Regional Outlook 2021 - Country notes

Canada

Progress in the net zero transition

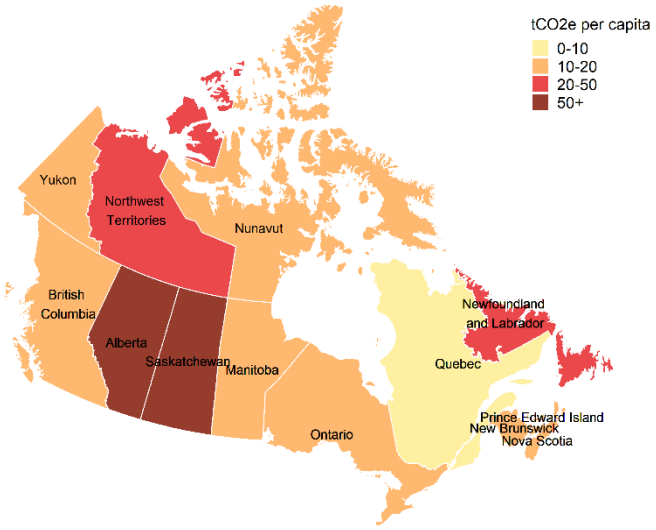
EMISSIONS

2018 OECD average: 11.5 tCO_2e/capita	2018 Canadian average: 19.7 tCO_2e/capita	Canadian target: net zero GHG emissions by 2050

Large regions (TL2)

Figure 1. Regional greenhouse gas emissions per capita

Tons CO_2 equivalent (tCO_2e), large regions (TL2), 2018



Greenhouse gas (GHG) emissions per capita generated in all Canadian large regions, except Quebec, are above 10 tCO_2e per capita. Only Quebec, Prince Edward Island and Ontario have lower emissions per capita than the OECD average of 11.5.

Emissions per capita in Saskatchewan are more than six times higher than in Quebec.

Small regions (TL3)

Figure 2. Contribution to estimated GHG emissions

By type of small region, 2018

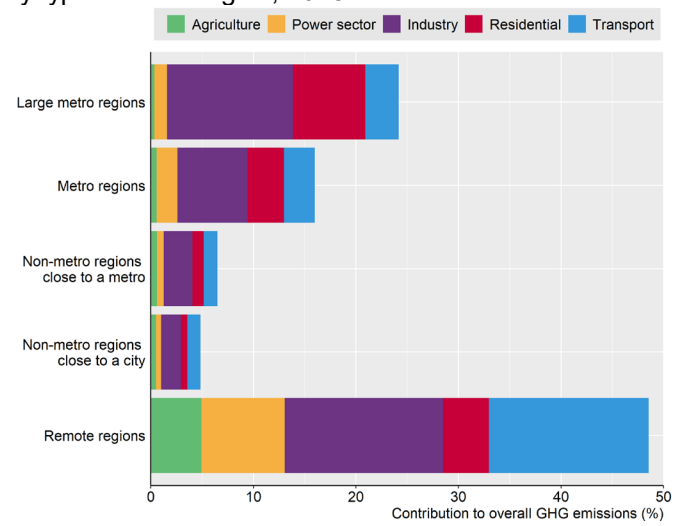
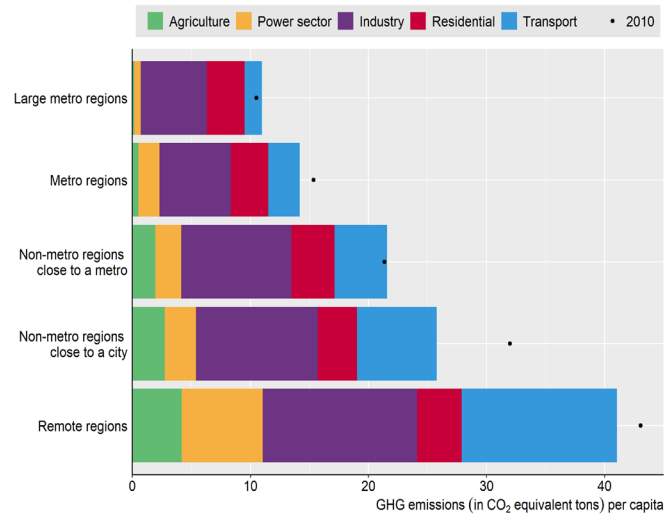


