emissions

Total GHG emissions in Alberta were 274 Mt in 2014, which represents 37.4% of total GHG emissions in the country.³ Alberta's GHG emissions have increased by 56% since 1990 and the federal government has predicted that Alberta's emissions could reach 297 Mt by 2020.⁴ However, implementation of Alberta's *Climate Leadership Plan* (2015) is expected to reduce emissions by 20 Mt from a business-as-usual scenario by 2020 and 50 Mt from a business-as-usual scenario by 2030.⁵

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



Source: Environment and Climate Change Canada⁹

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 Alberta 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.

Alberta has the country's highest household energy consumption per square metre, due to variations in weather and the province's old and inefficient housing stock.¹⁰ Alberta's climate is very cold in the winter and hot in the summer, which means that a significant amount of energy is put into heating and cooling buildings, more often than would be needed in a more temperate climate.¹¹ Consequently, significant economic and environmental gains can be made from building retrofits to increase energy efficiency.

Although the Alberta government is offering programs, such as the newly announced 2016 Energy Efficiency Plan, 87% of the province's housing stock is still in need of energy efficiency retrofits.

Generally speaking, newer homes use less energy per square metre than older homes. Houses built between 1946 and 1977 use significantly more energy per square metre than houses built after 1996. There are significant opportunities to increase energy efficiency in Alberta, since over 55% of Alberta's housing stock was built before 1980.¹² Retrofitting the province's older housing stock should be a top priority because homes built before 1980 have the highest energy use per household and emit the most GHG emissions per home.¹³

Energy efficiency retrofits include new insulation, heating, ventilation or cooling equipment, and improvements to doors, windows, exterior siding and caulking. Investing in energy efficiency and retrofitting programs can help lower utility bills in response to energy savings, freeing up capital and discretionary income.

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

Targeted public investment of \$4.5 billion in energy efficiency and conservation over a five-year period, in combination with complementary workforce development policies, could generate 56,940 person-years of employment in Alberta and reduce annual GHG emissions by up to 8.3 Mt.

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

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

Renewable Energy

Alberta currently relies heavily on coal and natural gas for electricity. As of 2015, almost 40% of Alberta's installed electricity generation capacity was from coal and more than 40% was from natural gas. However, Alberta's Climate Leadership Plan (2015) has established targets and strategies to increase the province's renewable energy capacity. Alberta has committed to phase-out coal and to source 30% of electricity from renewable sources by 2030.¹⁴

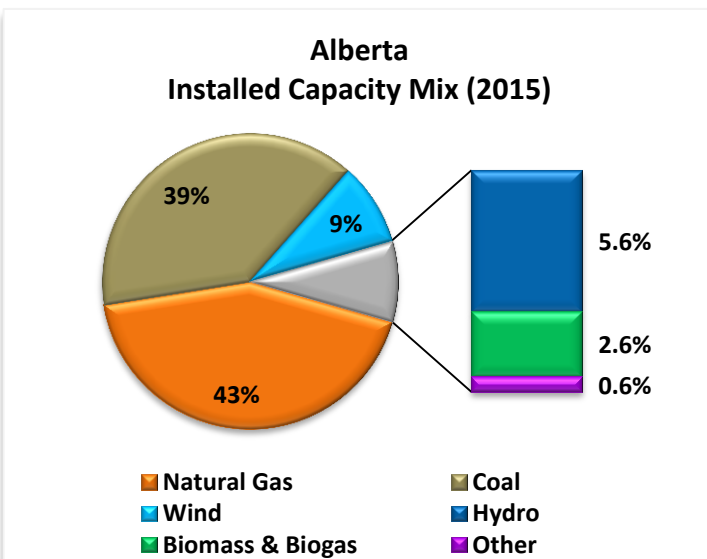
investments in modernizing grid and electricity infrastructure.¹⁶ Analysis from Greenpeace Canada (2016) has also shown that investments in renewable energy will create tens of thousands of jobs in Alberta.¹⁷

Alberta has significant unrealized renewable energy potential. The province currently has the country's third largest amount of wind power capacity at 1.46 gigawatts. However, this installed wind capacity represents less than 1% of Alberta's potential for wind power.¹⁸

The province also has substantial potential for geothermal and solar energy. Geothermal is particularly attractive in northwestern and central Alberta, with 120 GW of potential demonstrated geothermal power.¹⁹ Additionally, Alberta could take advantage of its vast potential for solar energy, where the province could meet its electricity needs using only 0.26% of total land area for solar panels.²⁰

Many exciting solar projects are already underway in Alberta, including a recent government initiative to install solar panels on three dozen schools around the province.²¹ First Nations have also taken on a leadership role in renewable energy development. For example, Louis Bull Tribe has installed solar panels on four public buildings on the Louis Bull reserve, as well as developing capacity in the solar energy industry for six of its tribe members. The money saved through energy costs can now be used to fund other priority areas, such as programs for health, education, and Elders.²²

Transitioning to a lower-carbon economy will require an increase in electrification. This electricity must be derived from renewable sources to reach the level of decarbonization required for Alberta to meet its renewable energy and 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.



