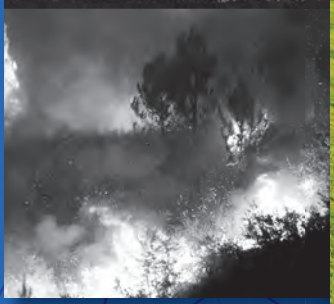
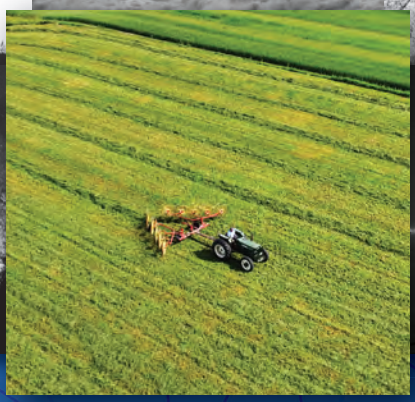
ENERGY & CLIMATE *at a Glance*

CANADIAN EDITION - 2024



Facts on **22 Prominent Climate Topics**




A Great Wager of National Treasure?

THE HEARTLAND INSTITUTE

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CANADIANS FOR SENSIBLE CLIMATE POLICY

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This book is styled after The Heartland Institute's "Climate at a Glance for Teachers and Students 2022 Edition," which is available, including videos, free of charge at https://climateataglance.com/, where it can also be downloaded for free, or accessed via an App (https://climateataglance.com/app/) that can be downloaded.

DEDICATION

To all the Canadians who followed the scientific method in their search to understand and promote the truth about energy and climate. For the past 28 years, many courageous and selfless Canadians have endured disparagement and censorship. While branded as deniers - akin to Holocaust deniers - and snubbed by most of the mainstream media,[1] these brave and talented individuals work hard to inform the public about the scientific, economic, and policy issues involved. Some have suffered ill health and loss of reputation as a result. They continue to strive for better public policies that serve the interests of present and future generations.

May this booklet inspire Canadians to build on this legacy by speaking out to family, friends, local politicians, and business leaders in a search for better understanding and sensible response to climate change and other environmental and economic issues.

Canadians for Sensible Climate Policy

October 2024

Notes:

1. Exceptions are: The National Post, The Epoch Times, and independent media

Energy & Climate at a Glance - 2024 Edition

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Authored by H. Sterling Burnett & Ron Davison

INTRODUCTION

Global net-zero emissions would require that emissions of greenhouse gases from human activities and removal of these gases are in balance by 2050. In other words, human activities are adding no carbon dioxide (or carbon dioxide equivalent gasses) to the atmosphere.

However, net zero by 2050 is a prohibitively costly goal. Present world debt is estimated to exceed $430 trillion (US $315 trillion).[1] Spending another $380 trillion (US $275 trillion) on net zero by 2050, as estimated by consultants McKinsey & Company, or $550 trillion (US $400 trillion), as estimated by economist Vaclav Smil, would impoverish people in all countries, including our children and grandchildren.[2, 3] These monetary costs will be borne almost entirely by the Western democracies via taxation or inflationary government borrowing. The broader impacts in the form of stunted development and reduced economic progress will be largely borne by the poorest people in developing countries.

The BRICS countries (Brazil, Russia, India, China, and South Africa), even without counting several other recently added developing nations, represent 42 percent or more of carbon emissions and more than two-thirds of the forecast growth in greenhouse gas emissions.[4] Yet the most populous developing nations are not required to publish and adhere to the Nationally Determined Contributions (NDCs) they submitted in accord with the Paris Climate Agreement of 2015. China, the world's largest emitter, made an emission-abatement pledge that is slated to begin in 2060. Clearly, the developing world, including large emitters that deem themselves as developing nations (despite being economic dynamos), is not following the same path as developed nations in reducing their carbon emissions. Furthermore, eliminating fossil fuels will impose mass starvation on developing nations whose access to sufficient food will be devastated by lack of nitrogen fertilizer and the natural fertilization of carbon dioxide.

Canada's original Paris Agreement commitments included a 30 percent reduction below 2005 CO_2 levels (0.571 GT/year) by 2030. Canada's new NDCs commit to a 40 to 45 percent reduction in emissions below 2005 levels by 2030, and net-

1 Institute for International Finance https://www.iif.com/portals/0/Files/content/Global%20Debt%20Monitor_May2024_vf.pdf

2 McKinsey Global Institute, "The Net Zero Transition: What it could cost—what it could bring." January 2022, "In brief," p. viii.

3 Vaclav Smil, "Halfway Between Kyoto and 2050: Zero Carbon is a Highly Unlikely Outcome." Fraser Institute, 2024, p. 26.

4 https://www.nature.com/articles/s41598-024-58827-9

zero at 2050, a level equivalent to Canada's emissions in 1880.[5] Canadian CO_2 emissions were 0.558 GT/year in 2016 when the Paris Agreement was signed. Canada's 2022 emission rate was 0.548 GT/year, a drop of just 0.010 GT/year. This represents only 1.7 percent of the 40 percent commitment over the first six years.

Many investment counsellors—custodians of the public's savings and investments such as pension funds and insurance companies— are willing to concede privately that humans cannot control climate change. But they remain silent when discussing alternative investment strategies that might call into question their company's public support for net zero. This is a recipe for financial and economic disaster.

Over the past decade, global investment in clean energy exceeded US $14 trillion.[6] Yet CO_2 emissions have still risen around 60 percent. The effectiveness of the net zero 2050 plans must be scrutinized. The plan requires negative economic growth, accompanied by reliance on very expensive wind or solar electricity and implausible levels of carbon capture for Canada to meet its reduction commitment.

The planet has been warming since the mid-1700s. However, most of this warming is not due to rising levels of atmospheric carbon dioxide or methane gases. Aiming for net zero carbon dioxide emissions is economic and environmental folly.

After providing a brief discussion of the 2015 Paris Climate Agreement, which set the framework for current climate policies and negotiations, our case is presented in four sections. Section 1 outlines the Canadian commitments to net zero and current progress. Section 2 addresses the futility and harm resulting from present net-zero policies. Section 3 uses facts and data to demonstrate why there is no "climate crisis." Section 4 shows why carbon dioxide is an essential ingredient of life on Earth, and why fossil fuels are essential for continued economic progress and human development, benefitting other species on Earth, as well.

To sum up, the transition to net zero is a ridiculously expensive exercise in pursuit of a likely unattainable goal. Pursuing net zero will harm average Canadians and put the country at a competitive and geopolitical disadvantage with allies and enemies alike.

Finally, in Section 5, we discuss what we should do, including changes that can and should be made to current policies.

5 Office of the Auditor General of Canada – Lessons learned from Canada's Record on Climate Change https://www.oag-bvg.gc.ca/internet/English/att__e_43947.html

6 https://www.iea.org/reports/world-energy-investment-2024/overview-and-key-findings

BACKGROUND ON THE PARIS AGREEMENT AND NET ZERO

The Paris Agreement on climate change was reached in December 2015 at the 21st meeting of the Parties to the U.N. Framework Convention on Climate Change (COP 21) with the goal of moving toward a low-carbon emissions world. The Agreement set a long-term goal of limiting global greenhouse gas (GHG) emissions to avoid increasing global average temperatures to no more than 2°C above pre-industrial levels.

The Agreement as an international treaty came into force in late 2016, and included 178 signatories (177 states plus the European Union). All of the participants committed to reduce their emissions through domestic policies to work together to mitigate and adapt to the impacts of climate change.

Certain developing nations (such as India, China, and others) were exempt from compliance with the Nationally Determined Contributions (NDCs), which are each country's voluntary commitments to reduce the emissions of GHG. Compliance with an NDC is not legally binding and there is no penalty for failure to attain an NDC.

With time, the Paris Agreement was deemed inadequate and "net zero by 2050" was pushed at the 2018 UNFCCC – COP24 meeting as an alternative in the U.N. Intergovernmental Panel on Climate Change's (IPCC) Report SR1.5. The initiative was rejected by the COP24 participants, but many institutional investors and governments around the world adopted the goal anyway.

Section 1

The Economics of Canadian Climate Commitments

Chapter 1

Canadian Commitments to Net Zero

Canada's initial 2015-2021 International Climate Finance Commitment was $2.65 billion. That number was met and in June 2021, the commitment was increased to $5.3 billion for the 2021 through 2026 period.[7, 8]

In June 2021, through the Net Zero Emissions Accountability Act, Canada joined with a number of other countries committing to go beyond their Paris commitments to adopt net zero by 2050 as a binding goal in legislation. The federal government defines achieving net-zero emissions as the Canadian economy either emitting no human-caused greenhouse gas emissions or offsetting its emissions. Examples include replacing fossil fuel energy with renewables, such as Industrial Wind Turbines (IWT) and Solar Photovoltaic Panels (PV); emission caps on oil and gas; tree planting; Carbon Capture Utilization & Storage (CCUS) technologies; and the purchase of tradable emissions credits from other countries.

The Liberal government has strongly promoted net zero as a means to significantly reduce CO_2 emissions to avoid the worst impacts of climate change while creating a "clean"

Key Takeaways

- Canada's original commitment under the Paris Agreement was a 30 percent reduction below 2005 CO_2 equivalent levels (0.739 GT) to 0.517 GT by 2030 and agreeing with other developed nations to voluntarily submit five-year plans indicating how they intended to reduce emissions.
- Canada also agreed to provide financing to developing countries to mitigate climate change, strengthen resilience, and enhance their abilities to adapt to climate impacts.
- The Paris Agreement was deemed inadequate and eventually morphed into "Net Zero by 2050."

7 Canada's $2.65 Billion International Climate Finance Commitment - Canada.ca

8 https://www.canada.ca/en/services/environment/weather/climatechange/canada-international-action/climate-finance/commitment.html

economy.[9] Their recent move, appointing Mark Carney (who was the UN's special envoy on climate action) as a Special Advisor, signals that they are doubling down on the UN's and World Economic Forum's climate change agenda (along with all their corporate partners).[10]

9 "Net-zero emissions in Canada by 2050" Government of Canada. https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/net-zero-emissions-2050.html

10 World Economic Forum (WEF) – Strategic Partner List - https://www.weforum.org/partners/#search

Chapter 2

Canada's CO_2 Nationally Determined Contributions

Key Takeaways

- Shortly after the passage of the 2021 Canadian Net-Zero Emissions Accountability Act, Canada submitted to the UNFCCC its enhanced Nationally Determined Contribution (NDC) of emissions, namely 40 to 45 percent below 2005 levels by 2030.
- These reductions will differ by sector and province.

Figure 2.1 shows the expected percentage reductions in human-caused greenhouse gases from 2005 to 2030 in various economic sectors in Canada.[11] For example, the electricity sector is expected to reduce emissions by 88 percent, largely by switching from fossil fuel-based energy to renewable and sustainable "clean" energies, and so on.

Economy wide, Canada is expected to reach its emissions targets, in part, through carbon pricing, the use of "cleaner" fuels, a reduction in methane emissions, and "private & public investment cash" in a Low Carbon Economy Fund to promote climate action projects. In the building sector, such projects could include construction of energy efficient buildings and retrofitting existing buildings with insulation, low emitting windows, and electric appliances.

Canada's oil and gas sector will be subject to a cap on oil and gas emissions. To meet those caps, the federal and Alberta governments proposed large tax incentives to encourage investment in CCUS technologies and methane emission reduction.

Figure 2.2 is a graph of Canada's targeted emissions reductions from 2005 to 2050 by sector.[12]

The Canadian provinces are all expected to create emission-reduction plans and measures, although the actual numbers vary by province.

11 "Exploring Approaches for Canada's Transition to Net-Zero Emissions," Environment and Climate Change Canada, Government of Canada. Page 13 https://unfccc.int/sites/default/files/resource/LTS%20Full%20Draft_Final%20version_oct31.pdf

12 "Canada's Energy Future," Executive Summary, Canada Energy Regulator, Government of Canada. https://www.cer-rec.gc.ca/en/data-analysis/canada-energy-future/2023/

Figure 2.1. 2030 ERP Projected Sectoral Contributions

Sector	Where we were in 2005 (Mt)	Where we were in 2019 (Mt)	Where we could be in 2030 (Mt)	Per Cent Reductions from 2005 levels*
Buildings	84	91	53	-37%
Electricity	118	61	14	-88%
Heavy Industry	87	77	52	-39%
Oil and Gas	160	191	110	-31%
Transportation	160	186	143	-11%
Agriculture**	72	73	71	-1%
Waste and Others	57	51	29	-49%
Land Use, Land Use Change, and Forestry (LU-LUCF)*, Natural Climate Solutions	-	-	-30	-
Total*	739	730	443	-40%

Figure 2.1: Emissions reductions expected in each economic sector between 2019 and 2030, with some sectors requiring more reductions than others.
Source: Government of Canada, "Exploring Approaches for Canada's Transition to Net Zero," p. 13.

Figure 2.2. GHG Reductions in Megatons by Sector

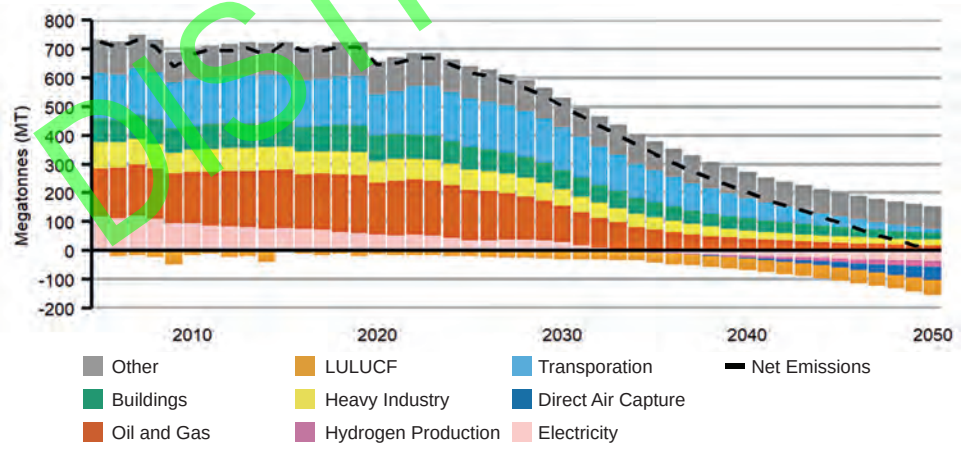


Figure 2.2: GHG reductions in Megatons by sector between 2005 and 2050.
Source: Canada's Energy Future, Scope

Chapter 3

Canada's Path and Obstacles to Net Zero

Key Takeaways

- Canada's federal government has proposed a number of policies to reach net zero, such as electric vehicle mandates, electric power transition to renewable sources, carbon capture and storage, the development of hydrogen technology, and agricultural reductions under the Emissions Reduction Plan (ERP).
- The government has not laid out the consolidated costs, the impact of those expenditures on the climate (i.e.: temperature reductions), or outlined the financial impact (debt, inflation, etc.) on society.

Emissions Reduction Plan (ERP)

Canada's net zero aspirations are laid out in the federal government's Emission Reduction Plan. The expected electrical generation changes are shown in Figure 3.1.

Despite Canada already leading the world with 82 percent of its electric power generation not emitting CO_2 (Figure 3.2), the federal government's ERP requires the electric power sector to be net zero by 2035.[13]

The Canadian Energy Regulator (CER) proposes meeting this goal through a combination of new wind, nuclear power, hydro, natural gas with CCUS, bioenergy with carbon capture and storage (BECCS), and solar. Fossil fuel generation without CCUS declines swiftly in response to increasingly strong climate policies. The sector achieves net-zero emissions by 2035 and becomes net-negative thereafter, a result of using BECCS."[14]

Canada's Energy Future Limited by Intermittent Renewables

Alberta's electrical grid highlights one of the problems with renewables, their intermittency. As shown in Table 3.1, the combined efficiency of wind and solar in Alberta, due to the fact that the sun does not always shine and the wind does not always blow, is 28.8 percent.

In Alberta, wind and solar

13 Canada's 2030 Emission Reduction Plan (ERP) - https://publications.gc.ca/collections/collection_2022/eccc/En4-460-2022-eng.pdf

14 Canada Energy Regulator - Canada's Energy Future 2023: Energy Supply and Demand Projections to 2050 https://www.cer-rec.gc.ca/en/data-analysis/canada-energy-future/2023/

Figure 3.1. (a) Change in Electricity Generation from 2021 to 2050, by Fuel, Global Net-Zero Scenario

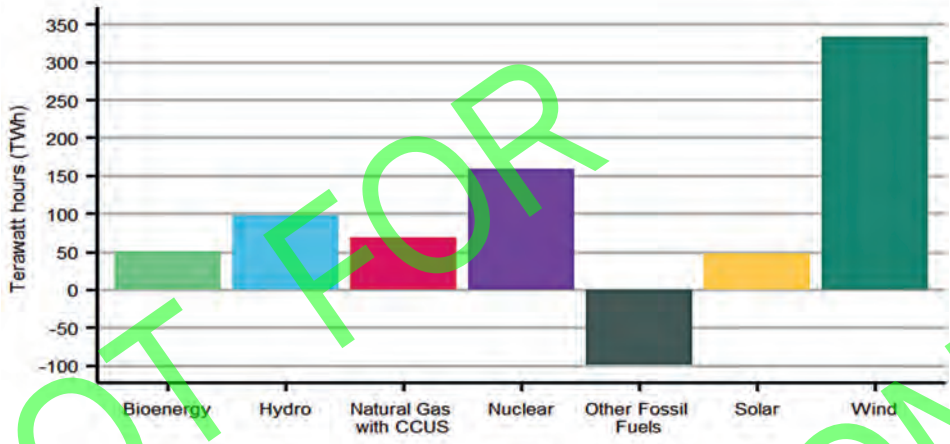


Figure 3.1. (b) GHG emissions from the electricity sector, by fuel, Global Net-zero Scenario

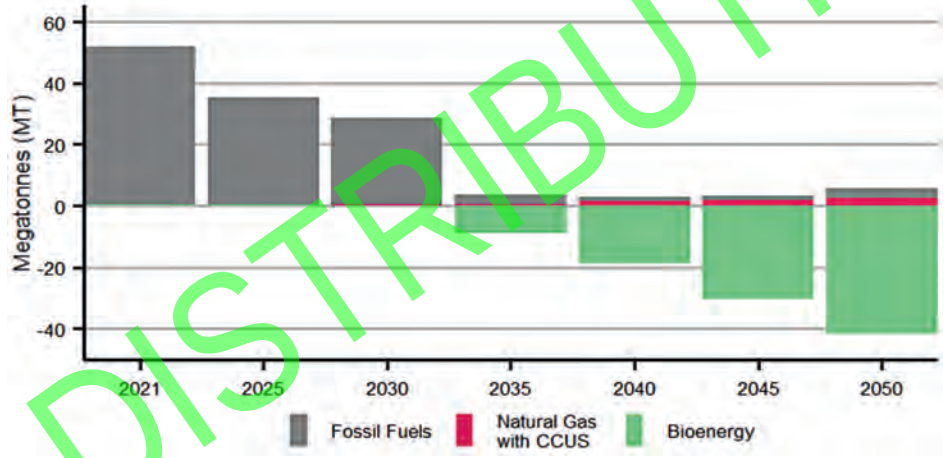


Figure 3.1: Emission Reduction Plan (ERP) – Change in electricity generation from 2021 to 2030, GHG emissions from the electricity sector by fuel.
Source: https://www.cer-rec.gc.ca/en/data-analysis/canada-energy-future/2023/executive-summary/

contributions are often close to zero for days to weeks at a time, frequently when the power is most-needed. Wind and solar combined are contributing less than 50 percent of the power more than 90 percent of the time; thus, adding more capacity is useless when the sun is not shining and the wind is not blowing.

Under the ERP, Canada's transportation fleet must be net-zero emissions by 2050. The Trudeau government's ambitious goal is for all light-duty vehicles to be zero emissions by 2035, and medium- to heavy-duty vehicles to be net zero by 2040, regardless of the population density. This means rural areas have to be electrified too.

Figure 3.2. Canada's Electricity Generation by Type

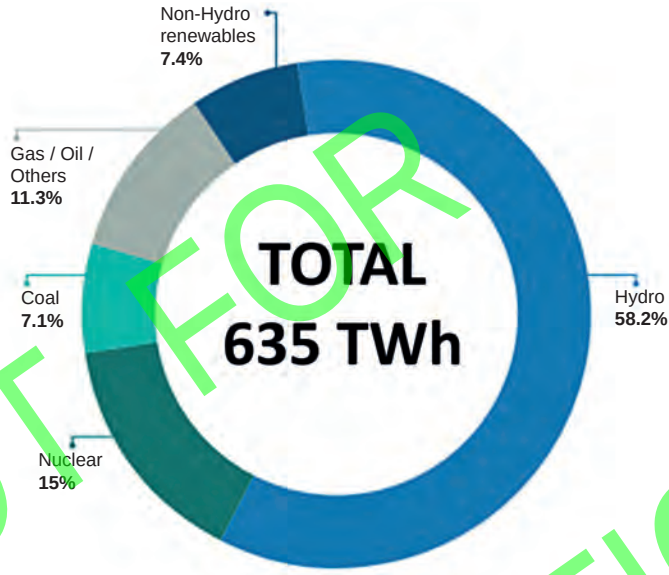


Figure 3.2: Canada's Electricity Generation by Type (82% non-emitting)

CCUS (Carbon Capture Utilization & Storage) Is Too Costly

CCUS, under which carbon dioxide emissions are captured from utility and industrial operations, and transported and stored permanently in underground reservoirs, is a pillar of the federal government's plan to achieve net zero. The ERP calls for the oil and gas sector to cap emissions.[15] Because the cost of the plan is estimated to be quite high, one analysis of the CCS option suggests that, "on balance, we expect that producer considerations related to the price of oil would reinforce the conclusion in this report that the optimal financial strategy for meeting the Cap is to curtail production."