Figure 3. Estimated GHG emissions per capita

By type of small region, 2018



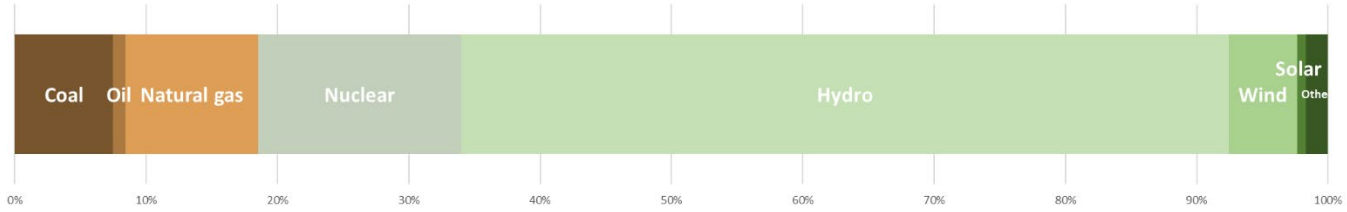
Across the OECD, metropolitan regions emit more greenhouse gases than remote regions. In Canada, the reverse is true. Emissions per capita in Canadian remote rural regions are much higher than in metropolitan regions. The difference is more pronounced than for the average OECD country.

Target notes: Emissions targets included in the Net Zero Tracker database from ECIU before January 25, 2021 are considered.
Figure notes: Figure 1 shows greenhouse gas inventory data from Environment and Climate Change Canada, accessed via Open Government. Figures 2, 3 and the OECD average show OECD calculations based on estimated greenhouse gas emissions data from the European Commission's Joint Research Centre (ECJRC). The Emissions Database for Global Atmospheric Research of the ECJRC allocates national greenhouse gas emissions to locations according to about 300 proxies. See Box 3.7 in the 2021 *OECD Regional Outlook* for more details.