Source: Natural Resources Canada¹⁵

The Pembina Institute (2016) has calculated that investments in renewable energy and energy efficiency can generate a net increase in jobs following the retirement of coal, with additional employment opportunities created through investments in community energy and long-term

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

With a total public investment of \$3.1 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 38,004 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 14.7 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

Public Transit and High-Speed Rail

The transportation sector was responsible for 12% of Alberta's GHG emissions in 2014 and road transportation related emissions in the province have risen significantly since 2005.²³ 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 in the province.

There is room for improvement in the proportion of commuters who choose public or active transit in Alberta:

- In Edmonton, 11% of commuters choose public transit, while over 5% of commuters choose active transit, and over 82% commute by car, truck or van; and
- Calgary has higher transit ridership at almost 16%, while over 6% of commuters choose active transit, and over 76% commute by car, truck, or van.²⁴

Investing in the expansion of Alberta's public transit system can decrease automobile dependency and reduce urban sprawl while creating jobs and lowering emissions. In fact, the **job creation per dollar spent on transit in Alberta can create between two to three times more jobs than investing in fossil fuel industries.**²⁵

Targeted investments in public transportation will introduce more comprehensive and accessible services while making fares more affordable 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.

Alberta also has an enormous opportunity to benefit from high-speed rail in the Edmonton-Red Deer-Calgary corridor. 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.**²⁶

According to Transportation Alberta, the province could save up to 3% of GHG emissions by investing in high-speed rail. Moreover, the province could see up to \$1.5 billion in increased development potential, specifically around the five station cities served by the high-speed rail system.²⁷

Developing high-speed rail in this corridor 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 \$12.46 billion in public transit and high-speed rail - including investments in transportation demand management²⁸ - GEN has calculated that

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

37,342 person-years of employment would be created in Alberta. Targeted public investment in transit will also reduce Alberta’s annual GHG emissions by up to 2.7 Mt, with the potential for greater emissions reductions over time.²⁹ 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
- Bus and Transit Driver
- Civil Engineer
- Community and Social Services
- Construction Equipment Operator
- Construction Labourer
- Education and Health Services
- Electrician
- Industrial Engineer
- Machinist
- Mechanic
- Mechanical Engineer
- Metal Fabricator
- Office and Administrative Support
- Rail-Track Layer
- Service Industry Occupations
- Transportation Planner
- Urban Planner
- Welder

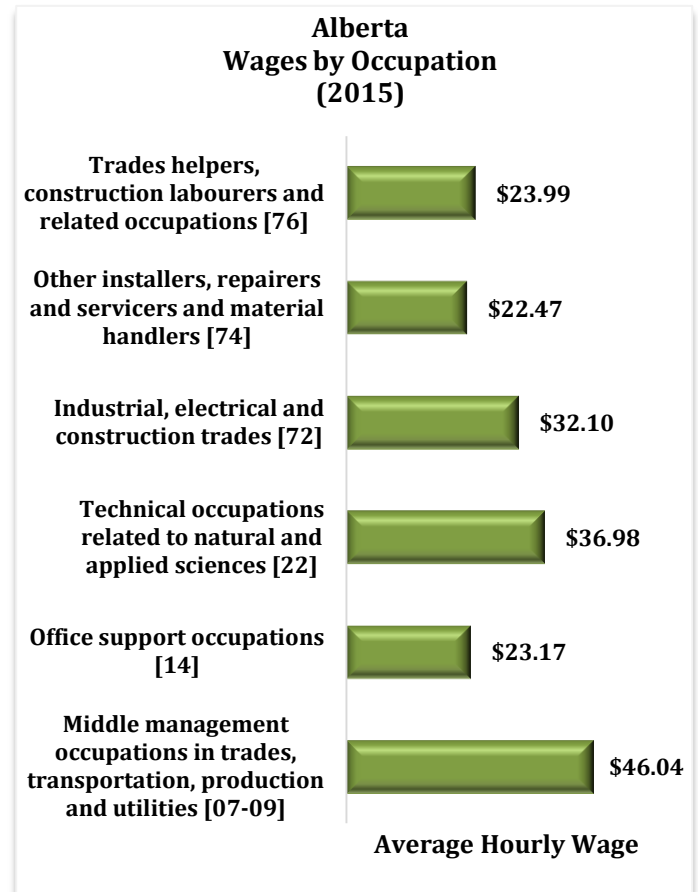
141,046 Climate Jobs in Alberta

The transition to a low-carbon economy in Alberta could create 141,046 person-years of employment over five years while reducing annual GHG emissions by up to 25.7 Mt. The jobs that will be created from this transition are good jobs with decent 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.³⁰

The transition to a green economy in Alberta 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.³¹



Source: CANSIM 282-0152

This plan for Alberta 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 Alberta a reality, get people back to work, and give our children the future that they deserve.