The impacts on that production curtailment would be significant for a 20 Mt CO_2e per year reduction. Under this scenario, Canada's oil production, primarily from Alberta, is expected to decline 10 percent, and its gas production by 12 percent. In Alberta alone, it is estimated this will reduce real GDP by 4.5 percent compared to the baseline, the equivalent of a combined $191 billion loss, resulting in a loss of 55,000 jobs from 2030 to 2040.

The Conference Board of Canada projects the cost of imposing an

15 Potential Economic Impact of the Proposed Federal Oil and Gas Emissions Cap – Deloitte – March 2024 https://open.alberta.ca/dataset/f9b8dd81-2fc1-4e73-a75f-bedf55463841/resource/bba401be-cab6-4ce1-a0f6-7a8da2da7e5b/download/epa-tbf-potential-economic-impact-of-the-proposed-federal-oil-and-gas-emissions-cap.pdf

Table 3.1. AESO Grid - Renewable (Wind and Solar) Efficiencies

Time On	Solar Efficiency %	Wind Efficiency %	Consolidated Solar/Wind Efficiency %
Less Than 25%	67.2	45.8	44.6%
25% to 50%	11.4%	31.4%	45.9%
50% to 75%	10.6%	21.9%	9.5%
Greater Than 75%	10.8%	0.9%	0.0%
	100.0%	100.0%	100.0%
Yearly Average	21.5%	31.1%	28.8%

Table 3.1: Alberta Power Generation – Efficiency Summary

emissions cap on Canada's oil and gas production under a mid-range scenario to be $2.9 billion (US $2.1 billion) per year by 2030 and $120 billion (US $88 billion) to $130 billion (US$ 95 billion) per year by 2050.[16]

A real-world example of the costs comes from the Pathways Alliance CCS project linking 20 oilsands facilities in the Cold Lake area and annually sequestering 12 Mt of CO_2 and CH_4, for a total cost of $16 billion (US $11.7 billion), or about $1,375 per tonne, 2.8 times higher than the Social Cost of Carbon guideline that is supposed to protect the public from higher costs.[17]

Hydrogen – There Is No Business Case

Developing technologies that run on hydrogen fuel cells are considered a promising mechanism to help meet the net zero goal, being mentioned 96 times in the ERP. However, hydrogen faces many technical, safety, transportation, and financial hurdles before it can become a viable energy alternative.

Recently, Germany, Japan, and Greece approached Canada asking to buy Canadian natural gas. They were told that there was "no business case." Yet a "green" hydrogen (i.e., hydrogen made using wind and solar power as energy sources to carry out electrolysis) deal was subsequently struck with Germany. Why? There

16 The Conference Board of Canada report, "The Path to Net Zero: Survey Results From Canadian SMEs," December 8, 2023: https://www.conferenceboard.ca/product/the-path-to-net-zero-results/

17 Blended Social Costs (SC) of emissions from oil. The government designated SC of CO_2 is $261/tonne and of CH_4 is $2,300. However, the warming effect of CH_4 is 30 times that of CO_2 but the global growth of CH_4 is 300 times less than of CO_2. So, the blended SC of emissions from oil is $261 + ($2,300 ÷ 10) = $491/tonne (Ref Happer_Wijngaarden https://co2coalition.org/publications/methane-and-climate/)

Figure 3.3. How Does it Make Commercial Sense?

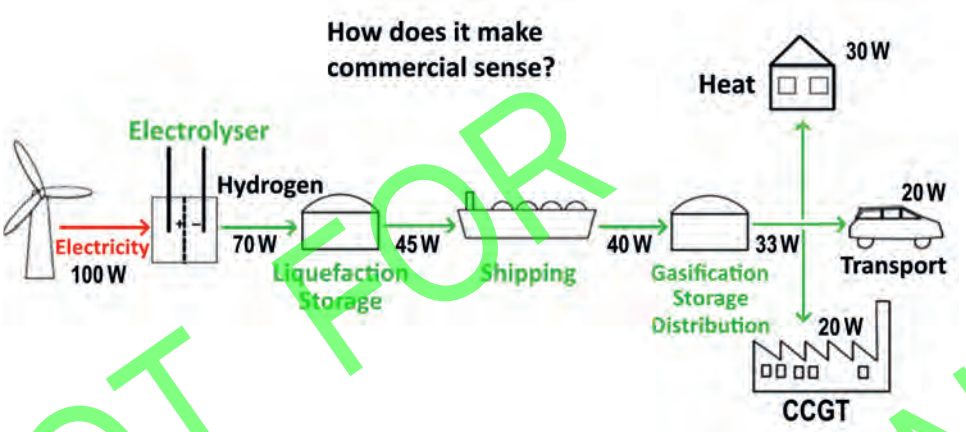


Figure 3.3: Creating hydrogen from wind and solar power. 100 W, 70 W, etc. indicates how much power remains after each stage in the process between the initial energy production and that available to the end user.
Source: Robert Lyman, Friends of Science

really is no business case for "green" hydrogen (roughly 67 percent of the wind/solar generated energy is used/lost before the generated hydrogen reaches the intended market), (Figure 3.3).[18] Despite the federal government's position, there is a business case for Canadian liquefied natural gas (LNG), with the added benefit that global CO_2 emissions would be reduced as LNG replaces the many proposed coal generation facilities being built by China, India, etc.

Agriculture – Self-Imposed Harm from Fertilizer Emissions Reduction

The ERP specifically calls for Canadian farmers to reduce emissions from their fertilizer use to the tune of 30 percent below 2020 levels by 2030. The primary way in which fertilizer emissions would be minimized is through reduced use of fertilizer.

Fertilizer reductions will lead to a sharp decline in crops, impacting both Canada and the world. One study compared "business as usual" with a 20 percent reduction in the use of chemical fertilizers from 2023 to 2030. The authors concluded the result would be to reduce yield by 23.6 bushels per acre per year for canola,

18 Canada's Hydrogen Policy Fiasco – Robert Lyman – Friends of Science Blog https://friendsofscience.org/library/policies-economics-and-ethics/canada%E2%80%99s-hydrogen-policy-fiasco.pdf

67.9 for corn, and 36.1 for spring wheat.[19] Annual corn production would decline by 43 percent in 2030. In countries where fertilizer restrictions have already been imposed, food production has dropped dramatically, hunger has increased, and in some instances, protests and massive riots have toppled governments.

In 2030, the total value of lost production of these three crops would be $10.4 billion. The cumulative losses from 2023 to 2030 would be $40.5 billion, concentrated in Saskatchewan and Alberta.

The Western Canadian Wheat Growers Association found that income losses caused by lower projected yields in corn, canola, and wheat would cost farmers $2.95 billion per year in Alberta, $4.61 billion per year in Saskatchewan, and $1.58 billion per year in Manitoba by 2030.

Canada's Emissions Reduction Plan Is All Pain, No Gain

There has been no comprehensive accounting of separate or cumulative costs of all these mandates and programs, nor of the broader societal impacts. As discussed in chapters three and four of section 3, they will also have no appreciable impact on climate.

The Fraser Institute, in their July 2024 report, reviewed the ERP potential, and observed:

> "The ERP is noticeably thin on cost estimates. The analysis herein supports several conclusions. First, the ERP will reduce Canadian GHG emissions but not by enough to reach the 2030 target level. Second, the ERP will seriously dampen GDP growth and eliminate net growth in real income per worker between 2022 and 2030. … The pricing mechanism costs the least per tonne, but the regulatory measures are extremely inefficient and raise the per-tonne cost of the package as a whole to about 3.5 times that of the carbon tax alone."[20]

19 Implications of a Total Emissions Reduction Target on Fertilizer – Prepared for Fertilizer Canada by MNP LLP https://fertilizercanada.ca/wp-content/uploads/2021/10/MNP-Economic-Report_FINALweb.pdf

20 The Economic Impact and GHG Effects of the Federal Government's Emissions Reduction Plan through 2030 – Ross McKitrick – July 2024 https://www.fraserinstitute.org/sites/default/files/economic-impact-and-ghg-effects-of-govt-ERP-thru-2030.pdf

Chapter 4

Economic Impact of Meeting Global and Canadian Targets

Key Takeaways

- National governments have been dishonest with the public about how much net zero policies will actually cost local governments and individual citizens.
- The global costs of reaching net zero are estimated to top $275 trillion by 2050, or approximately 10 percent of global GDP per year for the next three decades.

Scale and Cost of Required Global Mining and Infrastructure Is Enormous

National governments have not been honest with the public about how much net zero policies will actually cost local governments and individual citizens. Estimates from non-governmental sources, such as the McKinsey report, expect net zero will cost $275 trillion by 2050, or about $9 trillion per year.[21] This enormous sum equals approximately 10 percent of annual global GDP.

One recent analysis finds: "To achieve net-zero carbon, affluent countries will incur costs of at least 20 percent of their annual GDP," because poorer countries lack the resources to make emissions cuts.[22]

These estimates of upfront capital costs must be compared to the 2022 global government debt of $315 trillion—333 percent of global GDP.[23]

The scale of today's energy transition requires new non-carbon electric power sources by 2050, equivalent to 38,000 projects the size of British Columbia's Site C hydroelectric dam—about 1,100 MW costing $16 billion.

A 2022 Royal Bank of Canada (RBC) study estimated the cost of net zero to Canada at $60 billion per year, during the 28 years to 2050.[24] Considering that the federal government's deficit

21 The net-zero transition: what it would cost, what it could bring – McKinsey Global Institute https://www.mckinsey.com/capabilities/sustainability/our-insights/the-net-zero-transition-what-it-would-cost-what-it-could-bring

22 Halfway Between Kyoto and 2050 – Zero Carbon Is a Highly Unlikely Outcome – Fraser Institute – Vaclav Smil – 2024 https://www.fraserinstitute.org/sites/default/files/halfway-between-kyoto-and-2050.pdf

23 Navigating the New Normal – Institute of International Finance (IIF) - Global Debt Monitor – May 2024 https://www.iif.com/portals/0/Files/content/Global%20Debt%20Monitor_May2024_vf.pdf

24 Net Zero Report – Royal Bank of Canada (RBC) – October 2022 https://www.rbc.com/community-social-impact/_assets-custom/pdf/2022-net-zero-report.PDF

Figure 4.1. Annual Investment to Attain Net-Zero Emissions in Canada by 2050

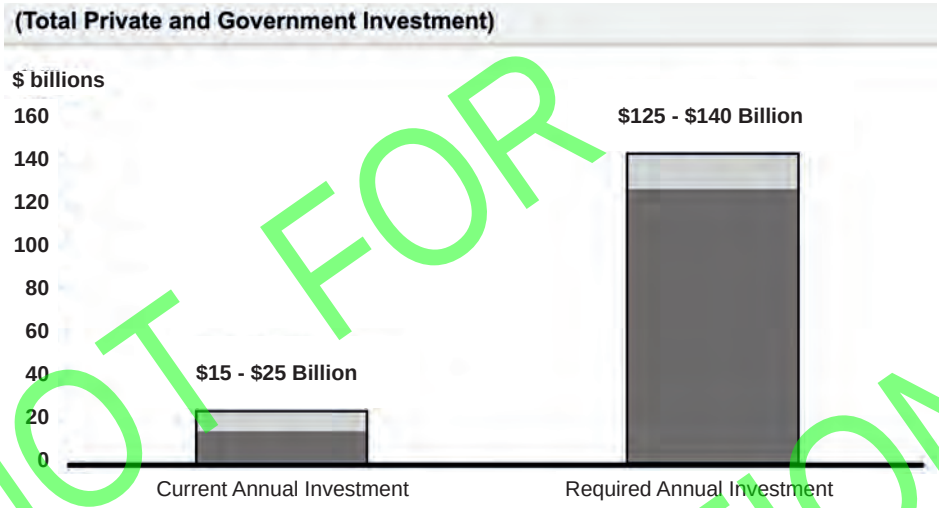


Figure 4.1: Annual Investment to Attain Net Zero Emissions in Canada by 2050 Source: 2022 Federal Budget

for 2024 is already $40 billion and cumulative debt is currently $1.2 trillion, the only place this extra $60 billion can come from is the taxpayers. The government will print more money, the debt/interest payments and tax obligations will increase, leading to more inflation and money printing, and the cycle will repeat. Based on roughly 16 million Canadian households, it's possible that each household could be paying up to 5.3 percent of their annual income for net zero policies alone—approximately $3,750 per year.

The federal government upped the ante in its 2022 budget with a forecasted net zero annual requirement of $125 billion to $140 billion in combined public and private capital (Figure 4.1), leading to a cost of 11.5 percent of annual household income or approximately $7,800 to $8,750 per year.[25]

25 Government of Canada – Budget 2022 https://budget.canada.ca/2022/home-accueil-en.html

Chapter 5

Environmental and Social Impact

Electric Vehicles Are Not Zero Emissions but Elsewhere Emissions

Canada's economy is already heavily dependent on mineral mining, with some 340 mines operating throughout the country. The increased demand for rare earths and critical minerals to manufacture and operate the technologies essential to meet net zero goals will necessitate a massive increase in mining on an expedited time scale. This will have massive environmental impacts. A 2023 study questioned whether mining can keep up with the demand from the electric vehicle (EV) transition alone.[26]

The International Energy Agency (IEA) reports that EVs are much more rare earth and critical mineral intensive than vehicles powered by internal combustion engines.[27] As a result, the IEA estimates international EV adoption pledges will require 50 new lithium mines, 60 new nickel mines, and 17 new cobalt mines by 2030. Overall, when one considers all the parts of battery cells and EVs dependent on critical minerals, the IEA estimates more than 388 new mines will have to open globally to meet EV goals.

Key Takeaways

- The mining necessary for minerals critical to the net zero energy transition results in land destruction, water and air pollution, and health harms in developing countries lacking strong property rights and/or strict environmental rules and enforcement.
- Wind and solar require massive expenditures related to raw materials, processing, and transportation. Their low power density and large land footprint causes widespread habitat destruction, disrupted natural visual impacts, and harms large numbers of wildlife, including many protected species.
- The energy, materials, and technology needed to meet the Trudeau administration's net zero goals will result in significant housing price increases.

26 Kenneth Green, "Can Metal Mining Match the speed of Electric Vehicle transition," The Fraser Institute, November 2023; https://www.fraserinstitute.org/sites/default/files/can-metal-mining-match-the-speed-of-planned-electric-vehicle-transition.pdf

27 International Energy Agency, "Minerals used in electric cars compared to conventional cars," May 2021; https://www.iea.org/data-and-statistics/charts/minerals-used-in-electric-cars-compared-to-conventional-cars

Figure 5.1. EVs Are Not Zero Emissions but Elsewhere Emissions

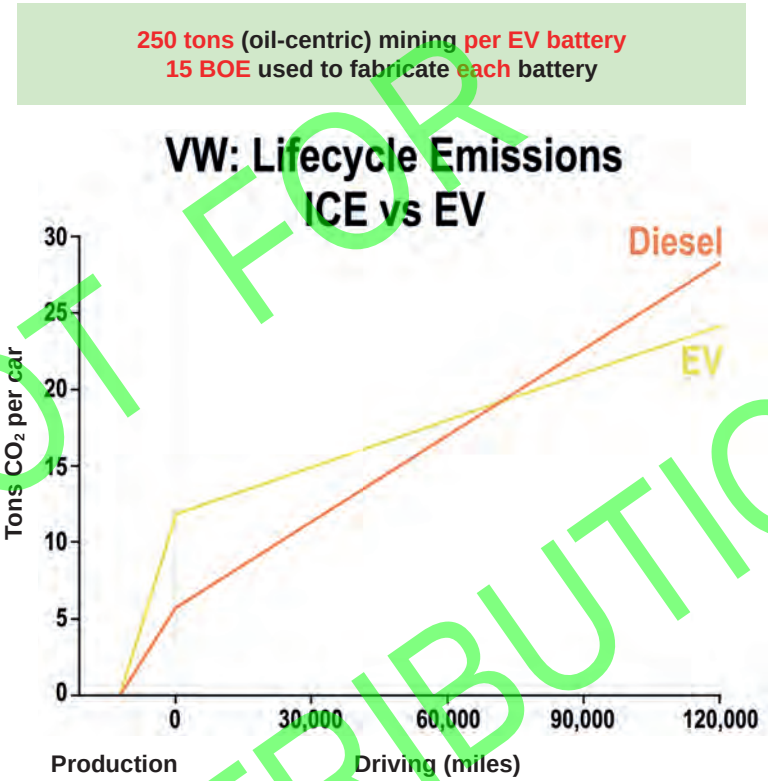


Figure 5.1: Volkswagen (VW) – Internal Combustion Engine (ICE), Electric Vehicle (EV) Lifecycle Emission Comparison. Graphic from Mark Mills - Manhattan Institute

The 2023 IEA study referenced above concluded:

> "The establishment of aggressive and short-term EV adoption goals sets up a potential conflict with metal and mineral production, which is historically characterized by long lead-times and long production timelines. The risk that mineral and mining production will fall short of projected demand is significant and could greatly affect the success of various governments' plans for EV transition."

EVs are zero emission in operation but not in manufacturing or charging, unless charging is done only using nuclear, hydro, wind, or solar. In fact, Volkswagen looked at full cycle CO_2 emissions for an EV and a diesel engine. The breakeven emission point is around 75,000 miles per car (likely beyond the useful battery life of most EVs. See Figure 5.1).

Figure 5.2. Volume and Time Required to Develop New Mines Make EV Mandates Nearly Impossible to Achieve

Figure 5.2: Existing Mines in Canada & US and Mine requirements with implementation times
Source: the Fraser Institute

Mineral Mines – An Opportunity Out of Reach

The Fraser Institute's estimated EV mine requirements are shown in Figure 5.2. The requirements go far beyond the EV transition. Concerning the energy transition requirements of the net zero transition, one report concluded it would be physically impossible to achieve on such a short time scale.[28]

The potential demand implies an opportunity for Canada. However, the supply chain of some 17 rare earth metals that presently are essential to efficient operation of EVs is dominated by China (Figure 5.3). Given the red tape hurdles in Canada, new mines are highly unlikely to open before 2030. So, the negative balance of payments from the 2030 EV mandate is Canada's gift to China.

Social Impacts – Exploitation of People in Poor Countries

The social impacts of the energy transition will also be negative (Figure

28 Assessment of the Extra Capacity Required of Alternative Energy Electrical Power Systems to Completely Replace Fossil Fuels - Geological Survey of Finland – Simon P. Michaux – August 2021; https://tupa.gtk.fi/raportti/arkisto/42_2021.pdf

Figure 5.3. China Is the OPEC of Green Energy Minerals

Figure 5.3: China's Dominance in the Rare Earth Mineral Fields
Source: IEA, "The Role of Critical Minerals in Clean Energy Transitions," 2021

5.4), starting with the child labor used in cobalt mining in the Congo[29] and slave labor in China for solar panel battery mineral production.[30]

Wind and Solar Have Large Footprints and Harm Wildlife

In addition, wind and solar facilities have large footprints on the landscape relative to other sources of energy. For example, solar energy requires an estimated 43.5 acres per megawatt of power produced, when mining, disposal, and transmission are considered. This footprint is more than three times larger than coal, natural gas, or nuclear.[31] (Figure 5.5)

Wind power's land footprint is even larger than solar at approximately 70 acres to generate a megawatt of energy.