ENERGY

Canadian electricity mix

Figure 4. National electricity generation by energy source in 2019

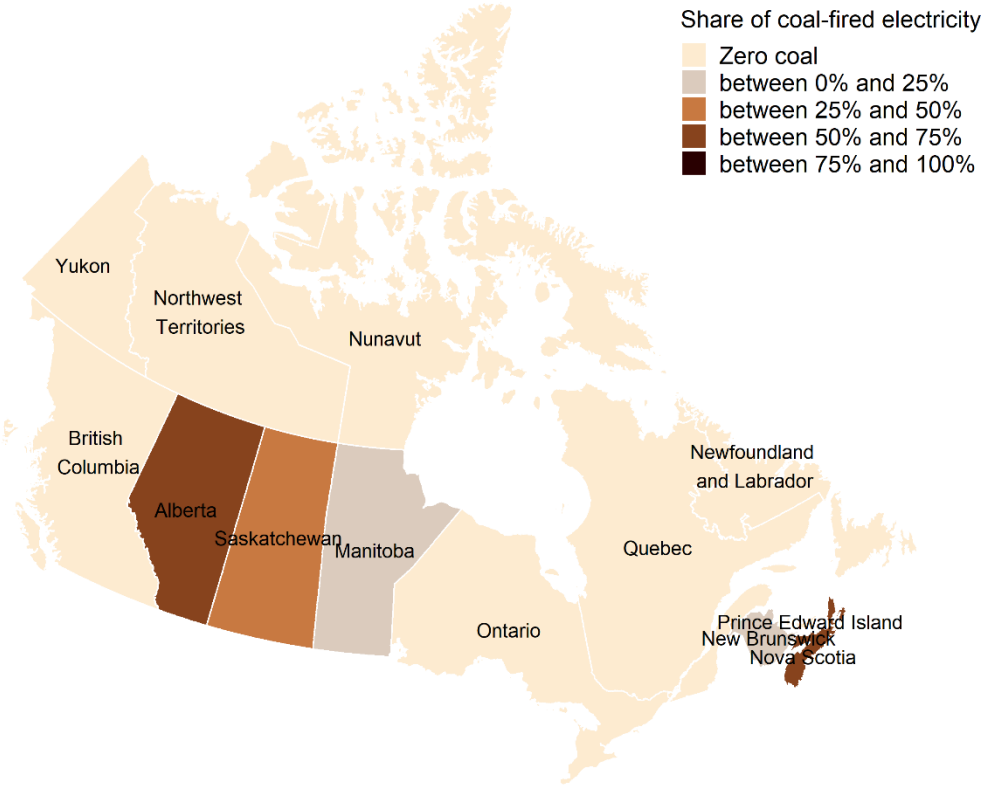


Share of coal-fired electricity generation

2019 OECD average: 23%	2019 Canadian average: 7%	2030 well below 2°C benchmark for North-America: <2% 2030 1.5°C benchmark for OECD countries: 0%

Figure 5. Regional coal-fired electricity generation estimates

Per cent of total electricity generation, large regions (TL2), 2017



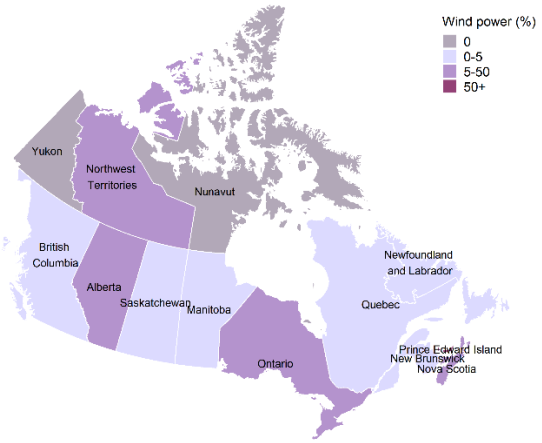
Most regions do not use coal in electricity generation. Some regions still rely largely on coal. For example, Alberta depended on coal for 62% of its electricity generation in 2017. No new capacity is planned or being build.

Wind power

2019 OECD average: 8%	2019 Canadian average: 5%	2030 well below 2°C benchmark for North-America: >17%

Figure 6. Regional wind power generation estimates

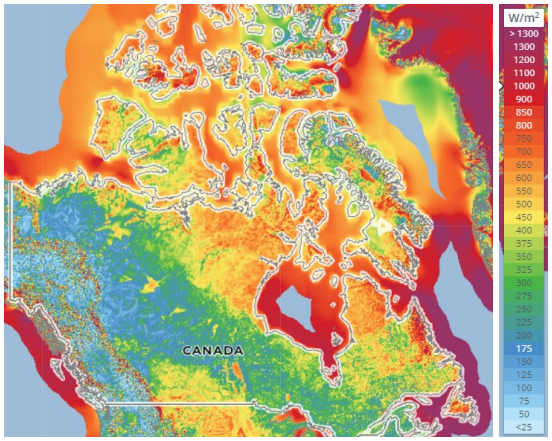
Per cent of total electricity generation, large regions (TL2), 2017



Regional wind electricity generation is estimated using facility level data for 98% of Canada's wind capacity.