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

¹ Environment and Climate Change Canada (2015). *Alberta: Environment Profile* <https://www.canada.ca/en/environment-climate-change/briefing/alberta-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>;

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>; and

Government of Alberta (2015). *Climate Leadership Report – Executive Summary* <https://www.alberta.ca/documents/climate/climate-leadership-report-to-minister-executive-summary.pdf>

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 \$10.89 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 \$10.89 billion over five years (\$2.18 billion/year) cited for Alberta is the allocation of funding required for Alberta 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 Environment and Climate Change Canada (2016) *National Inventory Report 1990–2014: Greenhouse Gas Sources and Sinks in Canada*.

⁴ 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>

⁵ Boothe, P., & Boudreault, F. A. (2016). *By the Numbers: Canadian GHG Emissions*. Lawrence National Centre for Policy and Management, University of Western Ontario.

⁶ Government of Alberta (2015). *Climate Leadership Plan* <http://www.alberta.ca/climate-leadership-plan.aspx>; and

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

⁷ Government of Alberta (2015). *Carbon levy and rebates* <https://www.alberta.ca/climate-carbon-pricing.aspx#Reinvesting>

⁸ 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>

⁹ 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.

¹⁰ Statistics Canada (2011). *Households and the Environment: Energy Use*, p. 25 <http://www.statcan.gc.ca/pub/11-526-s/11-526-s2013002-eng.htm>

¹¹ Statistics Canada (2012). *Households and the Environment: Energy Use* <http://www.statcan.gc.ca/pub/11-526-s/2010001/part-partie1-eng.htm>

¹² 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

¹³ Natural Resources Canada, *Survey of Energy Household Use, 2011, Residential Sector*.

¹⁴ Jayakumar, Binu (2016). *Job Growth in Clean Energy: Employment in Alberta's emerging renewables and energy efficiency sectors*, The Pembina Institute <http://bluegreencanada.ca/sites/default/files/resources/Job%20growth%20in%20clean%20energy%20-%20Nov%202016.pdf>

¹⁵ Natural Resources Canada (2016). *Alberta's Electric Reliability Framework* <http://www.nrcan.gc.ca/energy/electricity-infrastructure/18826>

¹⁶ Jayakumar, Binu (2016). *Job Growth in Clean Energy: Employment in Alberta's emerging renewables and energy efficiency sectors*, The Pembina Institute

¹⁷ Greenpeace Canada (2016). *100, 000+ Jobs: Getting Albertans back to work by building a low-carbon future* <http://www.greenpeace.org/canada/Global/canada/report/2016/04/GP-GreenJobsReport2016.pdf>

¹⁸ Greenpeace Canada (2016). *100, 000+ Jobs: Getting Albertans back to work by building a low-carbon future* <http://www.greenpeace.org/canada/Global/canada/report/2016/04/GP-GreenJobsReport2016.pdf>

¹⁹ Glave, J. and Thibault, T. (2014). *Power to change: How Alberta can green its grid and embrace clean energy*. Pembina Institute and Clean Energy Canada <http://cape.ca/wp-content/uploads/2015/02/Pembina-AB-coal-report-May-2014.pdf>

²⁰ Glave, J. and Thibault, T. (2014). *Power to change: How Alberta can green its grid and embrace clean energy*. Pembina Institute and Clean Energy Canada <http://cape.ca/wp-content/uploads/2015/02/Pembina-AB-coal-report-May-2014.pdf>

²¹ Thomson, S. 2016. *Alberta government will fund solar panels for new school projects*. Edmonton Journal, October 26, 2016 <http://edmontonjournal.com/news/local-news/alberta-government-will-fund-solar-panels-for-new-school-projects>

²² Narine, S. *Louis Bull Tribe to celebrate green energy accomplishments*. Aboriginal Multi-Media Society, September 27, 2016 <http://www.ammsa.com/publications/alberta-sweetgrass/louis-bull-tribe-celebrate-green-energy-accomplishments>

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

²³ Greenpeace Canada (2016). *100, 000+ Jobs: Getting Albertans back to work by building a low-carbon future* <http://www.greenpeace.org/canada/Global/canada/report/2016/04/GP-GreenJobsReport2016.pdf>

²³ Greenpeace Canada (2016). *100, 000+ Jobs: Getting Albertans back to work by building a low-carbon future* <http://www.greenpeace.org/canada/Global/canada/report/2016/04/GP-GreenJobsReport2016.pdf>

²⁴ 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.

²⁵ Thomson, D. (2009). *Green Jobs: It's time to build Alberta's future* Greenpeace, Alberta Federation of Labour, and Sierra Club <http://www.greenpeace.org/canada/PageFiles/10931/green-jobs-report.pdf>

²⁶ 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.

²⁷ Transportation Alberta (2009) *Economic Benefits for Development of High-Speed Rail Service in the Calgary-Edmonton Corridor*, p. iv. https://www.transportation.alberta.ca/Content/publications/production/Economic_Benefits_of_HST_02-2008_rev.pdf

²⁸ 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/TDMCanadian_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

²⁹ 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

³⁰ 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>; and

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>

³¹ 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/>