Unlike wind, land for PV and CSP solar power plants is unusable for

29 Congressional-Executive Commission on China – Hearings – November 14, 2023 https://www.cecc.gov/events/hearings/from-cobalt-to-cars-how-china-exploits-child-and-forced-labor-in-the-congo

30 China uses Uyghur forced labour to make solar panels, says report (bbc.com) – May 14,2021 https://www.bbc.com/news/world-asia-china-57124636

31 Linnea Lueken, "Energy at a Glance: Solar Power and the Environment," The Heartland Institute, May 2023; https://energyataglance.com/2023/05/01/energy-at-a-glance-solar-power-and-the-environment/

Figure 5.4. Some Examples of the Many Environmental Problems with Renewable Energy

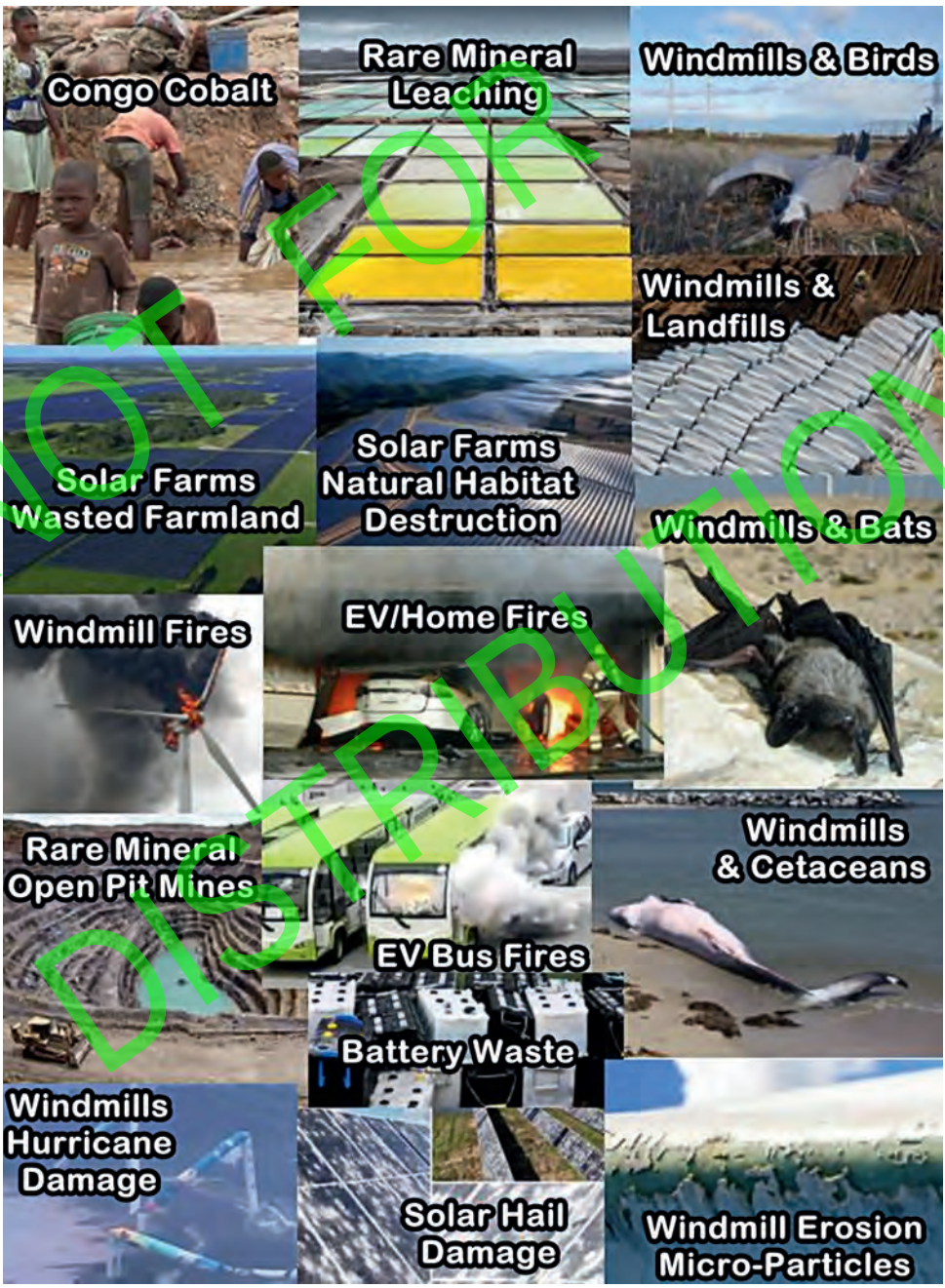


Figure 5.4: Some examples of the many environmental problems with renewable energy.

Figure 5.5. Land Use in Acres Per Megawatt Energy Produced

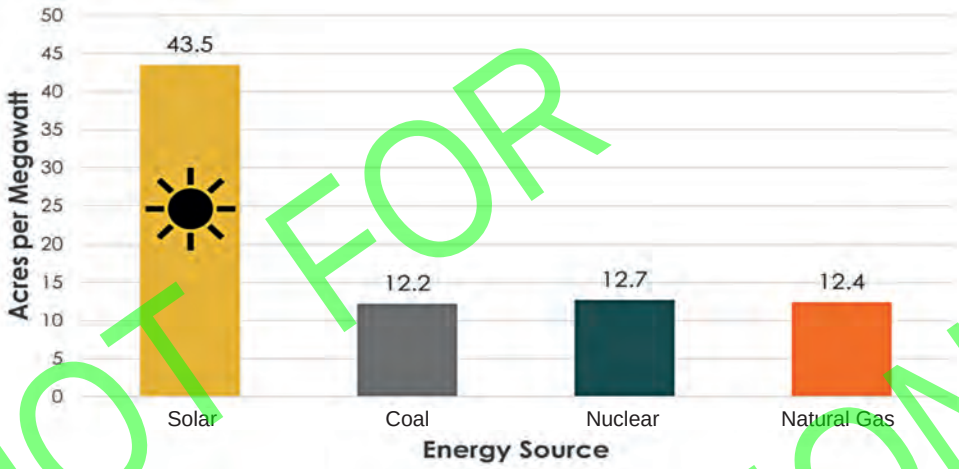


Figure 5.5: Land use in acres per megawatt energy produced for solar, coal, nuclear, and natural gas generated electricity. Data from: Landon Stevens et al., The Footprint of Energy: Land Use of U.S. Electricity Production, Strata, June 2017, https://docs.wind-watch.org/US-footprints-Strata-2017.pdf

other purposes. Millions of trees and other plants have been cleared to make way for industrial wind and solar farms, severely disrupting wildlife habitat in the process.

There is also the direct loss of birds, raptors, bats, insects, cetaceans, plants, etc., caused by industrial wind and solar facilities. In the United States alone, conservative estimates place the number of birds killed by wind turbine operations at 573,000 to 1.2 million each year. In addition, wind facilities are estimated to be responsible for the deaths of more than 888,000 bats annually.[32] Many of the birds and bats killed are threatened or endangered species normally protected by various laws.

Finally, there are the direct pollution consequences of "green energy." For example, the release to the environment of fibreglass particles due to erosion on the leading edge of wind turbine blades, and end of life toxic waste management from wind and especially solar power facilities. One study by Environmental Progress found that, when generating the same amount of energy as a nuclear plant, solar panels create at least 300 times as much toxic waste per unit of energy.[33]

32 Linnea Lueken, "Energy at a Glance: Wind and the Environment," The Heartland Institute, December 2023; https://energyataglance.com/2023/12/06/energy-at-a-glance-wind-and-the-environment-2/

33 Lueken, Solar Power, 2023; https://energyataglance.com/2023/05/01/energy-at-a-glance-solar-power-and-the-environment/

There are a variety of restrictions to renewables in Canada. The minimum setback distance for industrial wind turbines in Ontario,[34] including the City of Ottawa, is 550 meters from "noise receptors" such as homes.[35] This will make it difficult to site turbines anywhere near the urban centres for which the power is supposedly generated.

Alberta recently laid out renewable restrictions. The map portrayed in Figure 5.6 lays out the areas that have restrictions.[36] The restrictions affect 57 renewable projects worth $14 billion. Thirty-five of those projects are subject to agricultural limitations and another 22 are in no-go areas or areas that require a visual impact review. The same scenario will apply to most densely populated areas in Canada, making renewable energy expansion problematic.

Residential Housing Costs – Huge Increases from Net Zero Building Codes

The Trudeau government's Emissions Reduction Plan (ERP) indicates building codes will require an "[i]ncrease in energy efficiency such that new (residential) buildings use 61 percent less energy by 2025 and 65 percent less energy by 2030 in comparison to 2019." A companion proposal requires commercial buildings to meet a 47 percent efficiency improvement target by 2025 and 59 percent by 2030.[37]

A Fraser Institute study found that these plans will dramatically increase housing costs, compromising the government's plans to add more than 3.5 million affordable homes to the market by 2030. The study concluded the net zero building efficiency provisions will add 8.3 percent to the cost of new homes—$22,000 to $35,000 in additional building costs in Atlantic Canada, $38,000 in Quebec, and more than $70,000 in Ontario and British Columbia, yielding a national average of about $55,000 per home.[38]

The same study calculated that the added costs to residential and commercial construction would result in a national GDP decline of 1.8 percent as of 2030, in part due to a decline in construction of 6.8 percent, culminating in a loss of more than 80,000 construction-related jobs.

34 Chapter 3: Required setback for wind turbines - Government of Ontario, Updated November 10, 2023 https://www.ontario.ca/document/technical-guide-renewable-energy-approvals/required-setback-wind-turbines

35 Ontario – Technical Guide to Renewable Energy Approvals – Chapter 3: Required Setback for Wind Turbines https://www.ontario.ca/document/technical-guide-renewable-energy-approvals/required-setback-wind-turbines

36 Alberta government releases map showing what areas are off-limits for renewable power projects – Global News – March 15th, 2024 https://globalnews.ca/news/10363332/alberta-government-renewable-energy-map/

37 https://financialpost.com/opinion/ottawa-energy-efficiency-raise-new-home-costs-8

38 Fraser Institute: "Wrong move at the wrong time" https://www.fraserinstitute.org/studies/wrong-move-at-the-wrong-time-economic-impacts-of-the-new-federal-building-energy-efficiency-mandates

Figure 5.6. Suggested Setbacks, Buffers, Visual Impact Zones proposed for Alberta.

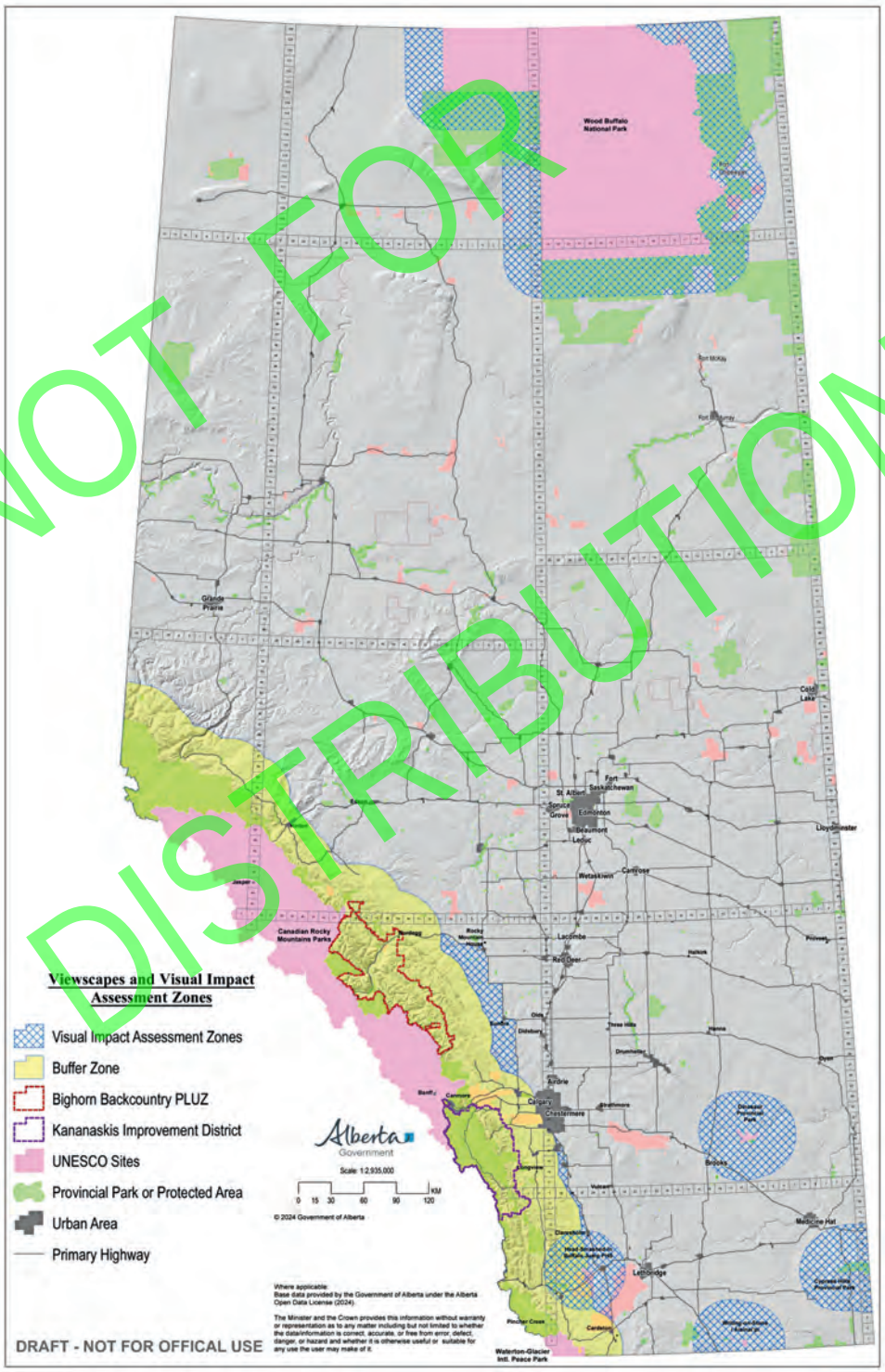


Figure 5.6: Suggested Setbacks, Buffers, Visual Impact Zones proposed for Alberta.

Section 2

Domestic CO_2 Restrictions Are Futile and Harmful

Chapter 1

Can Net Zero Goals Be Realistically Met?

Key Takeaways

- Canada cannot realistically meet its net zero emissions commitments. Emissions have only dropped 7.8 percent since 2007, which is not nearly enough to reach a 40 to 45 percent emission reduction by 2030 without major economic dislocation.
- Canada's net zero climate efforts, including the carbon tax, will reduce workers' income by 1.5 percent by 2030 and cost each worker $6,700 per year by 2030.
- Despite creating significant burdens on the Canadian economy and workers, the federal Emissions Reduction Plan (ERP) will not meet its targets and will be immensely costly with negligible gain.

As Figure 1.1 shows, Canadian CO_2 emissions peaked in 2007 at 0.594 gigatons (GT)/year. Emission-reduction policies have had some success, but they have been minor—a 7.8 percent drop since the 2007 peak.

Given these modest reductions, Canada will not achieve its net zero goals by 2050. Its 2030 goal (40 to 45 percent below 2005 levels) is also at serious risk. In fact, Canada's emissions have started to creep back up since the COVID-19 pandemic, when the economy was virtually shut down.

Despite failing to meet its reduction targets, Canada's emission reduction plans are expensive and will become more so in the future. Income per worker will fall by 1.5 percent by 2030 compared to 2022 levels; Canada's plan will cost $6,700 per worker each year by 2030.[39]

The net zero target becomes even more difficult, if not impossible to meet, as long as Canada's population remains on its current growth trajectory.

Historically, Canada's carbon emissions have been curtailed by the vast boreal forests, great plains, and extensive coastlines that act as massive carbon sinks by absorbing Canada's globally insignificant CO_2 emissions. However, net zero policies ignore these natural carbon sinks.

39 Ross McKitrick, "The Economic Impact and GHG Effects of the Federal Government's Emissions Reduction Plan Through 2030." *Fraser Institute,* July 18, 2024. https://www.fraserinstitute.org/sites/default/files/economic-impact-and-ghg-effects-of-govt-ERP-thru-2030.pdf

Figure 1.1. Canadian CO_2 Emissions

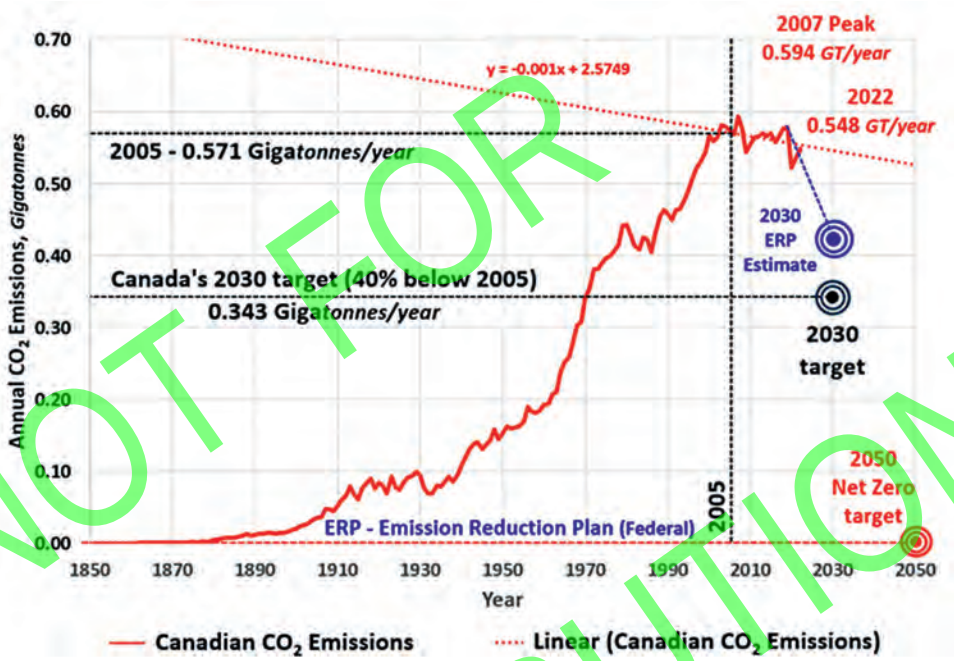


Figure 1.1: Canada is far from meeting its 2030 Net Zero goals.
Source: Ron Davison, Friends of Science Society, based on data from Our World in Data https://our-worldindata.org/

Chapter 2

How Will Canada's Net Zero Sacrifice Impact Global Emissions?

Canada's share of global CO_2 emissions in 2022 (0.548 GT) is miniscule as a percentage of global emissions, especially when compared to that of other countries such as China and India. Moreover, Canada's emissions are only 1.5 percent of the global emissions of 37.5 GT (see Figure 2.1).[40] In total, Canada's effect on global emissions is virtually zero (see Figure 2.2).[41]

Every two-and-a-half weeks, China emits more emissions than Canada's yearly total. When emissions from India and Africa are included, the timeframe falls to less than two weeks. Moreover, China is growing its emissions, in part as a result of the country building, or planning to build, two coal-fired power plants every week.[42]

Canada's emission-reduction efforts will have no impact on global climate, even were it not for the rapid growth of emissions in China, India, and other developing countries (Figure 2.3). Recognizing this futility, and the high cost of net zero efforts to replace fossil fuels, the European Union has recently reinterpreted natural gas as a "green" solution to its energy crisis.

Key Takeaways

- Canada's emissions are miniscule as a percentage of global emissions so its efforts to reduce emissions will have an insignificant impact on global CO_2 concentrations, even before considering the rapid growth of emissions in countries like China and India.
- If it is truly necessary to reduce greenhouse gas emissions, the best strategy for Canada to do so would be to increase the production and export of natural gas to reduce the need for dirty transportation and electric power production from EVs, biofuels, and biomass burned for electricity, cooking, and heat.

40 Government of Canada, "Greenhouse gas emissions." Sept 22, 2023. This is the source for the graphic.

41 Much of the emissions data in this chapter comes from the Our World in Data website, "CO_2 and Greenhouse Gas Emissions." https://ourworldindata.org/

42 Helen Davidson, "China continues coal spree despite climate goals." The Guardian, Aug. 29, 2023.

Figure 2.1. GHG Emissions by Nation 2022

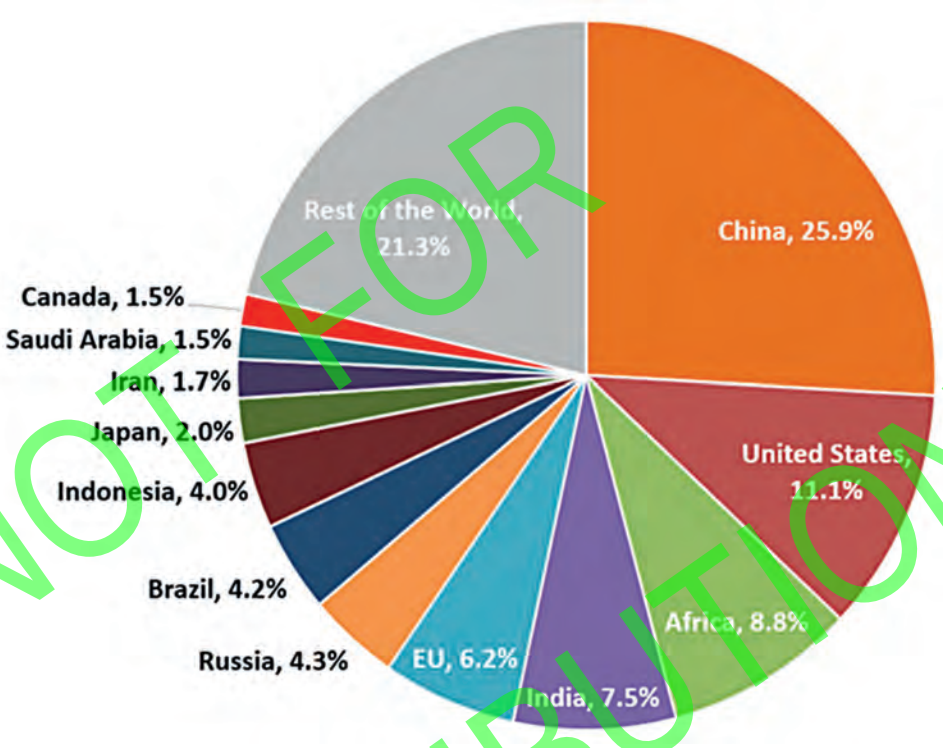


Figure 2.1: Canada produces only 1.5% of the world's greenhouse gas emissions.
Source: Ron Davison, Friends of Science Society, based on data from Our World in Data, https://our-worldindata.org/

Instead of taxing emissions and investing in wasteful renewable energy projects and electric vehicles, Canada should follow Europe's lead and prioritize natural gas production. Exporting natural gas to countries like China and India to replace their coal-generated power would have a far larger impact on global emissions than Canada's current initiatives.