Figure 7. Wind power potential

Mean wind power density (W/m^2)



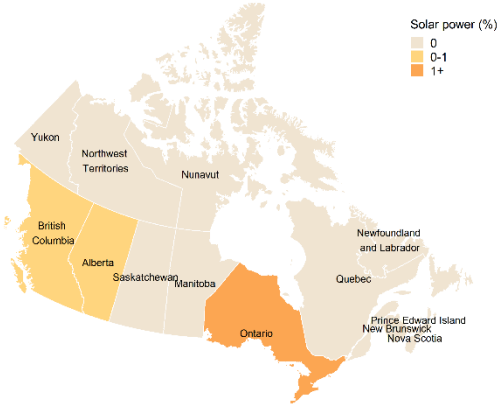
Source: Map produced by The Global Wind Atlas

Solar power

2019 OECD average: 3%	2019 Canadian average: 2%	2030 well below 2°C benchmark for North-America: >13%

Figure 8. Regional solar power generation estimates

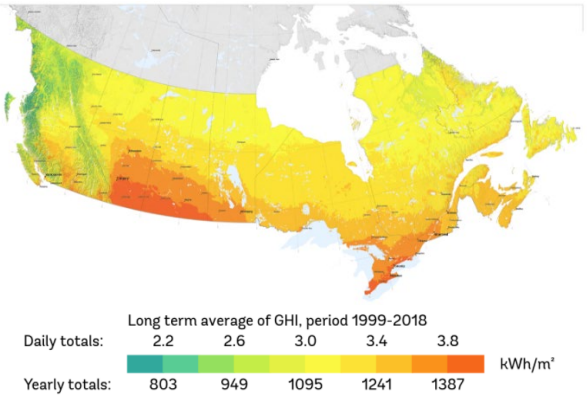
Per cent of total electricity generation, large regions (TL2), 2017



Regional solar electricity generation is estimated using facility level data for 59% of Canada's solar capacity.

Figure 9. Solar power potential

Global horizontal irradiation (kWh/m^2)



Source: Map produced by The Global Solar Atlas

Although wind and solar shares are low, Canada has one of the largest shares of zero-emission electricity generation due to hydropower and nuclear power. Regions such as Alberta and Saskatchawan, which have the highest coal shares, have among the biggest potentials for onshore wind and solar electricity. Offshore potential is very strong especially on the East coast.

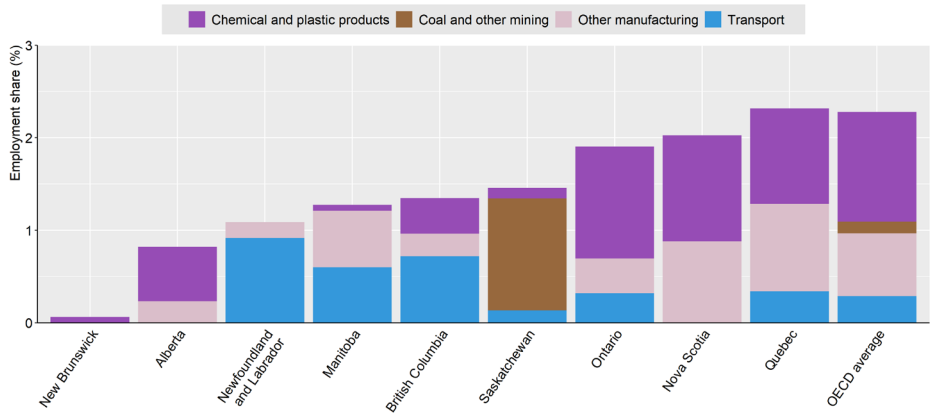
Benchmark notes: The well-below 2 degrees benchmarks show IEA Sustainable Development Scenario (SDS) numbers. The SDS models how the global energy system can evolve in alignment with the Paris Agreement's objective to keep the global average temperature increase well below 2°C above pre-industrial levels. According to the Powering Past Coal Alliance (PPCA), a phase-out of unabated coal by 2030 for OECD countries is cost-effective to limit global warming to 1.5°C.