Figure 2.2. Global Emissions (With and Without Canada)

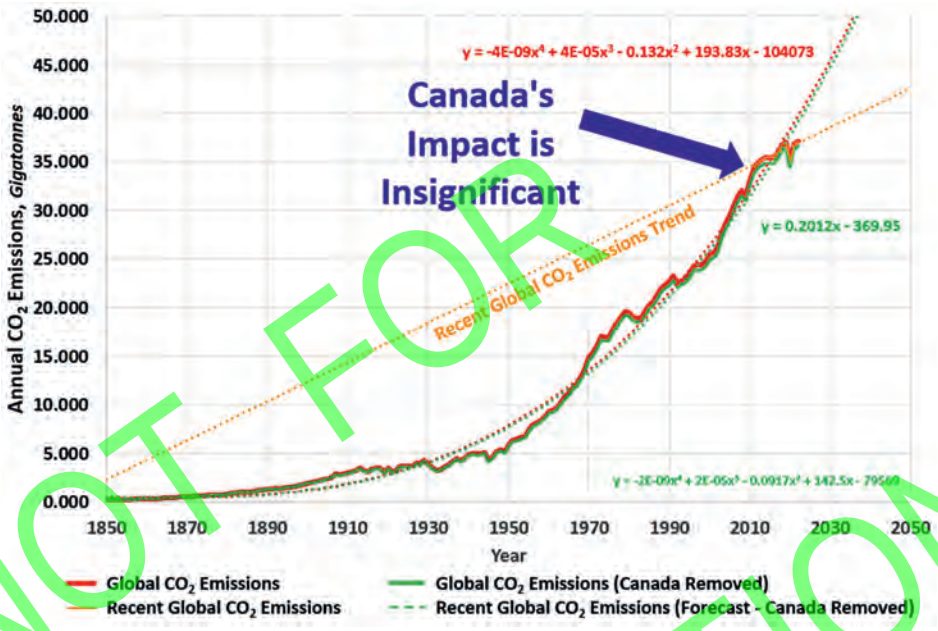


Figure 2.2: Global emissions including Canada (red line) and without Canada (green line). Canada's "contribution" to emissions reduction is effectively zero.
Source: Ron Davison, Friends of Science Society, based on data from Our World in Data https://ourworldindata.org/

Figure 2.3. CO_2 Emissions - Africa, China, India

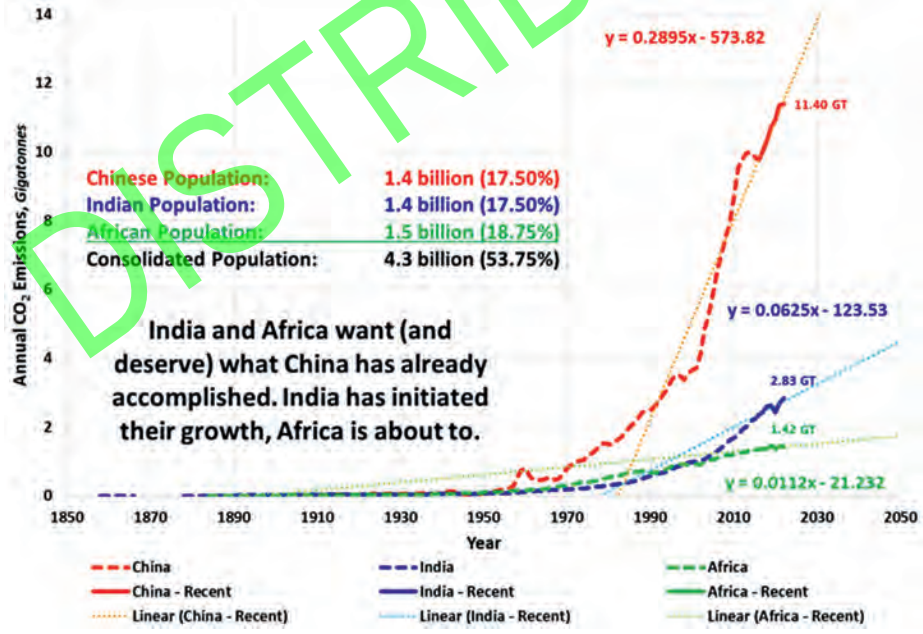


Figure 2.3: Carbon emission growth of developing regions like China, India, and Africa. Recent = 2016-2022
Source: Ron Davison, Friends of Science Society, based on data from Our World in Data https://ourworldindata.org/

Chapter 3

What Will the Sacrifices Cost? What Will Be Gained?

Canada's net zero goals raise crucial questions about how much these efforts would impact global temperatures.

Bjorn Lomborg, president of the Copenhagen Consensus Center, has estimated that if all nations met their 2015 Paris Agreement commitments until 2100, the expected global temperature reduction would be a trivial 0.17°C.[43] Lomborg estimates that the global cost of meeting the Paris Agreement targets is expected to range from $1.3 trillion to $2.6 trillion (US $1 trillion to $2 trillion) per year.[44]

Canada's contribution toward reducing global warming, in Lomborg's calculation, (see Figure 3.1) would be to prevent an undetectable 0.003°C (1.5 percent of 0.17°C) of temperature rise.

These minuscule temperature reductions are based on the IPCC's extreme, RCP8.5 "business as usual" scenario, which even the IPCC now considers unrealistic.[45] Other analyses suggest that the amount of temperature rise avoided by net zero will be even lower, with the costs much higher.

For example, the McKinsey Global Institute estimates that global costs could reach $380 trillion (US $275 trillion) by 2050.[46] A 2024 report by economist Vaclav Smil projects even

Key Takeaways

- Even if each of the parties to the Paris Agreement were to meet all their obligations through 2100, the warming prevented globally could be as low as 0.17°C or less; Canada's share would be a fraction of that, at 0.0034°C, or less.
- For Canada, net zero is estimated to cost $3.4 trillion to $5.2 trillion (US $2.5 trillion to US $3.7 trillion) from 2023 to 2050, or $212,500 to $325,000 per each of Canada's 16 million households.

43 Bjorn Lomborg, "Paris climate promises will reduce temperatures by just 0.05°C in 2100."

44 Bjorn Lomborg, "Welfare in the 21st century." *Technological Forecasting and Social Change*, Vol. 156, July 2020, 119981. Available online.

45 RCP stands for Representative Concentration Pathways, a series of scenarios that range from high levels of emissions reductions (RCP2.6) to more-than "business as usual" (RCP8.5). The IPCC no longer considers RCP8.5 a realistic scenario; however, it continues to feature in climate-alarmist arguments, including the IPCC's Summary for Policymakers.

46 McKinsey Global Institute, "The net zero transition: What it would cost, what it could bring." January 2022, "In brief," p. viii.

Figure 3.1. Temperature Reduction with Paris Agreement

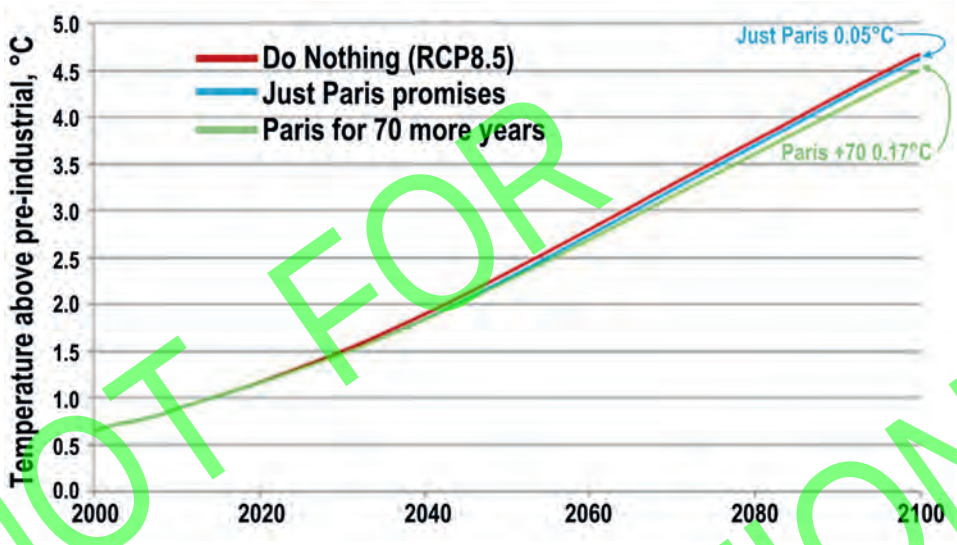


Figure 3.1: Temperature reduction with Paris (blue line, estimated by Lomborg at 0.05°C if all nations kept their climate promises up to 2030), without Paris (red Line), and if nations follow Paris for 70 more years up to 2100 (green line). There is virtually no difference in temperature reduction from following the Paris Agreement. Source: Bjorn Lomborg

higher transition costs—up to 20 percent of the yearly GDP of high-income nations, or $607 trillion (US $440 trillion), which means nearly $20 trillion (US $15 trillion) per year for 30 years.[47]

Yet, after spending all this money, a 2024 study by physicists Richard Lindzen, William Happer, and W. A. van Wijngaarden estimates that achieving net zero globally by 2050 would only prevent a 0.07°C rise in temperature. In this calculation, Canada's contribution to temperature reduction is an unmeasurable 0.001°C to 0.004°C.

For Canada, net zero is estimated to cost $3.4 trillion to $5.2 trillion (US $2.5 trillion to US $3.7 trillion) from 2023 to 2050, or $212,500 to $325,000 per each of Canada's 16 million households.[48] In cost-benefit terms, Canada would be spending inconceivable amounts of money for an imperceptible temperature benefit.

Because Canada's relative contributions to atmospheric carbon

47 Vaclav Smil, "Halfway Between Kyoto and 2050: Zero Carbon is a Highly Unlikely Outcome." Fraser Institute, May 2024, pp. 26, 32.

48 Robert Lyman, "Burdensome Ideology: The Cost to Canada of Climate Regulations." Friends of Science Society, May 21, 2024.

dioxide levels are unmeasurable, even if human emissions are responsible for some climate change (an open question as discussed in section 3, below) any impact on extreme weather or sea level rise could not be distinguished from natural variation.

Chapter 4

How Will Canada's Climate Sacrifice Position the Nation Economically and Geopolitically?

Canada's economic growth rate has fallen from nearly 4 percent annually in the early 1970s to approximately 1.5 percent per year in recent decades (see Figure 4.1).

Projections by the Organization of Economic Cooperation and Development (OECD) suggest that Canada's GDP growth might stabilize around 2 percent annually, putting it in the middle range among OECD nations. At this rate, Canada's GDP will grow to just $10 trillion (US $7.2 trillion) annually by mid-century, a relatively poor performance compared to other OECD nations.

On a per-capita basis, the numbers are even worse. A 2024 report indicates that Canada's GDP per capita growth was third from the bottom among 30 countries from 2014 to 2022 (see Figure 4.2), with an average annual GDP per-capita growth rate of only 0.6 percent.[49]

In part due to Canada's net zero policies and financial commitments, Canada's anticipated

Key Takeaways

- Canada's GDP has declined in comparison to other developed OECD nations, in large part due to Canada's aggressive net zero policies, which are hobbling the nation's energy, natural resource, and other sectors.
- Projections for GDP growth in the years 2030 to 2060 put Canada last among all OECD nations.
- The Parliamentary Budget Office (PBO) has reported that extreme "climate change" (considered unlikely by the IPCC) will reduce Canada's GDP by just 6.6 percent. And full global compliance with the Paris commitments will improve Canada's GDP by 0.8 percent, a relatively trivial $17 billion in the year 2100, meaning Canada will be slightly less wealthy, while having almost no effect on climate. The PBO's calculations indicate that it is not worth spending anywhere from $3.4 to $5.2 trillion by 2050 for such a miniscule return.
- Canada's net zero policies, including carbon taxes, are putting the nation at a competitive disadvantage with trading partners and economic competitors, most of which have not imposed a carbon tax.

49 Alex Whalen, Milagros Pilacios, & Lawrence Shembri, "We're Getting Poorer—GDP per Capita in Canada and the OECD, 2002-2060." Fraser Institute, 2024. https://www.fraserinstitute.org/sites/default/files/were-getting-poorer-gdp-per-capita-in-canada-and-oecd-2002-2060.pdf

Figure 4.1. Canadian GDP Profile - OECD

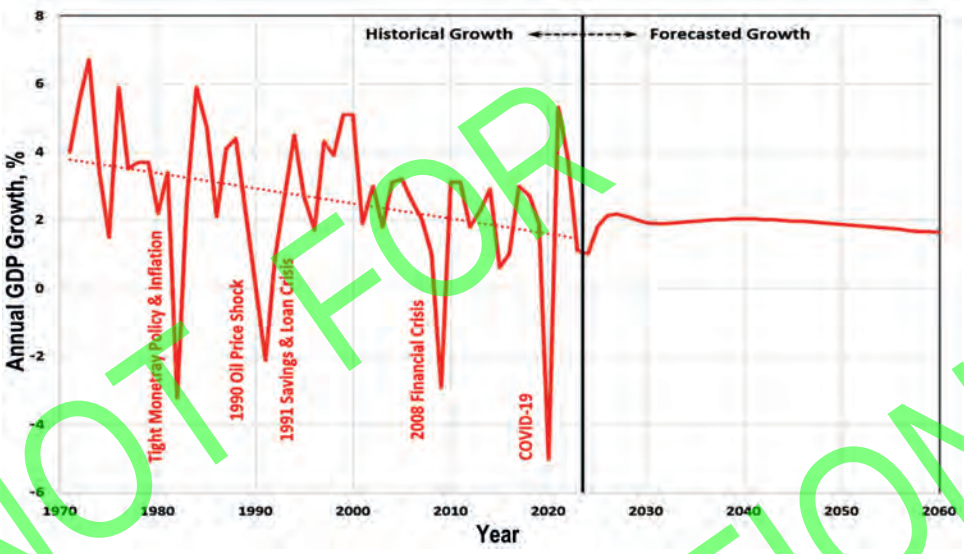


Figure 4.1: Canada's declining GDP from 1970 to today, plus forecasted declines.
Source: OECD

per-capita GDP growth from 2030 through 2060 ranks last among OECD countries at a mere 0.78 percent per year (see Figure 4.3).

Canada's net zero financial policies, which hobble the economically vital resources sector, are putting the nation at a serious disadvantage in competing with its OECD peers.

A 2022 Canada Parliamentary Budget Office (PBO) report stated that Canada's emissions are not large enough to materially impact climate change. Still, the agency issued a report estimating the economic impact that "climate change" and the 2015 Paris Agreement commitments are having and will have on Canada's GDP growth.[50]

To summarize (as per Table 4.1), the vagaries of "climate change" will reduce Canada's GDP growth in 2100 by 6.6 percent. At an unrestricted 2 percent/year GDP growth rate, Canada's GDP would grow by roughly 378 percent by 2100, meaning "climate change" would reduce that growth to 371.4 percent (a difference of roughly $140 billion). The PBO also showed that under full global adherence to the Paris Accord commitments, Canada's GDP would improve from a 6.6 percent reduction to a 5.8 percent reduction (a 0.8 percent improvement, roughly $17 billion).

50 Parliamentary Budget Office (PBO), "Global greenhouse gas emissions and Canadian GDP." Nov. 8, 2022. https://publications.gc.ca/collections/collection_2023/dpb-pbo/YN5-259-2022-eng.pdf

Figure 4.2. Average Growth Rates (%) in Real GDP Per Capita, OECD Countries, 2014-2022

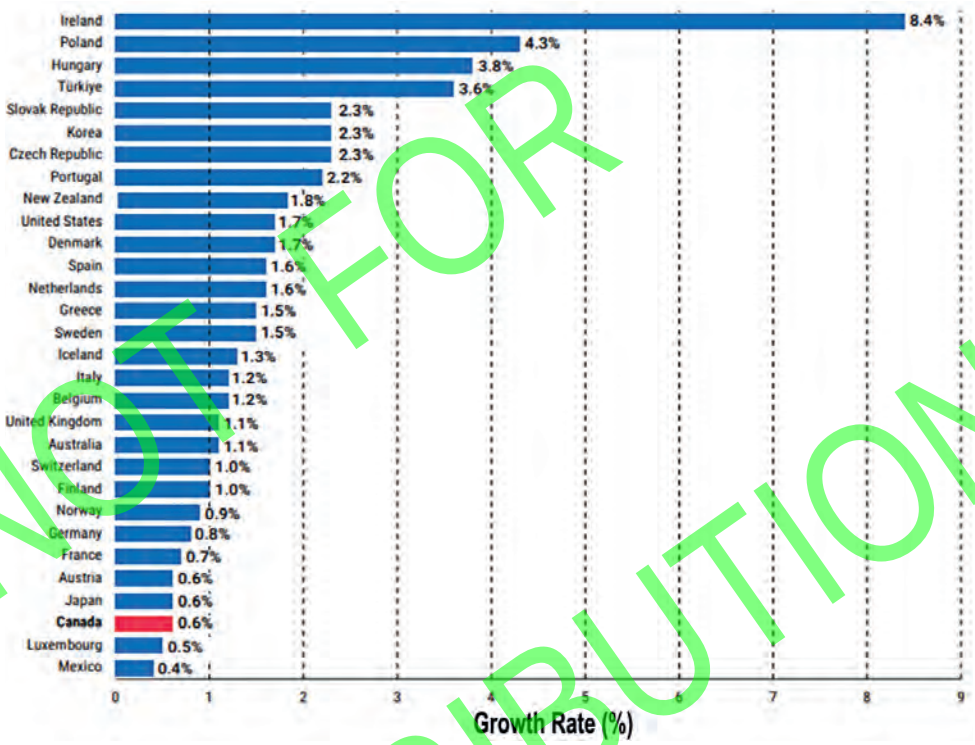


Figure 4.2: Average GDP/capita growth rates for OECD nations; Canada is near the bottom in red.
Source: OECD

Canada's current carbon tax of $80 (US $58) per tonne, rising to $170 (US $122) by 2030, makes it an outlier compared to direct competitors in the natural-resources and energy industry.

The top four energy producers (coal, oil, and natural gas combined) are China, the United States, Russia, and Saudi Arabia. None of these nations collect a national carbon tax. Of Canada's two closest trade partners, the United States doesn't have a national carbon tax; the carbon tax in Mexico is only $4.80 (US$3.50) per tonne of carbon.

As a result, Canada's carbon-pricing policies are putting the country at a distinct disadvantage with its direct economic and trade competitors, increasing the price of Canadian goods and thus hampering access to world markets (see Figure 4.4).[51]

51 Figure 4.3 comes from "The Canada-United States-Mexico Agreement: Economic Impact Assessment," Global Affairs Canada, Feb. 26, 2020. https://www.international.gc.ca/trade-commerce/assets/pdfs/agreements-accords/cusma-aceum/cusma-impact-repercussion-eng.pdf

Figure 4.3. Projected Growth Rates in Per-Capita GDP, OECD Countries, 2030-2060

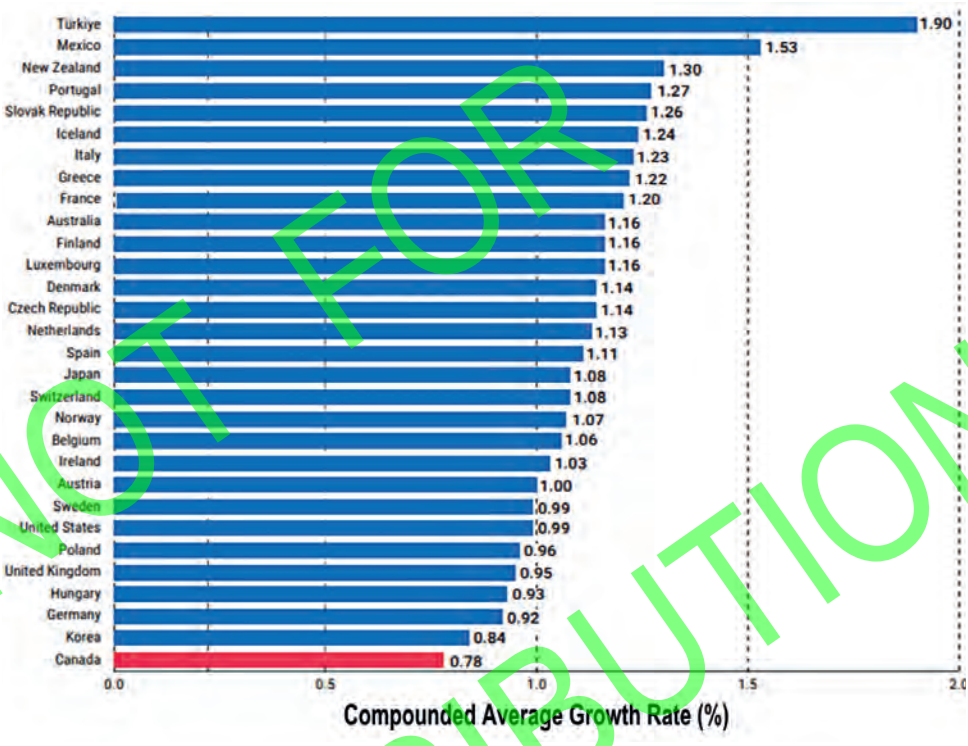


Figure 4.3: OECD projections of GDP growth rates per capita 2030-2060. Canada (in red) is at the bottom of all OECD countries with only 0.78 per cent projected growth.
Source: OECD

Worse, Canada is even turning customers away. When Germany and Japan asked to buy Canadian liquefied natural gas (LNG), Prime Minister Justin Trudeau told them there was "no business case" for LNG.[52]

Ironically, Canada's carbon policies will ultimately lead to higher global emissions because every barrel of oil, molecule of natural gas, or tonne of coal that is prevented from being exported will be produced in countries with lower ethical, social, and environmental standards (i.e., higher emissions, more pollution, higher safety risks, etc.).

52 Leslie Palti-Guzman & Rachel Ziemba, "On LNG, Canada turned away Germany, then Japan – this country cannot keep doing that." *Globe and Mail,* Jan 24, 2023. https://www.cnas.org/publications/commentary/on-lng-canada-turned-away-germany-then-japan-this-country-cannot-keep-doing-that#:~:text=Canadian%20Prime%20Minister%20Justin%20Trudeau%20lauded%-20Japan%20for

Table 4.1. Estimated Impact of Climate Change on Canada's Real GDP Based on Global GHG Emissions Scenarios

With the Paris Accord

Percentage difference	2021	2050	2075	2100
Current policies plus announced pledges (APS)	-0.8	-2.4	-4.1	-5.8
Current policies only (STEPS)	-0.8	-2.5	-4.4	-6.6

Without the Paris Accord

Table 4.1: Estimated impact of Climate Change on Canada's real GDP based on global GHG emissions scenarios.
Source:. https://publications.gc.ca/collections/collection_2023/dpb-pbo/YN5-259-2022-eng.pdf

Figure 4.4. Share of Major Trading Partners in Total U.S. Merchandise Imports, 1990-2018 (%)

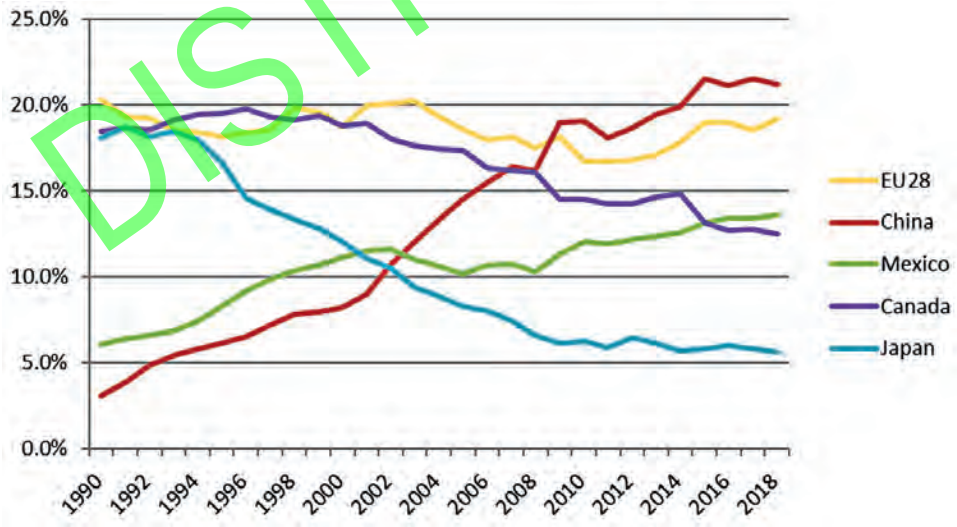


Figure 4.4: Canada's share of trade with the United States is falling, while U.S. trade with China is increasing, in part because our products are less competitive due to our carbon-tax policies.
Source: Global Affairs Canada, Office of the Chief Economist.

Section 3

There Is No 'Climate Crisis'[53]

53 This section borrows heavily from Anthony Watts, et al, "Climate at a Glance for Teachers and Students," The Heartland Institute, 2022, as updated; https://climateataglance.com/

Chapter 1

CO2 Does Not Control the Temperature

Greenhouse gases make up no more than 2 percent of Earth's total atmosphere. However, they are critical to making the planet habitable; without them, Earth would be a freezing rock in space like Mars.

Water vapor is responsible for about 95 percent of the greenhouse-gas warming. CO_2 and other trace gases make up 5 percent or less of the greenhouse gases in the atmosphere, with human activities contributing only about one-quarter of 1 percent of present warming (see Figure 1.1).[54, 55]

In Earth's geologic past, global temperatures and CO_2 concentrations have not been correlated; that is, temperatures and CO_2 levels have risen and fallen, sometimes dramatically, with no corresponding impact or connection to the other.[56] (see Figure 1.2).[57]

Over the past 400,000 years, CO_2 increases have consistently *followed*

Key Takeaways

- Carbon dioxide is only a small part of the atmosphere as a whole and as a percentage of greenhouse gases.
- Throughout Earth's history, atmospheric CO_2 levels have risen and fallen, with little or no correlation to temperature until the past few hundred thousand years, when temperature increases consistently preceded CO_2 increases.

54 The Atmosphere: Getting a Handle on Carbon Dioxide—Part Two. NASA Jet Propulsion Laboratory, October 9, 2019, https://climate.nasa.gov/news/2915/the-atmosphere-getting-a-handle-on-carbon-dioxide/

55 "Greenhouse gases, water vapor and you." MIT Joint Program on the Science and Policy of Global Change, Massachusetts Institute of Technology, November 18, 2011. https://globalchange.mit.edu/news-media/in-the-news/greenhouse-gases-water-vapor-and-you

56 Figure based on Monte Hieb, "Climate and the Carboniferous Period: Similarities with Our Present World," Plant Fossils of West Virginia (Web site), updated September 19, 2006; available at http://mysite.verizon.net/mhieb/WVFossils/Carboniferous_climate.html. For temperature data, see C.R. Scotese, "Climate History: Ice House or Hot House?" PALEOMAP Project, April 20, 2002; available at http://www.scotese.com/climate.htm. For CO_2 data, see Robert A. Berner and Zavareth Kothavala, "Geocarb III: A Revised Model of Atmospheric CO_2 over Phanerozoic Time," American Journal of Science, Vol. 301, February 2001, pages 182-204; available at http://www.ajsonline.org/cgi/content/abstract/301/2/182.

57 https://www.dr-robert-fagan.com/climate-charts-ice-cores-and-milankovitch-cycles/

Figure 1.1. Breakdown of Total Atmospheric Gas Composition by Percent, All Greenhouse Gases

(Note: read left to right for diminishing values)

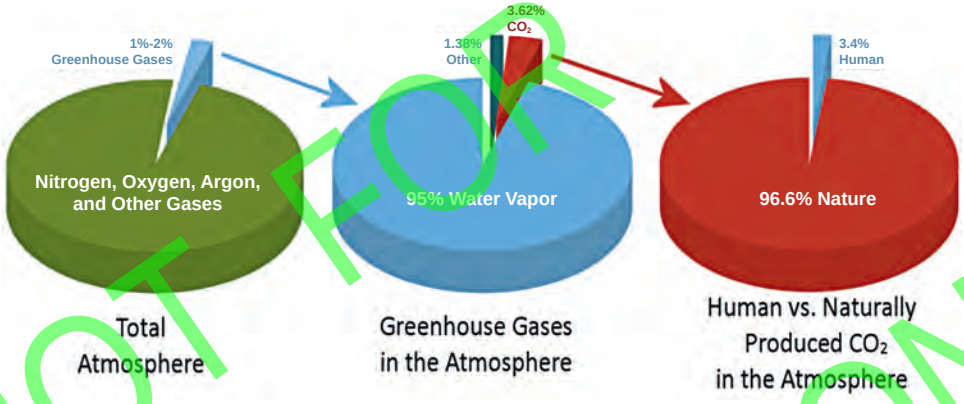


Figure 1.1: A breakdown of total atmospheric composition, all greenhouse gases, and human versus naturally produced carbon dioxide in Earth's atmosphere. Graphic by A. Watts, adopted from National Center for Policy Analysis, A Global Warming Primer.

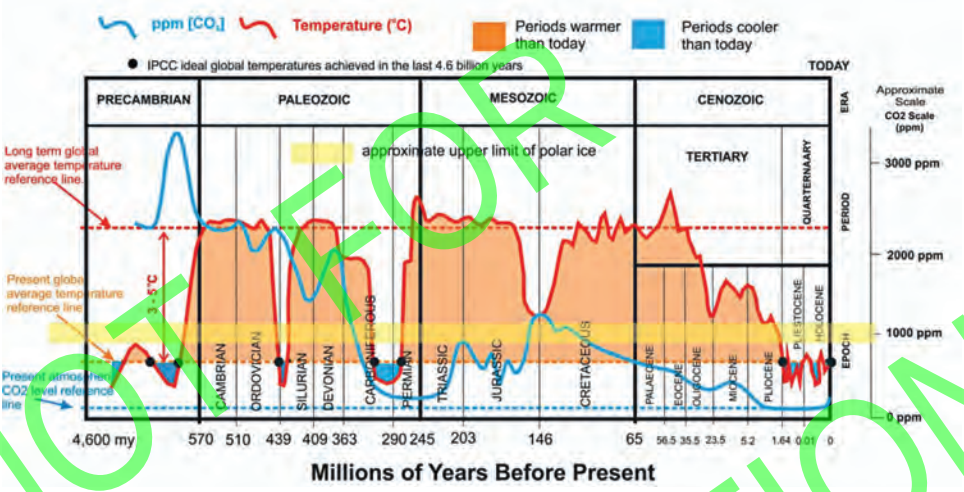
rising temperatures.[58] This is true of the past 150 years, as well. Carbon dioxide only began increasing after the Earth began to cycle out of the Little Ice Age—with no human help—in the mid-1700s.

Physics suggests that at present levels, CO_2 is saturated in the atmosphere, meaning further additions of CO_2 should have limited or no warming impact.[59]

58 Hubertus Fischer et al., "Ice Core Records of Atmospheric CO_2 Around the Last Three Glacial Terminations," *Science*, Vol. 283, No. 5408, March 12, 1999, pages 1,712-14. Also see Urs Siegenthaler et al., "Stable Carbon Cycle-Climate Relationship During the Late Pleistocene," *Science*, Vol. 310, No. 5752, November 25, 2005, pages 1,313-17; and Leonid F. Khilyuk et al., "Global Warming: Are We Confusing Cause and Effect?" *Energy Sources, Part A: Recovery, Utilization and Environmental Effects,* Vol. 25, Issue 4, April 2003, pages 357-370.

59 Richard Lindzen, William Happer, Steven Koonin, "There Will Be Disastrous Consequences For The Poor, People Worldwide, Future Generations And The West If Fossil Fuels, CO_2 And Other Ghg Emissions Are Reduced To 'Net Zero'," p. 15. The CO_2 Coalition; https://co2coalition.org/wp-content/uploads/2024/04/Lindzen-Happer-Koonin-climate-science-4-24.pdf

Figure 1.2. Geological Timescale: Concentration of Atmospheric CO_2 & Mean Global Temperatures



1 - Analysis of the Temperature Oscillations in Geological Eras by **Dr. C.R. Scotese** © 2002. 2 - **Ruddiman, W.F.** 2001, *Earth's Climate past and future* .W..H. Freeman & Sons, New York, NY. 3 Mark Pagani et al. *Marked Decline in Atmospheric Carbon Dioxide Concentrations During the Paleocene. Science*: Vol 309, No. 5734; pp 600-603, 22 July 2005. *Conclusion and Interpretation* by Nasif Nahle © 2005, 2007. *Corrected on 07 July 2008 (CO2: Ordovician Period).*

*Additional lines, highlights, colouring and text by **Robert Fagan**, 2018. Please be aware that the horizontal time scale varies markedly from left to right. The temperature troughs represented in blue as glacial episodes are up to 2 - 3 times deeper than portrayed. Additional information available at www.dr-robert-fagan.com*

Web link to data for this chart. http://www.biocab.org/carbon_dioxide_geological_timescale.html

Figure 1.2: Temperature and CO_2 variations over 600 million years. Over geologic time there is little correlation between temperature and CO_2. Source: Temperature after Scotese (2002), & CO_2 after Pagani et.al, (2005), with contributions by others.

Chapter 2

Climate Model Projections Don't Reflect Real Temperatures

Key Takeaways

- Climate models invariably forecast temperatures higher than actually occur.
- Data from satellites, radiosonde weather balloons, and surface-temperature measurements show a warming rate of less than half that predicted by climate models.
- No climate model projections match real-world observations.

Since their inception, climate models have consistently made temperature projections that are higher than actual measured temperatures. Recent research confirms that the current generation of climate models, Coupled Model Intercomparison Project Phase 6 (CMIP6), also continue to run too hot.[60]

Real-world data collected by three independent types of temperature-measuring instruments — satellites, weather balloons, and surface-stations—show the actual measured rate of warming is relatively mild and less than half the rates forecast by climate models (see Figure 2.1).[61]

The fact that every climate model overstates present warming and the recent warming trend suggests:

a) that the climate models' assumptions about the sensitivity of the climate to increases in CO_2 overstate the impact of CO_2 on temperatures, and/or

b) that factors other than CO_2, not accounted for by climate models, play a larger role in temperature than assumed by the scientists working with the IPCC.

60 Zeke Hausfather, Kate Marvel, Gavin A. Schmidt, John W. Nielsen-Gammon & Mark Zelinka, "Climate simulations: recognize the 'hot model' problem," *Nature* 605, 26-29 (2022), accessed 4/30/24, https://www.nature.com/articles/d41586-022-01192-2; and Paul Voosen, *Science*, "U.N. climate panel confronts implausibly hot forecasts of future warming," July 27, 2021, accessed April 30, 2024, https://www.science.org/content/article/un-climate-panel-confronts-implausibly-hot-forecasts-future-warming

61 Christy, J.R., McNider, R.T., "Satellite bulk tropospheric temperatures as a metric for climate sensitivity," Asia-Pacific J Atmos Sci 53, 511–518 (2017). https://doi.org/10.1007/s13143-017-0070-z and S. House Committee on Science, Space & Technology, 2 Feb 2016, Testimony of John R. Christy University of Alabama in Huntsville, accessed 4/29/24, https://www.nsstc.uah.edu/aosc/testimonials/ChristyJR_Written_160202.pdf

Figure 2.1. Global Bulk Atmospheric Temperatures (TMT Surface to 50K ft) 1979-2022

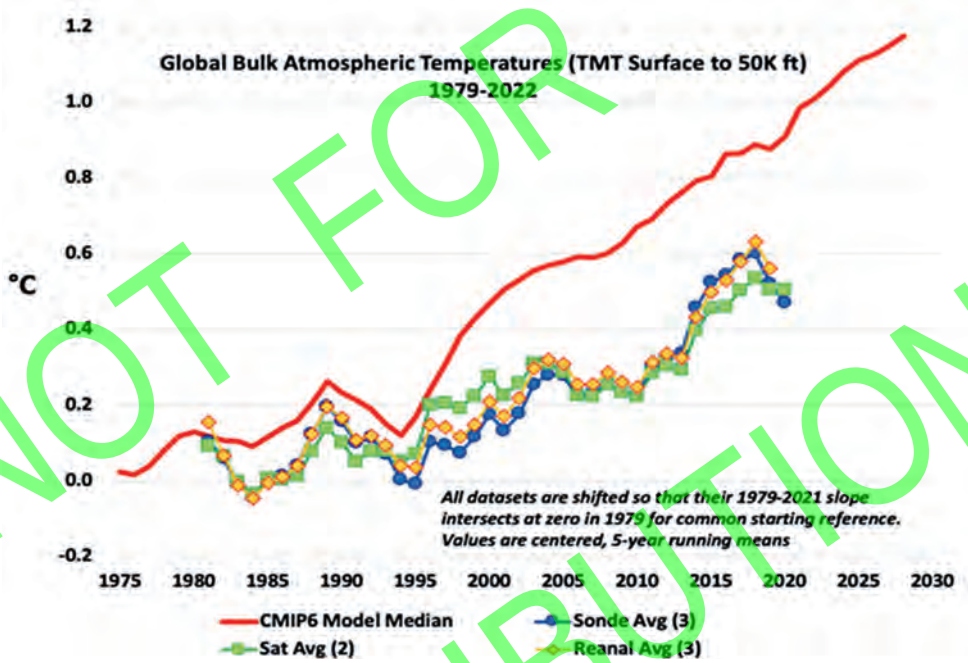


Figure 2.1: Comparison of global warming trends from 1979 to 2022 between CMIP6 climate models (median of all models in red) compared to average of satellite-derived temperature measurements (green), average of weather radiosonde balloons (blue), and reanalysis of average surface temperature measurements (orange). Note the red line (climate model temperatures) has warming rates nearly double that of actual measurements in 2022. Graph by Dr. John Christy.

Chapter 3

Urban Heat Island Effect Boosts Surface Temperature Records

The surface station temperature record is badly compromised by a variety of factors.

In the United States and globally, the agencies that measure and maintain the surface temperature records routinely adjust the raw temperature data *upward* for recent reported temperatures, and *downward* for historical temperatures, making warming trends appear steeper than they are.[62]

Data discontinuity occurs when a station in one location is closed and another opened in the same region but with different geographic features, yet the data are often reported as if it were continuous from the same location.[63] Even worse, a recent investigative report found that temperatures were being reported for 1,218 U.S. Historical Climatology Network stations, even though 30 percent of the stations no longer exist.[64]

In addition, repeated on-site surveys of ground-based temperature stations

Key Takeaways

- The surface-station temperature record is badly compromised due to a variety of factors, most particularly by the Urban Heat Island (UHI) effect.
- The National Oceanic and Atmospheric Administration (NOAA) and official agencies keeping temperature records in other countries routinely adjust recent temperatures upward, while simultaneously adjusting historical records lower.
- NOAA does not account for errors introduced when temperature stations are moved, and reports data from stations that are no longer functional.

62 H. Sterling Burnett, Climate Change Weekly 172, May 18, 2015; https://heartland.org/opinion/temperature-fibbers-being-investigated/ and Jennifer Marohasy, "Bureau Caught in Own Tangled Web of Homogenisation," September 12, 2014, https://jennifermarohasy.com/2014/09/bureau-caught-in-own-tangled-web-of-homogenisation/

63 See for example, William C. Patzert, et al., "Will The Real Los Angeles Stand Up: Impacts of a Weather Station's Relocation on Climatic Records (and Record Weather)," file:///C:/Users/sterl/Downloads/119064%20(1).pdf; and Stanley A. Changnon and Kenneth E. Kunkel, "Changes in Instruments and Sites Affecting Historical Weather Records: A Case Study," Journal of Atmospheric and Oceanic Technology, Volume 23: Issue 6, June 2006; https://journals.ametsoc.org/view/journals/atot/23/6/jtech1888_1.xml

64 Katie Spence, "Hidden Behind Climate Policies, Data From Nonexistent Temperature Stations," Epoch Times, April 9, 2024; https://www.theepochtimes.com/article/hidden-behind-climate-policies-data-from-nonexistent-temperature-stations-5622782

Figure 3.1. Weather Station at the University of Arizona

Figure 3.1: U.S. Historical Climatology Network weather station used to collect climate data. This station is located in a parking lot at the University of Arizona in Tucson. The station was previously located in a grassy area, but researchers moved the station as the campus grew. Photo by Anthony Watts.

have found that very few meet the National Weather Service (NWS) location requirements for producing quality data.

Cities are significantly warmer than the surrounding rural areas, especially during the summer, because roads, concrete sidewalks, and buildings absorb and re-emit the sun's heat, radiating it into the air and creating "warming." In addition, many other direct sources of artificial heat, like machinery and other equipment, emit waste heat during their operation. This artificial warming is called the Urban Heat Island effect, or UHI.

Recognizing this problem, the National Weather Service (NWS) created a set of standards to establish unbiased temperature stations to record quality data.[65] The standards include, for instance, that stations be placed on level ground that's representative of the area, and that they avoid dark surfaces, concrete, rock, roofs, irrigated lawns, and heat sources like air conditioners, chimneys, and air vents.

65 National Weather Service, Site and Exposure Standards," https://www.weather.gov/coop/sitingpolicy2#:~:text=The%20best%20site%20for%20a,the%20precipitation%20error%20will%20be.

Figure 3.2. CONUS, All Unperturbed

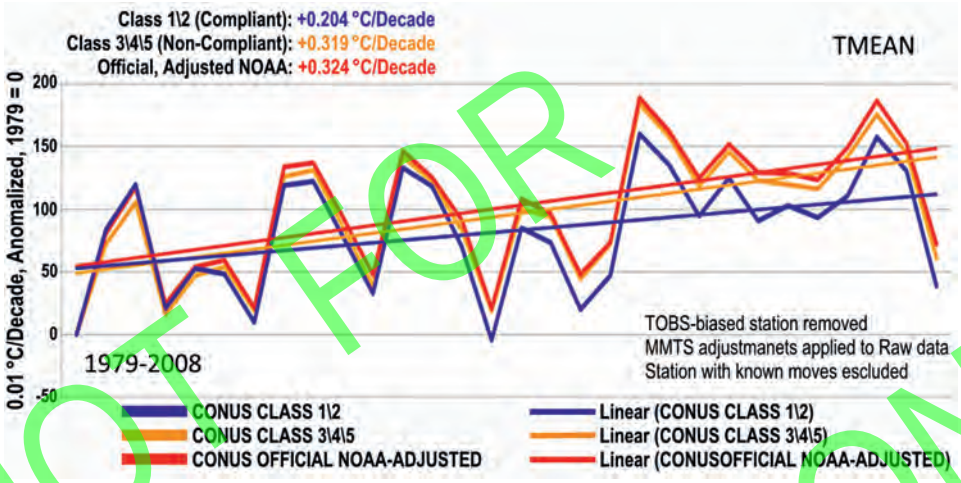


Figure 3.2: Uncorrupted stations (classes one and two, blue line) report much less warming than stations corrupted by urban heat island factors (classes three, four, and five, red line). The trend lines for the corrupted stations (red) clearly show more warming than the uncorrupted stations (blue).[67]

A 2009 site inspection survey found 89 percent of stations violated NWS's siting requirements, resulting in heat-bias issues (see Figure 3.1).[66] In 2022, a second survey was conducted to determine whether the siting situation had improved. It had not. Of the 128 surface-stations surveyed, 123 were found to be unacceptably sited by NWS standards, with the result that 96 percent of the stations were reporting UHI-biased temperatures.