Figure notes: Figure 4 shows data from the IEA (2020). Figures 5, 6 and 8 show OECD calculations based on the Power Plants Database from the WRI. The database captures electricity generation from the power plants connected to the national power grid. As a result, small electricity generation facilities disconnected from the national power grid might not be captured. See here for more details. Figures 7 and 9 show the power potential of solar and wind. Mean wind power density (WPD) is a measure of wind power available, expressed in Watt per square meter (W/m^2). Global horizontal irradiation (GHI) is the sum of direct and diffuse irradiation received by a horizontal surface, measured in kilowatt hours per square metre (kWh/m^2).

SECTORAL EMPLOYMENT RISKS

Figure 10. Employment in selected sectors which may be subject to employment loss by 2040 if emissions are reduced in line with the Paris climate agreement

Per cent of total regional employment, large regions (TL2), 2017

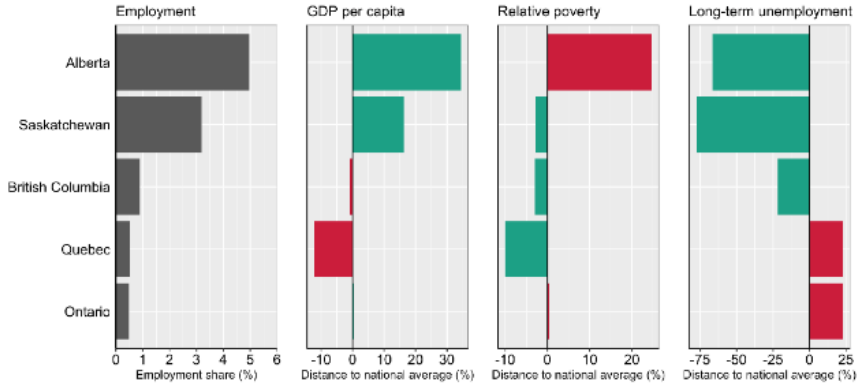


There will be both employment gains and losses due to the transition to net zero greenhouse gas emissions. They may not be distributed in the same way across regions. Employment in sectors that may be subject to some job loss by 2040 as a result of policies to reduce emissions in line with the climate objectives in the Paris Agreement amounts to less than 2.5% in all Canadian regions. All Canadian regions, except Quebec, have less employment in these sectors than the OECD average. Quebec, Nova Scotia and Ontario have a larger share, largely driven by chemicals. The selection of sectors is broad and based on employment effects simulated across OECD countries (See Box 3.9 of the 2021 *OECD Regional Outlook*). It does not take specific local characteristics into account.

Oil & Gas

Figure 11. Regions with employment in the extraction of crude petroleum, natural gas and manufacture of coke and refined petroleum products, and regional socio-economic indicators

Large regions (TL2) with employment in selected sector, 2017



While activities related to oil and gas extraction may not be at risk of employment loss across all OECD countries by 2040, they are more likely to be at risk in Canada. In Canadian regions oil is extracted at higher costs than in other oil-supplying regions. Policies to drive greenhouse gas emissions to net zero will drive highest-cost producers out of the market first. Investment in oil-extraction therefore risks becoming stranded resulting in substantial economic loss.[1]

Employment in the sector is particularly strong in Alberta and Saskatchewan. The transition to net-zero greenhouse gas emissions needs to be just, avoiding social hardship. Canadian regions with the largest shares of employment in the oil and gas extraction sector have higher GDP per capita and lower long-term unemployment. However, relative poverty is high in Alberta.

[1] Reference: Mercure, J. F., et al. (2018). Macroeconomic impact of stranded fossil fuel assets. Nature Climate Change, 8(7), 588-593.

Figure notes: Figures 10 and 11 are based on data from OECD Statistics. In Figure 10 sectors are selected based on macroeconomic simulations of a scenario limiting global warming to well below 2 degrees. See Box 3.9 in the 2021 *OECD Regional Outlook* for more details. In figure 11, poverty risk is assessed from individuals' survey respondents indicating there have been times in the past 12 months when they did not have enough money to buy food that they or their family needed. Long-term unemployment is defined

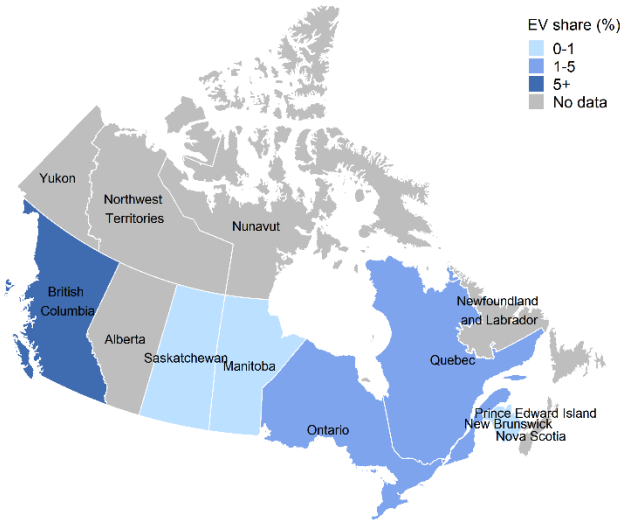
TRANSPORT

Electrification of passenger cars

2019 Canadian average share of full-electric new passenger car sales: 5%	Benchmarks for new zero-emission passenger car sales: IEA well below 2°C benchmark: 100% by 2040. Aligned with net zero emissions by 2050: 100% by 2035 at the latest. 2030 cost-effective.	Canadian target sales of zero emission new passenger cars: 100% by 2040

Figure 12. New full-electric passenger car sales

Percentage of total regional passenger car sales, large regions (TL2), 2019



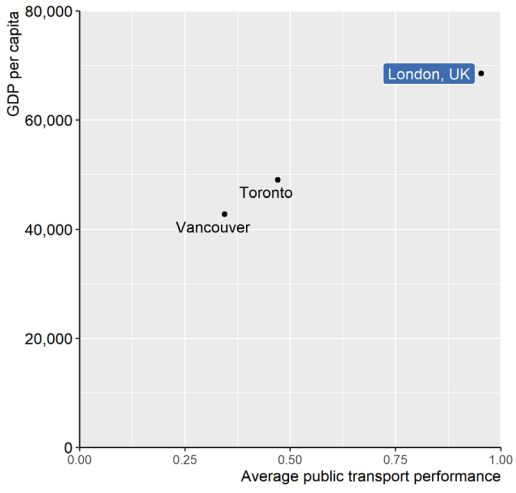
British Colombia is the only province, of those where data is available, for which over 5% of newly purchased passenger cars sales were fully electric in 2019.

Countries with a net zero target by 2050 will need to phase out sales of new conventional cars by 2035 at the latest (considering cars have an average useful life of 15 years). A phase-out by 2030 is more cost-effective.

Modal shift

Public transport performance data is not yet available for many North American metropolitan areas. Toronto has higher GDP per capita and better public transport performance than Vancouver. For comparison, London (UK) has among the highest public transport performance scores. Inhabitants of the metropolitan area of London can on average reach 95% of the population living within 8 km in 30 minutes by public transport.

Figure 13. Public transport performance in 2018



Benchmark notes: In the IEA's Sustainable Development Scenario, OECD countries (such as the European Union, Japan and the United States) as well as China fully phase out conventional car sales by 2040. This scenario is aligned with the Paris Agreement's objective to keep the global average temperature increase well below 2°C above pre-industrial levels. The UK Committee on Climate Change finds that all new cars and vans should be electric (or use a low carbon alternative such as hydrogen) by 2035 at the latest to reach net zero GHG emission targets by 2050. A more cost-effective date from the point of view of users is 2030.

Figure notes: Figure 12 is based on data from Statistics Canada. Figure 13 is based on data from ITF and OECD Statistics. See Box 3.10 in the 2021 *OECD Regional Outlook* for more details. GDP per capita is expressed in USD per head, PPP, constant prices from 2015.