A comparison of temperatures recorded at stations uncorrupted by UHI with those that suffer from poor location and UHI bias shows that unbiased stations report about half the warming of biased stations (see Figure 3.2).

Research from Dr. Roy Spencer and Dr. John Christy at the University of Alabama in Huntsville's Earth System Science Center suggests that an estimated 22 percent of the U.S.

66 Anthony Watts, "Is the U.S. Surface Temperature Record Reliable?," The Heartland Institute, March 1, 2009; https://heartland.org/publications/is-the-us-surface-temperature-record-reliable/

67 Watts, et al., "Comparison of Temperature Trends Using an Unperturbed Subset of The U.S. Historical Climatology Network," American Geophysical Union presentation, December 16, 2015; https://wattsupwiththat.wpcomstaging.com/wp-content/uploads/2015/12/agu-poster-watts-website-release.pdf

warming trend from 1895 to 2023 is due to localized UHI effects.[68] Other research suggests that the UHI bias may account for as much as 40 percent of the measured warming since the 1850s.[69]

In short, the surface-station data do not accurately reflect current temperatures, but rather reflect poor data management and reporting.

68 Roy Spencer and John Christy, "New paper submission: Urban heat island effects in U.S. summer temperatures, 1880-2015," https://www.drroyspencer.com/2023/10/new-paper-submission-urban-heat-island-effects-in-u-s-summer-temperatures-1880-2015/

69 Soon, et al., "The Detection and Attribution of Northern Hemisphere Land Surface Warming (1850–2018) in Terms of Human and Natural Factors: Challenges of Inadequate Data," *Climate,* Volume 11 Issue 9, August 2023; https://www.mdpi.com/2225-1154/11/9/179.

Chapter 4

Extreme Weather and Weather-Related Disasters Are Not Getting Worse

Mainstream media, politicians, and activists often claim that anthropogenic climate change is causing a dangerous increase in the number and severity of extreme weather events. Trend data for such events refute this claim.

Key Takeaways

- Claims that climate change is increasing the frequency and intensity of extreme weather events are not supported by available data.
- Real-world data does not support claims that drought, heatwaves, hurricanes, and wildfires have become more numerous or more severe.
- The IPCC reports find no, or only weak, evidence for worsening trends in weather.

Droughts Are Not Becoming Worse

Droughts have not become more frequent or severe during the recent period of modest warming. On drought, for example, the United States recently experienced its longest period in recorded history with fewer than 40 percent of the country experiencing "very dry" conditions, and overall trends since 1895 are virtually flat.[70]

In its 2021 Sixth Assessment Report, the IPCC distinguishes four categories of drought: hydrological, meteorological, ecological, and agricultural. The IPCC found no evidence climate change has increased the number, duration, or intensity of hydrological or meteorological droughts, and it has only medium confidence that climate change has contributed to changes in agricultural and ecological droughts in 12 of the 47 regions of the world its contributing authors divide the world into.[71]

70 National Centers for Environmental Information, "U.S. Percentage Areas (Very Warm/Cold, Very Wet/Dry)," U.S. National Oceanic and Atmospheric Administration, accessed September 27, 2023, https://www.ncdc.noaa.gov/temp-and-precip/uspa/wet-dry/0

71 IPCC Sixth Assessment Report, Working Group I, Chapter 12, Table 12.12, p. 1856. See https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Chapter12.pdf. Curiously, if you consult the Summary for Policymakers for this version of the report, you will find claims that extreme weather events *are* occurring. See https://www.ipcc.ch/report/ar6/wg1/#SPM. For a discussion of how the IPCC exaggerates "extreme weather", see Roger Pielke, Jr., "What the IPCC actually says about extreme weather," available online.

Figure 4.1. IPCC's AR6 Report Table

Climatic Impact-driver Type	Climatic Impact-driver Category	Already Emerged in Historical Period	Emerging by 2050 at Least for RCP8.5/SSP5-8.5		Emerging Between 2050 and 2100 for at Least RC8.5/SSP5-8.5	
Wet and Dry	Mean precipitation		6	7		
	River flood					
	Heavy precipitation and pluvial flood				8	
	Landslide					
	Aridity					
	Hydrological drought					
	Agricultural and ecological drought					
	Fire weather					

6. Increase in most northern mid-latitudes, Siberia, Arctic regions by mid-century, others later in the century.
7. Decrease in the Mediterranean area, Southern Africa, South-west Australia.
8. Northern Europe, Northern Asia and East Asia under RCP8.5 and not in low-end scenarios.

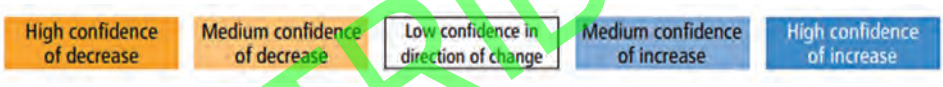


Figure 4.1: IPCC's AR6 report shows no human-influenced trend for most wet and dry "extreme weather." The white boxes indicate "low confidence in direction of change" (i.e., no discernible human influence"). Source: IPCC AR6, Working Group I, Chapter 12, Table 12.12.

Tropical Cyclones (Hurricanes) Are Not Becoming Worse

Data show no increase in the number or intensity of tropical cyclones (commonly referred to as hurricanes in North America) since 1971.[72]

Recent studies suggest that hurricane frequency has actually declined over the past century, with one study indicating a 13 percent decline in tropical cyclones across all basins since 1850.[73]

72 Ryan N. Maue, "Global Tropical Cyclone Activity," Climate Atlas, http://climatlas.com/tropical/frequency_12months.png and https://climatlas.com/tropical/global_running_ace.png.

73 Chand, S.S., Walsh, K.J.E., Camargo, S.J. et al. Declining tropical cyclone frequency under global warming. Clim. Chang. 12, 655–661 (2022). https://doi.org/10.1038/s41558-022-01388-4; Number of typhoons, confirmed values up to 2022 and preliminary figures for 2023, Japan Meteorological Agency, https://www.data.jma.go.jp/fcd/yoho/typhoon/statistics/generation/generation.html; and Philip J. Klotzbach, et al. Trends in Global Tropical Cyclone Activity: 1990–2021, Geophysical Research Letters, 14 March 2022, https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2021GL095774

Figure 4.2. Global Tropical Cyclone Frequency - 12 month Running Sums (Updated December 31, 2023) @RyanMaue

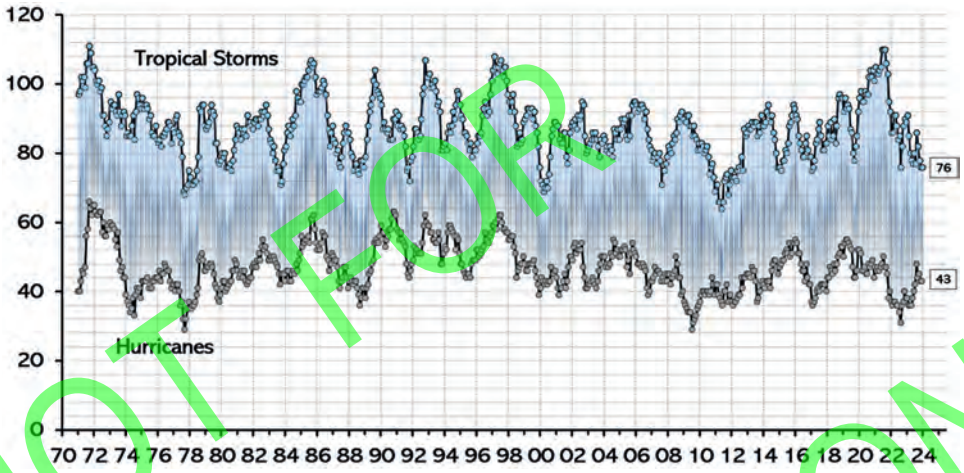


Figure 4.2: This figure shows that global hurricane and tropical cyclone activity is not increasing. Even with the slight uptick in the number of tropical storms in 2021, it is still below the peak recorded in 1971. Source: Ryan N. Maue, "Global Tropical Cyclone Activity," Climate Atlas, http://climatlas.com/tropical/frequency_12months.png.

Figure 4.3. IPCC's AR6 Report Table

Climatic Impact-driver Type	Climatic Impact-driver Category	Already Emerged in Historical Period	Emerging by 2050 at Least for RCP8.5/SSP5-8.5	Emerging Between 2050 and 2100 for at Least RC8.5/SSP5-8.5
Wind	Mean wind speed			
	Severe wind storm			
	Tropical cyclone			
	Sand and dust storm			

Figure 4.3: IPCC's AR6 report shows no human-influenced trend (white boxes) for most "wind" weather events. Source: IPCC AR6, Working Group I, Chapter 12, Table 12.12.

Figure 4.4. Canada "All-Time" Provincial & Territorial High Temperature Records

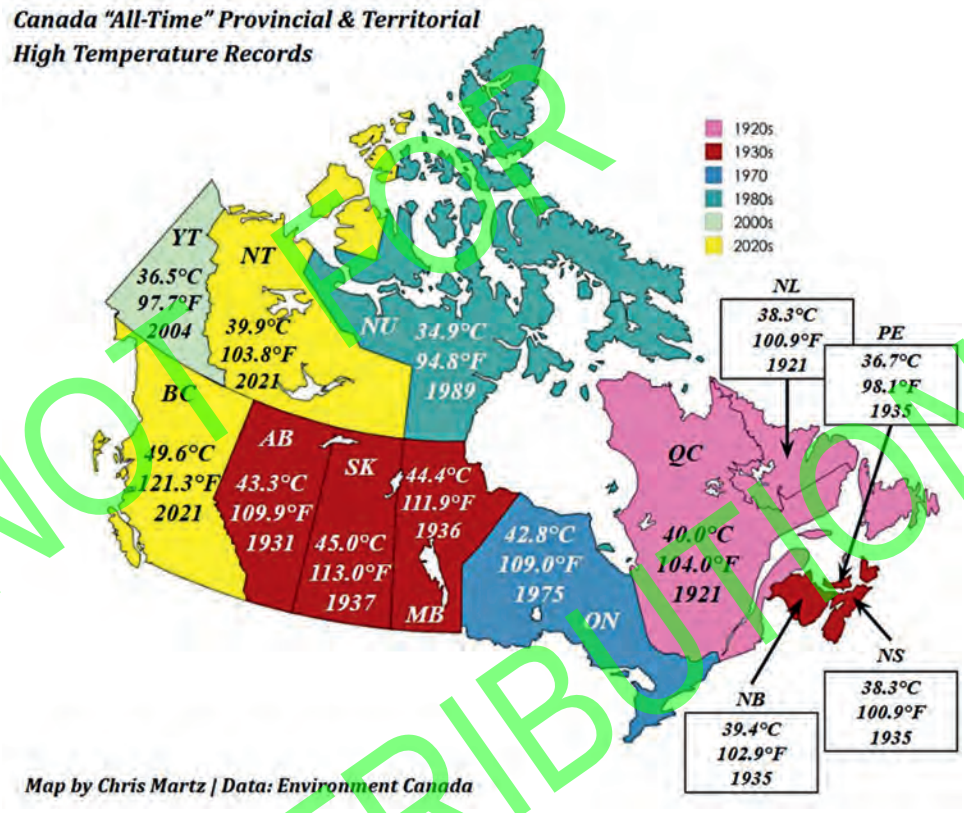


Figure 4.4: Temperature records by province Source: Chris Martz (map), Environment Canada.

The IPCC writes it has "low confidence for the attribution of any detectable changes in tropical cyclone activity to anthropogenic influences."[74] Looking ahead, even under the unrealistic RCP8.5 scenario, the IPCC indicates it also has no confidence that climate change will lead to an increase in tropical cyclone frequency or severity by 2100.

Heatwaves Are Not Becoming Worse

Support for the IPCC's assertion that it is "virtually certain" that heatwaves have increased in number and duration is lacking according to data from the United States and Canada.[75]

The record-high temperature records

74 Sonia Seneviratne and Neville Nicholls, coordinating lead authors, et al., "Changes in Climate Extremes and their Impacts on the Natural Physical Environment," Chapter 3, Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX). A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change (Cambridge, U.K.: Cambridge University Press, 2012), https://www.ipcc.ch/site/assets/uploads/2018/03/SREX-Chap3_FINAL-1.pdf

75 Watts, et al., "Climate at a Glance: U.S. Heatwaves," The Heartland Institute, 2022; https://climateataglance.com/climate-at-a-glance-u-s-heatwaves/

Figure 4.5. Global Burned Area 1901-2018

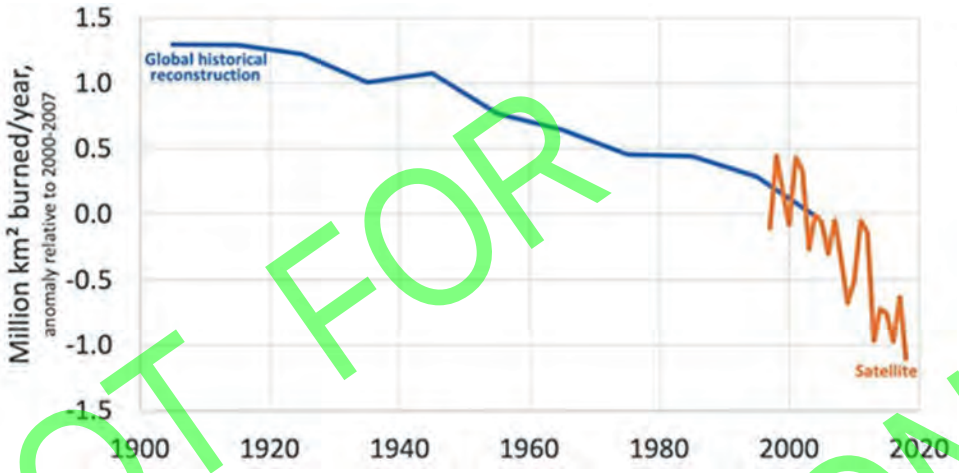


Figure 4.5: 1901-2007 data from https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2013JG002532; 1997-2016 from http://globalfiredata.org/index.html; 2017-2018 from https://gwis.jrc.ec.europa.eu/apps/gwis.statistics/

for six of 13 Canadian provinces and territories were set in the 1930s; two provinces' high temperature records were set in the 1920s (Quebec and Newfoundland/Labrador); one provincial record was set in each of the 1970s (Ontario) and 1980s (Nunavut); only one province recorded its highest temperature in the 2000s (Yukon); and only two provinces' records were set in the 2020s (British Columbia and Northwest Territories) (see Figure 4.4).

There is no clear trend of sustained record-setting heat in Canada during the supposedly "hottest two-and-a-half decades on record."[76]

Wildfires Aren't Becoming Worse

Concerning wildfires, the IPCC reports an increase in fire weather. However, satellite data from NASA and the European Space Agency show the annual number of wildfires and the acreage lost to wildfire globally has declined substantially over the past few decades (see Figure 4.5).[77]

76 Chris Martz https://www.facebook.com/photo?fbid=1081829566748443&set=a.607926074138797 referencing data from Environment Canada, https://weather.gc.ca/canada_e.html

77 NASA Earth Observatory, Researchers Detect a Global Drop in Fires, June 29, 2017, https://earthobservatory.nasa.gov/images/90493/researchers-detect-a-global-drop-in-fires and European Space Agency, Multi-decade global fire dataset set to support trend analysis,28 January 2021, https://climate.esa.int/de/news-events/multi-decade-global-fire-dataset-set-support-trend-analysis/

Figure 4.6. Number of Fires and Area Burned in Canada by Year

Source: Canadian Nation Fire database (CNFDB)

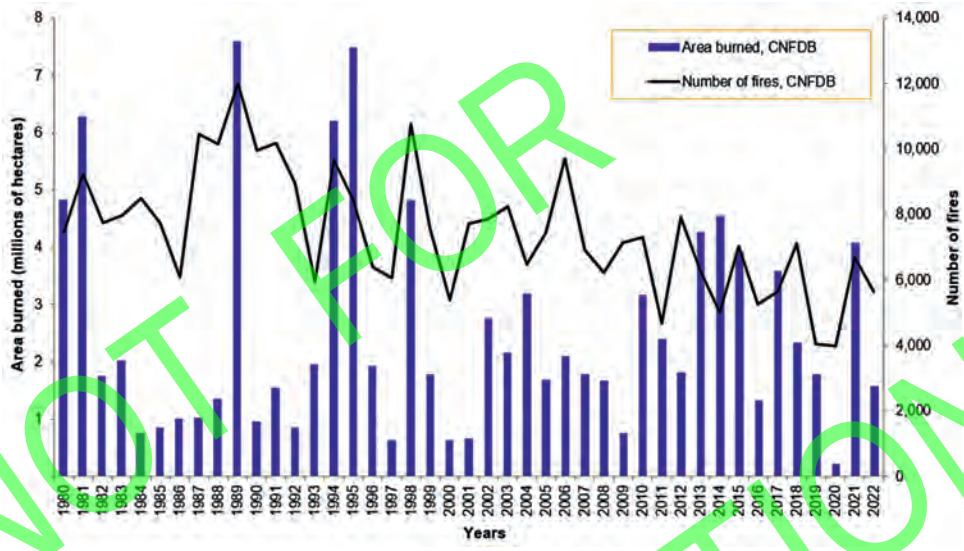


Figure 4.6: The number of forest fires has declined in Canada since 1980.
Source: Canadian National Fire database

The large wildfires that swept across much of Canada in 2023 were departures from the norm for the country in recent history. In fact, they were likely caused by drought, changed forestry practices resulting in a long-term build-up of ground fuel, and at least partially to arson.[78] Data from Canada's National Forestry Database show declining trends for both the number of fires and area burned over the past 31 years (see Figure 4.6).[79]

A study by Canadian Forest Service scientists attributes the decline in forest fires over the past few decades to the combined effect of carbon-dioxide fertilization and modestly rising temperatures, which resulted in improved soil-moisture conditions.[80]

78 Laura Paddison and Paula Newton, "A climate conspiracy theorist said the government deliberately lit wildfires. He just pleaded guilty to starting 14 himself," CNN, January 17, 2024; https://www.cnn.com/2024/01/17/climate/canada-conspiracy-theorist-arson-wildfires-intl/index.html

79 National Forestry Database; http://nfdp.ccfm.org/en/index.php

80 M.D. Flannigan et al., "Future wildfire in circumboreal forests in relation to global warming," *Journal of Vegetation Science*, February 1998; https://onlinelibrary.wiley.com/doi/10.2307/3237261

Chapter 5

Oceans Aren't Acidifying, Islands Aren't Disappearing, Sea Level Rise Is Normal

Oceans Are Not Acidifying

Climate activists and mainstream media make several claims regarding the oceans: that they are acidifying; that seas are rising at an alarming rate; and that island nations will soon be submerged under rising seas. The best available evidence suggests that each of these claims is false.

A pH of 7 is neutral, a pH greater than 7 is considered basic, and a pH lower than 7 is acidic (see Figure 5.1). The pH of the oceans now averages about 8.1 with a range of 7.8 to 8.5, well above acidic levels. In none of our records have the oceans ever been acidic and it will not happen in the foreseeable future.

Rather than causing ocean pH problems, the best evidence suggests that the increase in oceanic CO_2 is a boon for sea life, boosting the production of phytoplankton, which form the foundation of the marine food chain.[81]

Key Takeaways

- There is no physical evidence that the oceans are becoming "acidic."
- Seas are not rising or falling at a uniform or unusual rate, and measurements show that island nations are adding land mass, not sinking under rising seas.

Sea Level Is Not Dangerously Rising and Islands Are Not Sinking

Recent sea-level rise is not uniform and, except where the land has fallen or subsided because of compaction due to development, wetlands conversion, or because underground water withdrawals have increased, the rate of rise has not increased outside of historical norms.

NASA satellite instruments, with readings dating back to 1993, show global sea level rising at a pace of only three centimeters (1.2 inches) per decade.[82] Tide gauge data show that

81 Patrick Moore, "Ocean Health: Is There an 'Acidification' Problem?" *CO_2 Coalition*, June 2020, https://CO_2coalition.org/publications/ocean-health-is-there-an-acidification-problem/

82 U.S. Geological Survey, "How Does Present Glacier Extent and Sea Level Compare to the Extent of Glaciers and Global Sea Level During the Last Glacial Maximum?," https://www.usgs.gov/faqs/how-does-present-glacierextent-and-sea-level-compare-extent-glaciers-and-global-sea-level

Figure 5.1. The PH Scale

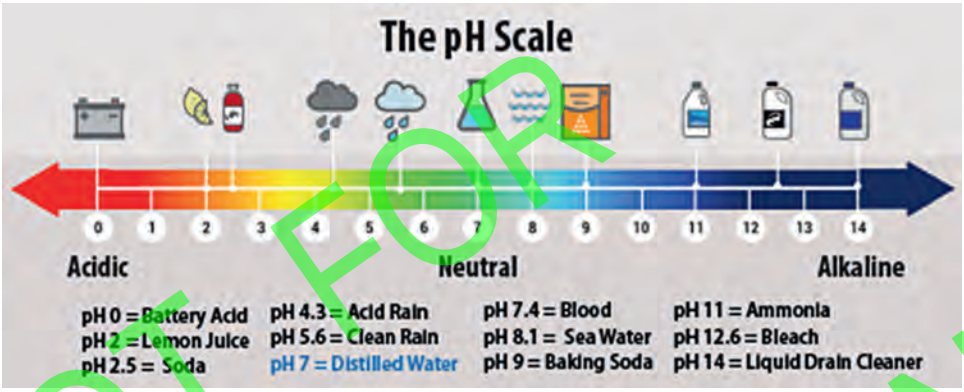


Figure 5.1: Comparison of the pH of common substances. U.S. Environmental Protection Agency, "Measuring Acid Rain," https://www.epa.gov/acidrain/what-acid-rainy

some locations are experiencing sea-level rise, others are relatively stable, and some show that sea levels have fallen.[83]

Multiple, large-scale studies show that most islands and atolls, such as Kiribati, the Maldives, the Marshall Islands, Tuvalu, and Vanuatu, are growing, not shrinking. As the sea gradually rises, it brings sand and sediment along with it, building up the shorelines and height of islands.[84]

And, in the case of coral atolls, unless damaged by domestic pollution or inappropriate breakwater construction, the coral has been growing more quickly than any likely sea level rise, ensuring the islands are not inundated.