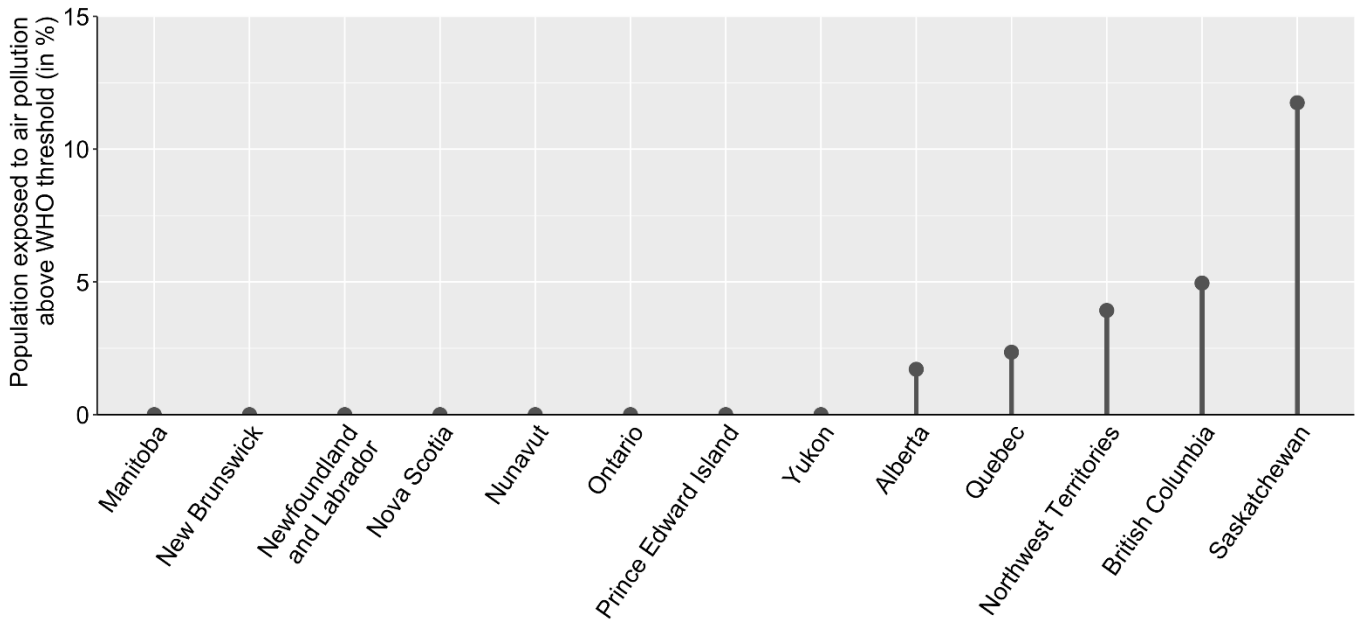
AIR POLLUTION

Large regions (TL2)

2019 OECD share of population exposed above the WHO-recommended threshold: 62%	2019 Canadian share of population exposed above the WHO-recommended threshold: 2%	WHO-recommended air quality threshold: PM2.5 annual mean concentration < 10 µg/m^3

Figure 14. Share of population exposed to levels of air pollution above the WHO-recommended threshold

Percentage of population exposed to above 10 µg/m3 PM2.5, large regions (TL2), 2019



Policies towards net-zero greenhouse gas emissions can bring many benefits beyond halting climate change. They include reduced air and noise pollution, reduced traffic congestion, healthier diets, enhanced health due to increased active mobility, health benefits through thermal insulation, and improved water, soil and biodiversity protection. Some are hard to quantify.

Small particulate matter (PM2.5) is the biggest cause of human mortality induced by air pollution. Major disease effects include stroke, cardiovascular and respiratory disease. Air pollution amplifies respiratory infectious disease such as Covid-19. It affects children the most. It reduces their educational outcomes as well as worker productivity.

Figure notes: Figure 14 is based on data from OECD Statistics.