Two other facts also suggest that rising seas are not threatening island nations:

- their populations are growing, with no evidence of mass emigration, and

83 Dennis Hedke, "Data versus Hype: How Ten Cities Show Sea-level Rise Is a False Crisis," The Heartland Institute, October 2017; https://heartland.org/wp-content/uploads/documents/Hedke%20Sea%20Level%20Rise%20Ten%20Cities.pdf

84 Marian Faa, "'Sinking' Pacific Nation Is Getting Bigger: Study," Phys.org, February 9, 2018, https://phys.org/news/2018-02-pacific-nation-bigger.html; Megan Tuck et al., "Physical Modelling of the Response of Reef Islands to Sea-Level Rise," Geology, Volume 47, No. 9, September 1, 2019, https://pubs.geoscienceworld.org/gsa/geology/article-abstract/47/9/803/572047/Physical-modelling-of-the-responseof-reef-islands?redirectedFrom=fulltext; Paul S. Kench, Murray R. Ford and Susan D. Owen, "Patterns of Island Change and Persistence Offer Alternate Adaptation Pathways for Atoll Nations," Nature Communications, February 9, 2018, https://www.nature.com/articles/s41467-018-02954-1; Virginia K.E. Duvat, "A global assessment of atoll island planform changes over the past decades," Wires Climate Change, October 25, 2018, https://wires.onlinelibrary.wiley.com/doi/abs/10.1002/wcc.557

Figure 5.2. Reconstructed Global Sea Level

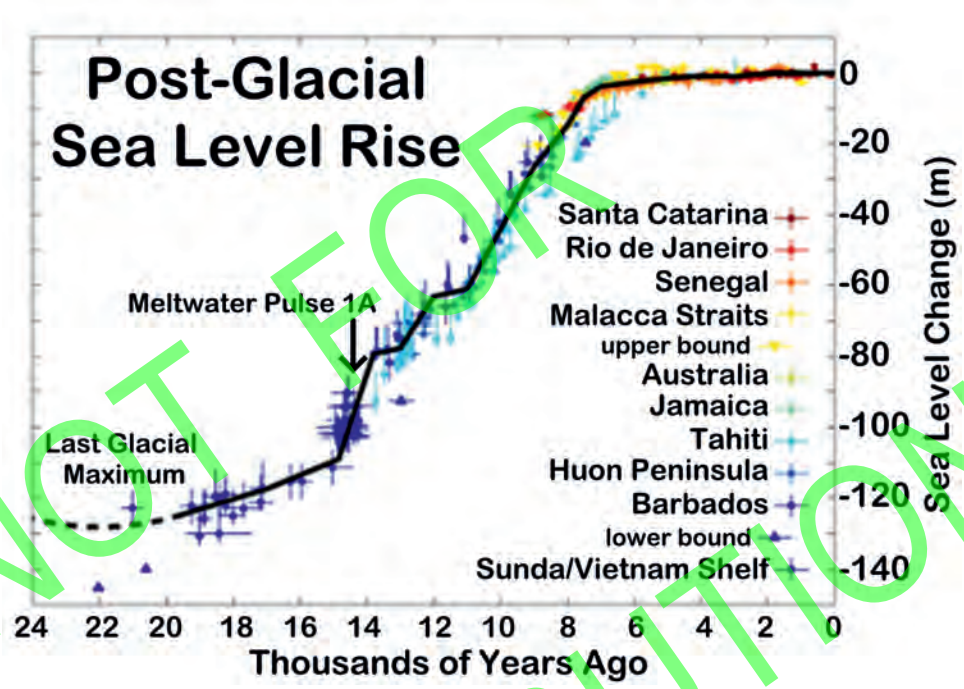


Figure 5.2: Sea level since the Last Glacial Maximum, 20,000 years ago, based on dated worldwide coral and peat deposits.[85]
Source: R.G. Fairbanks

- island nations' governments and businesses are investing heavily in infrastructure for residents and to attract tourists.

The world's oceans and seas face problems, some of them of human origin, but climate change is not among them.

85 Adapted from Fairbanks, R.G. 1989. A 17,000 year glacio-eustatic sea-level record: Influence of glacial melting rates on the Younger Dryas event and deep-ocean circulation. Nature 342: 637–42; Toscano, M.A. and Macintyre, I.G., 2003. Corrected western Atlantic sea-level curve for the last 11,000 years based on calibrated 14C dates from Acropora palmate framework and intertidal mangrove peat. Coral Reefs 22: 257–70.

Chapter 6

Warming Is Saving Lives

The Intergovernmental Panel on Climate Change's (IPCC) AR6 report, Chapter 11, *Weather and Climate Extreme Events in a Changing Climate*, concludes that changes in the frequency and intensity of most severe weather events have not been detected nor can they be attributed to human-caused climate change.[86]

Regardless of weather trends and climate change, human deaths attributable to weather-related disasters, including floods, droughts, storms, wildfires, and extreme temperatures, have declined by more than 99 percent over the past 100 years. In the 1920s, deaths related to weather-related disasters averaged approximately 485,000 each year. By 2020, the average number of deaths attributable to extreme weather events had fallen to 7,790 (see Figure 6.1).

Two large-scale studies published in the prestigious medical journal *The Lancet* came to the same conclusions concerning temperatures and deaths:

Key Takeaways

- During the recent period of modest warming, deaths from extreme weather events have declined dramatically.
- Peer-reviewed research shows deaths associated with cold temperatures outnumber heat related deaths by almost 10 to one. The same research shows that deaths associated with non-optimum (too hot or too cold) temperatures have declined significantly during the recent period of modest warming.

1) Cold weather kills far more people each year than heat.

2) As the Earth has modestly warmed, the number of people dying from temperature-related health incidents has fallen significantly.

86 Weather and Climate Extreme Events in a Changing Climate, IPCC, Sixth Assessment Report, Working Group 1: The Physical Science Basis, Chapter 11, https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_Chapter11.pdf

Figure 6.1. Climate-related Deaths 1920-2021

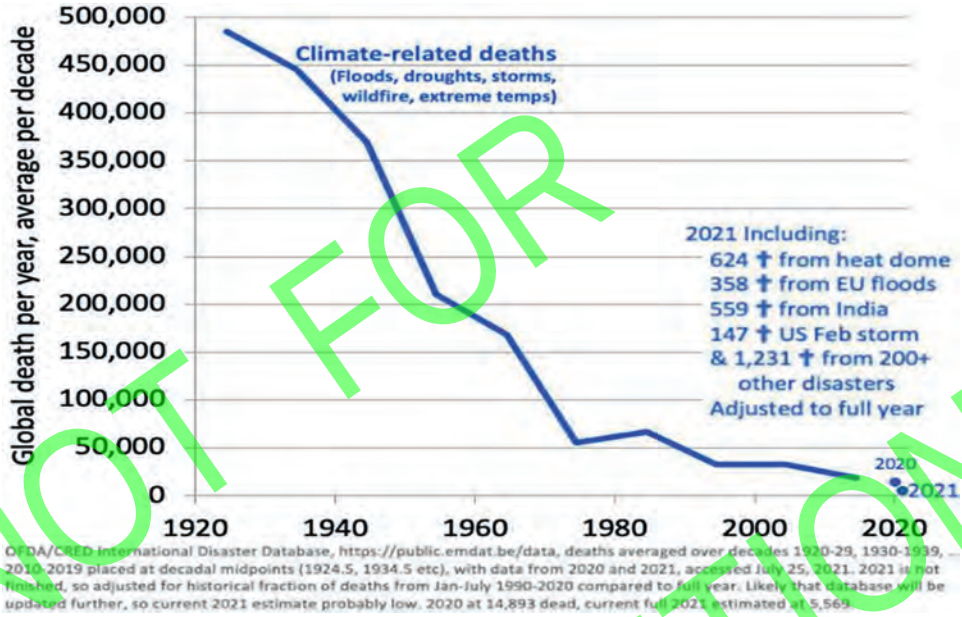


Figure 6.1. There has been a remarkable fall in human deaths related to all extreme weather events from 1920 to 2021. Source: Dr. Bjorn Lomborg, data from International Disaster Database published in ScienceDirect.[87]

The 2021 *Lancet* report was arguably the largest study ever to examine excess mortality associated with temperature.[88] The study's authors, 68 scientists representing universities and research institutes in 33 countries spanning all regions of the world, concluded that cold-related deaths outnumber deaths tied to extreme heat by 10 to one. The study also found hundreds of thousands fewer people have died in response to extreme warm and extreme cold temperatures each year as the Earth has warmed in recent decades (see Figure 6.2).

As a result of the recent modest rise in global temperatures, the study concluded that over the period of the study there were 166,000 fewer deaths tied to non-optimal temperatures.

A 2015 *Lancet* study followed an earlier large-scale 13-nation study that examined deaths from non-optimum temperatures from 384 locations, analyzing 74,225,200 deaths in various periods from 1985 to 2012.

87 "Welfare in the 21st century: Increasing development, reducing inequality, the impact of climate change, and the cost of climate policies," Lomborg, ScienceDirect, Elseveier, Technological Forecasting and Social Change, July 2020, https://www.sciencedirect.com/science/article/pii/S0040162520304157

88 Qi Zhao, et al., "Global, regional, and national burden of mortality associated with non-optimal ambient temperatures from 2000 to 2019: a three-stage modelling study," The Lancet Planetary Health, July 2021, https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(21)00081-4/fulltext

Figure 6.2. Climate Crisis Update, 2000-2019: About Ten Times As Many Deaths From Cold Weather As From Hot Weather

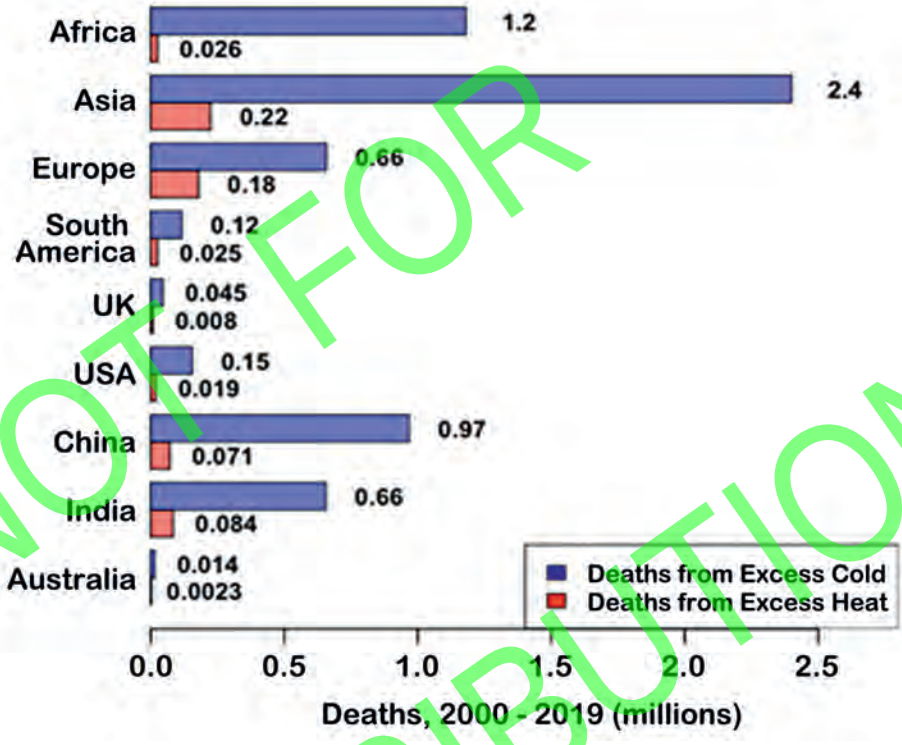


Figure 6.2: A Lancet study found deaths due to cold weather outnumbered deaths due to extreme heat by almost ten to one. Data Source: https://www.thelancet.com/journals/lanplh/article/PIIS2542-5196(21)00081-4/fulltext

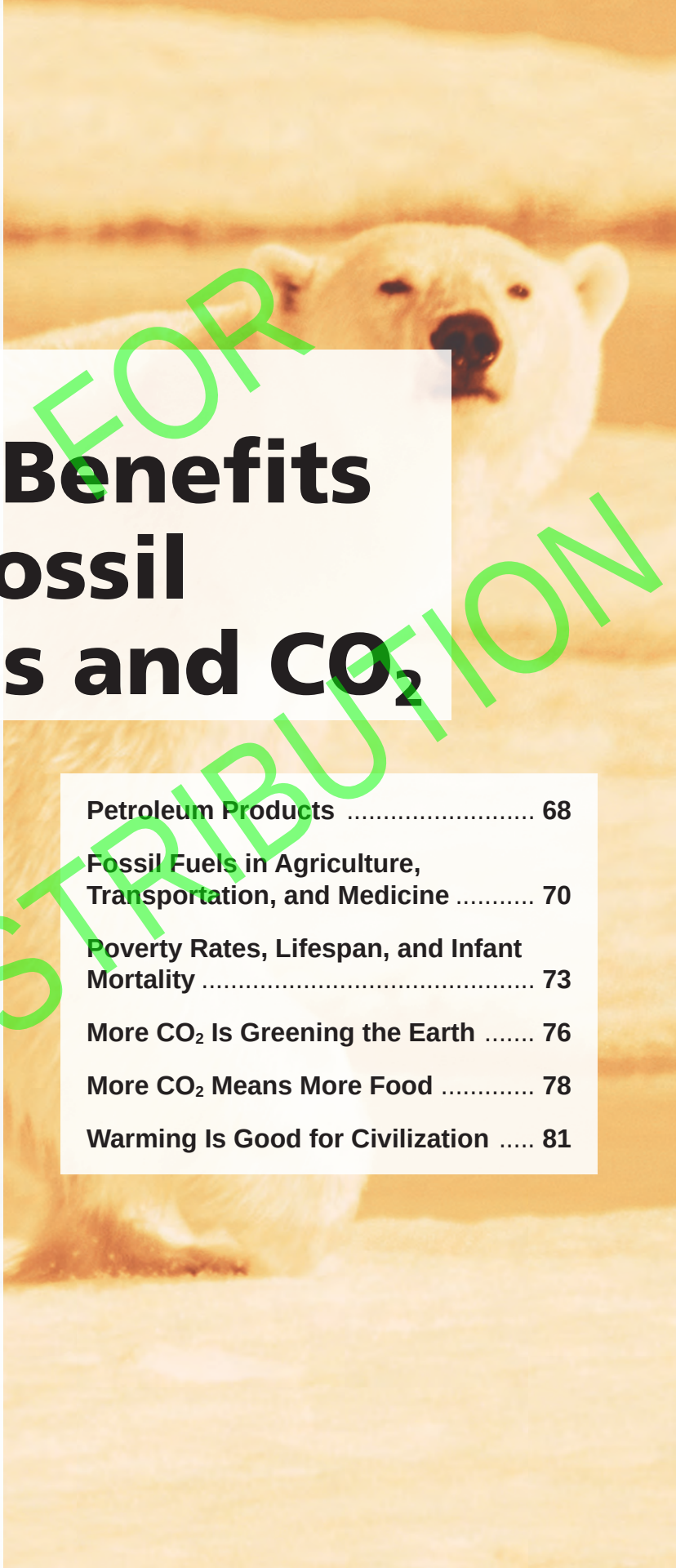
It also concluded, "[m]ost of the temperature-related mortality burden was attributable to the contribution of cold."[89]

These *Lancet* studies are supported by others published by the *Southern Medical Journal*, the Centers for Disease Control and Prevention, and National Health Statistics reports. They all consistently show that cold is the biggest temperature-related killer, not heat.[90]

Clearly, as the Earth has warmed over the past century, many fewer people are dying from causes related to weather and temperatures.

89 Antonio Gasparrini et al., Mortality risk attributable to high and low ambient temperature: a multi-country observational study, *The Lancet,* May 21, 2015; 386: 369–75; https://www.thelancet.com/pdfs/journals/lancet/PIIS0140-6736(14)62114-0.pdf

90 W. R. Keating and G. C. Donaldson, "The impact of global warming on health and mortality," National Library of Medicine, *Southern Medical Journal*, Nov. 2004; https://pubmed.ncbi.nlm.nih.gov/15586600/ and Berko et al., "Deaths Attributed to Heat, Cold, and Other Weather Events in the United States, 2006–2010," United States Center for Disease Control, National Health Statistics Reports, July 30, 2014, https://www.cdc.gov/nchs/data/nhsr/nhsr076.pdf



Section 4

The Benefits of Fossil Fuels and CO_2

Chapter 1

Petroleum Products

Aside from fuelling Canada's transportation, to a lesser extent its electric power grid, and lubricating all the machinery operated in Canada, even the gear boxes of wind turbines, petrochemicals made from oil are used to make more than 6,000 products in everyday use, from cell phones and computers, to medical equipment, to clothes, and beyond.[91] Before we agree to abandon fossil fuels, we should ask: How many products made with petroleum can we realistically, efficiently, and cost-effectively replace with "natural" alternatives?

For example, if we shut down oil and gas production, any product that includes plastic would have to be eliminated or be replaced with "natural" substitutes that could be more expensive and possibly more environmentally damaging than those made with fossil fuels.

Some of these products include, to pick just a few at random: oxygen masks, hospital tubing and fluid bags, cough syrup, paints, plastic containers of all kinds, computer and phone casings, rubber bands, golf balls, bandages, guitar strings, soap, telephones, surfboards, running shoes, chewing gum, and crayons.[92]

Key Takeaways

- Petroleum products aren't just used for fuel and lubricating oils—they are an indispensable ingredient of at least 6,000 other products that we depend on every day. These products include anything made of plastic to soaps, guitar strings, rubber bands, clothing, and even cough syrup.
- Eliminating fossil fuels under net zero means also eliminating all these products, or finding, where possible, more expensive, less effective, and sometimes more environmentally damaging "natural" replacements.

More than 60 percent of the fabrics used in clothing is synthetic, made from oil products, including polyester and nylon, and even cotton used for clothing is grown using fossil fuels.[93] And that is a very, very partial list (see Figure 1.1).

91 U.S. Department of Energy, "Products made from oil and gas," available at https://www.energy.gov, search term "Products from Oil and Natural Gas"

92 "The definitive list of 365 products made from oil/petroleum," *BadAss Work Gear*.

93 Common Objective, "What are our clothes made from?" https://www.commonobjective.co/article/synthetics-sustainable-synthetics-global-production

Figure 1.1. The Bigger Picture: Life Without Oil - Not As Simple As You May Think

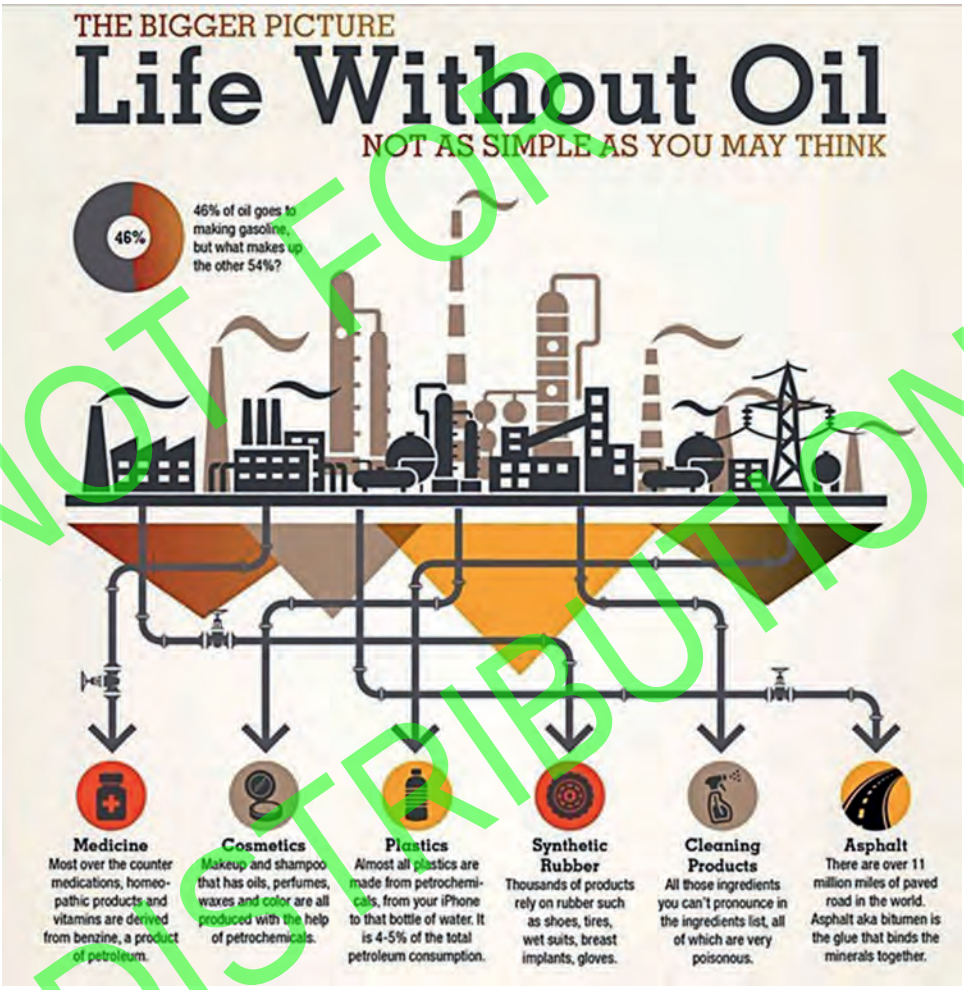


Figure 1.1: Life without out oil—just a few of the products we'd have to do without.

If we use any of these products (and we all do), we should be careful what we wish for when we demand that governments shut down the fossil fuel industry to fight climate change.

Chapter 2

Fossil Fuels in Agriculture, Transportation, and Medicine

Key Takeaways

- Fossil fuels are essential in modern agriculture, powering tractors, harvesters, grain driers, trucks, and other tools. They are also a key ingredient in synthetic fertilizers and pesticides.
- Reducing or eliminating synthetic fertilizers will severely reduce crop yields. In a world with eight billion people needing to be fed, net zero could mean unnecessary hunger and even starvation for millions, if not billions of people.
- Fossil fuels play a vital role in countless medicines, including aspirin.
- And, of course, fossil fuels play an essential part in the transportation networks that bring food and medicines to people.

Natural gas is a key ingredient for two fertilizer components: urea and ammonia, which are mixed with phosphorus and potassium to produce "synthetic" fertilizer. These human-made fertilizers have some advantages over "natural" fertilizers: they absorb into the soil more easily and they gradually release their nutrients. This means they need less frequent application and are more cost-effective for farmers than "natural" fertilizers.

Synthetic fertilizers also need less land to produce the same amount of food. Going "natural" would require cultivation of as much as 80 percent more cropland (see Figure 2.1).

In 2021, the "green" government of Sri Lanka decided to go "full net zero" and banned all synthetic (i.e., oil- and natural-gas based) fertilizers and pesticides in favour of "100 percent natural" farming. Sri Lankan rice production immediately fell by 80 percent, tea production fell by half, exports crashed, and food prices soared. Massive protests by angry farmers and consumers succeeded in changing the government's policies and forced Sir Lanka's president to leave the country.[94]

Governments in the Netherlands, Ireland, and elsewhere have also tried to institute similar policies, including a planned massive "cull" of methane-producing cattle in Ireland,[95] resulting

94 Tunku Varadarajan, "Sri Lanka's Green New Deal Was a Human Disaster," Wall Street Journal, July 15, 2022

95 For example, see Jude Webber, "Irish farmers pressured to cull up to 200,000 cows to meet climate goals," *Financial Times,* Aug. 10, 2023.

Figure 2.1. The Environmental Case for Synthetic Fertilizer

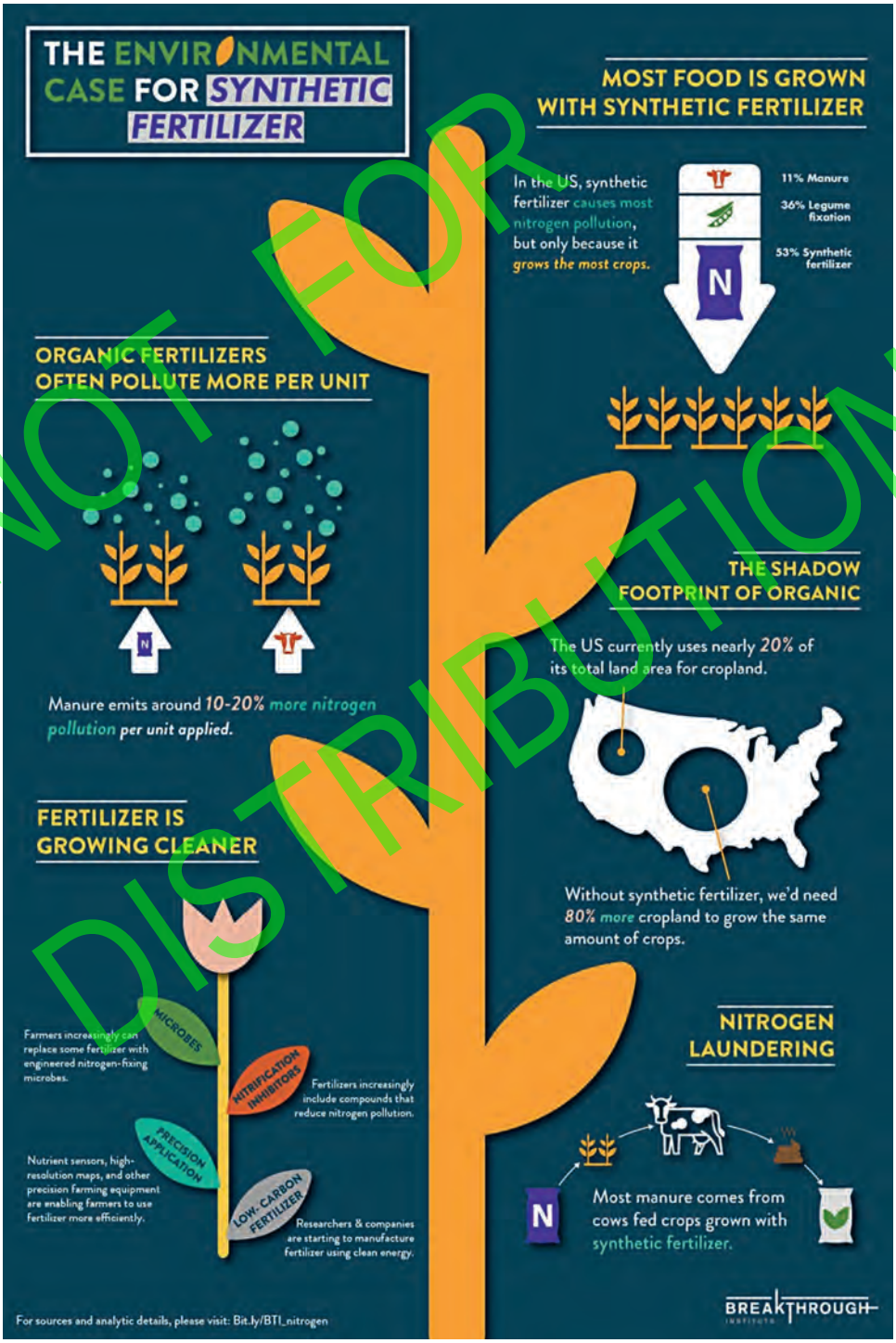


Figure 2.1: Without synthetic fertilizers, we would have to expand the amount of cropland by up to 80 per cent to feed the world. Source: Break Through Institute

in protests similar to what took place in Sri Lanka.

The world's population stands at more than eight billion and is growing. This means we need more food, not less, and organic agriculture cannot satisfy that demand without a massive increase in agricultural workers, an unacceptable conversion of land, and destruction of wildlife habitat.

As we've seen in the previous chapter, petroleum products also play a vital role in medicine, and therefore in human health. But apart from the many plastic-based medical products like oxygen masks, plastic tubing and fluid bags, many of the medications millions use daily are made from petroleum. For example, acetylsalicylic acid (aspirin) is made from the petrochemicals cumene, phenol, and benzene. Other widely used oil-based medications include antihistamines, antibacterials, suppositories, cough syrups, lubricants, creams, ointments, salves, analgesics, and gels such as hand sanitizers.[96] Fossil fuels also reliably power hospitals, keeping refrigeration systems, lights, and computers on 24/7, as well as equipment like MRI and X-ray machines. This also includes backup on-site generators for when regular electric power fails.

And, of course, fossil fuels still power most of the transportation network that brings us the food from farms and ranches, medications from pharmaceutical companies, and so on. Without fossil fuels and the myriad products currently produced using petroleum, it would be impossible to operate the more than 25,000 domestic and commercial flights per day in the United States alone. Moreover, the 14,000 military aircrafts and 100,000 ships and boats traversing the world's oceans daily would cease to function without fossil fuels.

Any attempts to radically reduce fossil fuel use through net zero policies would make these basic food and medical staples harder to obtain and more expensive. Net zero will harm not only our standard of living, but our basic health as well.

96 "Petroleum in real life: pills," CAPP https://www.capp.ca/en/oil-natural-gas-you/petroleum-and-real-life/

Chapter 3

Poverty Rates, Lifespan, and Infant Mortality

The use of fossil fuels has played a critical role in the increase of human lifespans and the decline of infant mortality and poverty rates world-wide over the past two centuries. Figure 3.1 shows the positive relationship between GDP (which is a good measure of well-being) and fossil fuel use.[97]

In other words, the reduction in global poverty since 1900 (and earlier) is directly related to the advent of fossil fuels. Because alternative energy sources aren't reliable substitutes for fossil fuels, net zero policies, which require limiting the use of fossil fuels, will result in a global decline in well-being and a surge in global poverty.

As people become better off, in part due to fossil fuels, they live longer. Figure 3.2 shows the increase in lifespan from 1770 to today. In 1800, the average lifespan in all regions of the world was 40-years-old; today it has nearly doubled to 71-years-old. In highly industrialized nations with the greatest access to and use of fossil fuels, the average lifespan is much longer.[98]

Key Takeaways

- Increased fossil fuel use is strongly linked to falling global poverty over the past two centuries. Countries that extensively use fossil fuels have enjoyed a fast-growing national GDP, which is a good measure of poverty reduction and prosperity.
- Reduction in poverty has also increased human lifespans and reduced infant mortality.

Even better, child mortality has also declined as nations become more prosperous, in large part due to fossil fuel use. (See Figure 3.3). This decline is common across developed and developing countries alike. Comparing Figure 3.3 and Figure 3.2 with Figure 3.1 shows the clear correlation between the increase in fossil fuel use and rising GDP, as well as longer average lifespans and a sharp decline in infant mortality. This is not a coincidence.

97 Figure 3.1 comes from Samantha Gross, "Why are fossil fuels so hard to quit?" *Brookings Institute*, June 2020.

98 "Key insights on life expectancy," *Our World in Data.*

Figure 3.1. GDP and Fossil Fuels Consumption

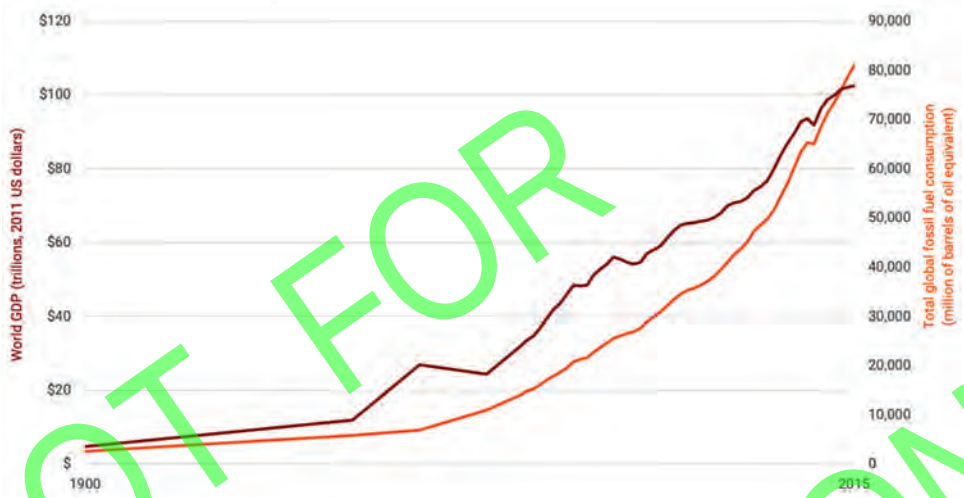


Figure 3.1: Rise of fossil fuel use and global GDP 1900-2015. Dark brown line is world GDP; light brown line is global fossil-fuel consumption. Source: Our World in Data/Brookings Institute

Figure 3.2. Life Expectancy

Figure 3.2: Increase in lifespan from 1770 to 2021. Source: Our World in Data

Figure 3.3. Neonatal Mortality Rate

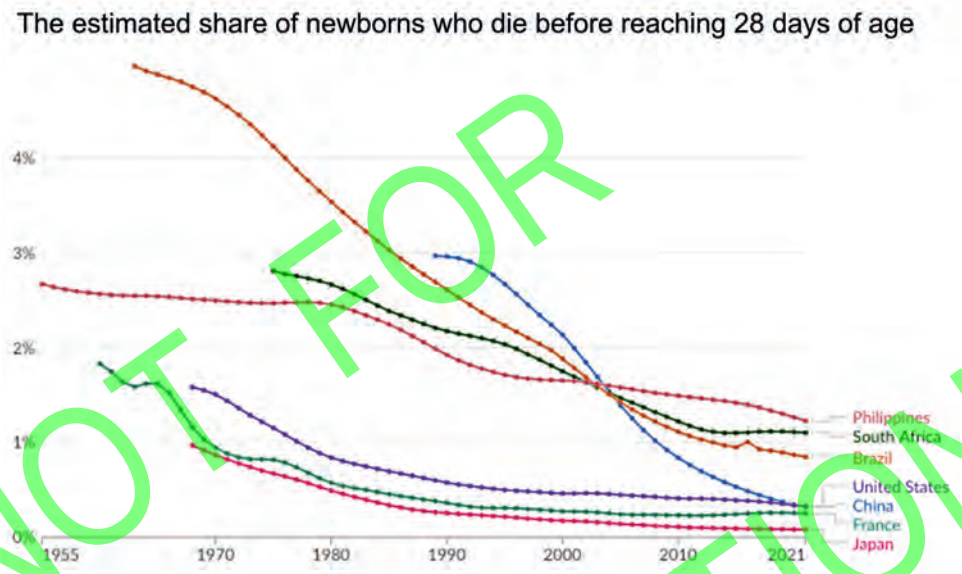


Figure 3.3: Decline in child mortality (newborns) from 1955 to 2021. Source: UN Inter-agency Group for Child Mortality Estimation (2023). From Our World in Data

Chapter 4

More CO_2 Is Greening the Earth

Key Takeaways

- Carbon dioxide is a plant fertilizer.
- As the amount of carbon dioxide in the atmosphere increases, the plant world has benefitted enormously—even NASA acknowledges that the planet has become significantly "greener" since 1990. More CO_2 is therefore good news for animals, including humans.

The government of former Prime Minister Paul Martin added CO_2 to the list of toxic substances controlled under the Canadian Environmental Protection Act.[99] Similarly, the U.S. Environmental Protection Agency (EPA) treats CO_2 as a "pollutant."[100] CO_2 is neither toxic nor a pollutant in any traditional sense of the term. Indeed, it is not toxic to humans or animals at many thousands of parts per million (ppm) above present levels. The Canadian and U.S. governments have mislabelled CO_2 for its purported role in driving climate change.

In fact, CO_2 is plant fertilizer and the vast majority of plants in existence today evolved when CO_2 levels were much higher than at present. CO_2 levels dipped to just 180 ppm late in the most recent ice age, leaving plants perilously close to the 150-ppm level at which they die.

As use of fossil fuels has increased levels of carbon dioxide, the planet has become *greener (*see Figure 4.1). The National Aeronautics and Space Administration (NASA) acknowledged this basic fact, writing, "from a quarter to half of Earth's vegetated lands have shown significant greening over the last 35 years due in part to rising levels of atmospheric carbon dioxide, according to recent research."[101]

In fact, NASA has measured a 10 percent greening of the Earth from 2000 to 2020. This greening represents a net increase in leaves on plants and trees equivalent in area to two times the size of the continental United States. (See Figure 4.1, below)

A more recent study showed that the world has become *5 percent greener*

99 https://www.canada.ca/en/environment-climate-change/services/canadian-environmental-protection-act-registry/substances-list/toxic/schedule-1.html

100 For details, see Wikipedia, "Regulation of greenhouse gases under the Clean Air Act." Basically, perhaps because it hasn't taken complete leave of reason, the EPA doesn't call carbon dioxide a "pollutant" directly; instead, it got the courts to agree that CO_2 fell under its Clean Air Act, which is aimed at "pollutants."

101 NASA, "Carbon dioxide fertilization greening Earth, study finds." April 26, 2016.

Figure 4.1. Change In Leaf Area (1982-2015)

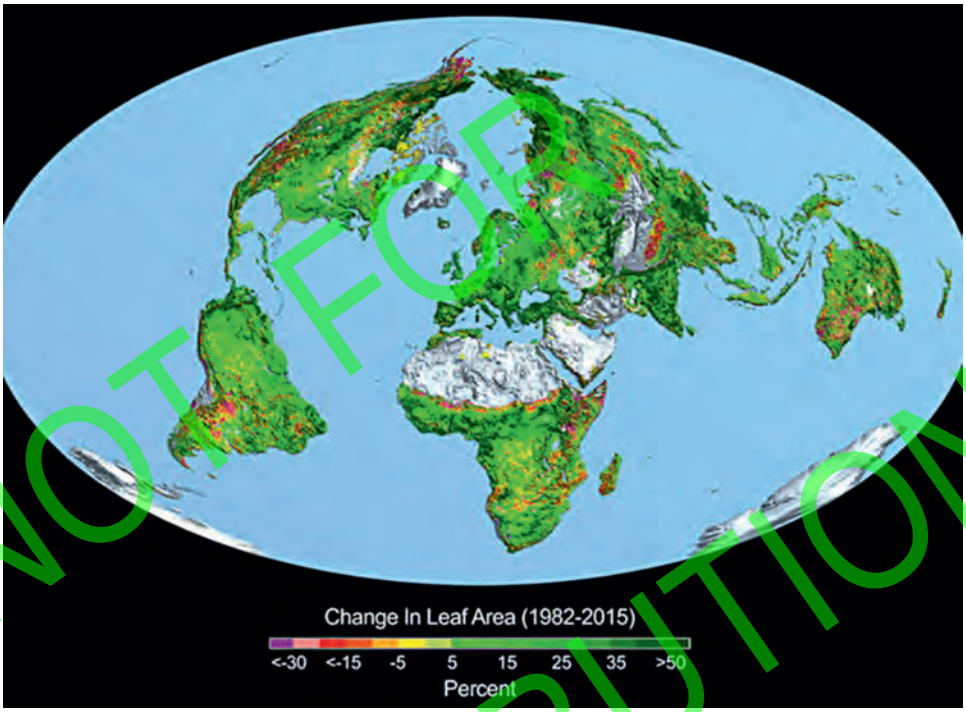


Figure 4.1: Earth shows 'significant' greening over last 35 years: NASA

in the past 20 years, the equivalent of an area as large as the Amazon rainforest.[102] At the same time, many plants have become more drought-resistant, as explained in Chapter 5.

A study by Australian and Chinese researchers found that, thanks to increased CO_2, "greening acceleration" was occurring in 55 percent of the globe, whereas 7 percent of the globe was experiencing "browning" (the opposite of "greening," due to increased dryness in some areas).[103]

A greener planet under higher CO_2 levels can only be positive for plants, wildlife—and humanity.

The increase in plant life is benefitting bees and other pollinators as well, expanding habitat and increasing sources of pollen, nectar, and food for insects.

102 Magnus Aschan, NASA, "The Earth is greener now than it was 20 years ago," March 5, 2021. The subheading reads: "The Earth has become five percent greener in 20 years. In total, the increase in leaf area over the past two decades corresponds to an area as large as the Amazon rainforests."

103 Xin Chen, et al. "Global greening continues despite increased drought stress since 2000," *Global Ecology and Conservation,* January 2024.

Chapter 5

More CO_2 Means More Food

Key Takeaways

- Increased carbon dioxide in the atmosphere has been beneficial for plant life in general, but especially for farmers growing the crops that feed eight billion people. For example, gradually rising CO_2 levels have increased the yields of corn, rice, soybeans, and wheat—four key crops for humanity.
- Despite the supposed "climate emergency," cereal stocks have also risen considerably.
- Studies have shown that yields of basic food crops would increase from 41 percent to 77 percent from an additional 300 ppm of CO_2, with major income benefits for farmers and food supplies for humanity.

Higher CO_2 levels enhance photosynthesis and generally improve water use for plants. Consequently, increasing CO_2 has been a boon for crop production. For example, Figure 5.1 shows the increase in crop yields of corn, wheat, and soybeans from 1866 to 2021 in a world with gradually rising CO_2 levels.

Figure 5.2 shows the increase in cereal crop production and stocks globally:

Not surprisingly, greenhouse growers routinely increase CO_2 levels of their greenhouses to 1,000 ppm or more. For example, an Ontario government website notes:

> "Higher CO_2 concentrations increases productivity through improved plant growth and vigor in a variety of ways: it produces earlier flowering, higher fruit yields, reduced bud abortion in roses, improved stem strength and flower size, and improved root growth and nutrient uptake."[104]

In addition, as CO_2 concentrations rise, plants use water more efficiently. The underside of plant leaves contain tiny openings called *stomata* that ingest the CO_2 molecules plants need for growth and photosynthesis. However, when the stomata are open, plants lose water vapor through transpiration, which they also need for health and life.

But with more CO_2 molecules available, plants don't need to leave the stomata open as long to get the carbon they need, and, as a result, they lose less water during transpiration. So, not only do higher CO_2 levels

104 "Supplemental carbon dioxide in greenhouses." Ontario Government, December, 2002.

Figure 5.1. Corn, Soybeans, & Wheat vs. CO_2

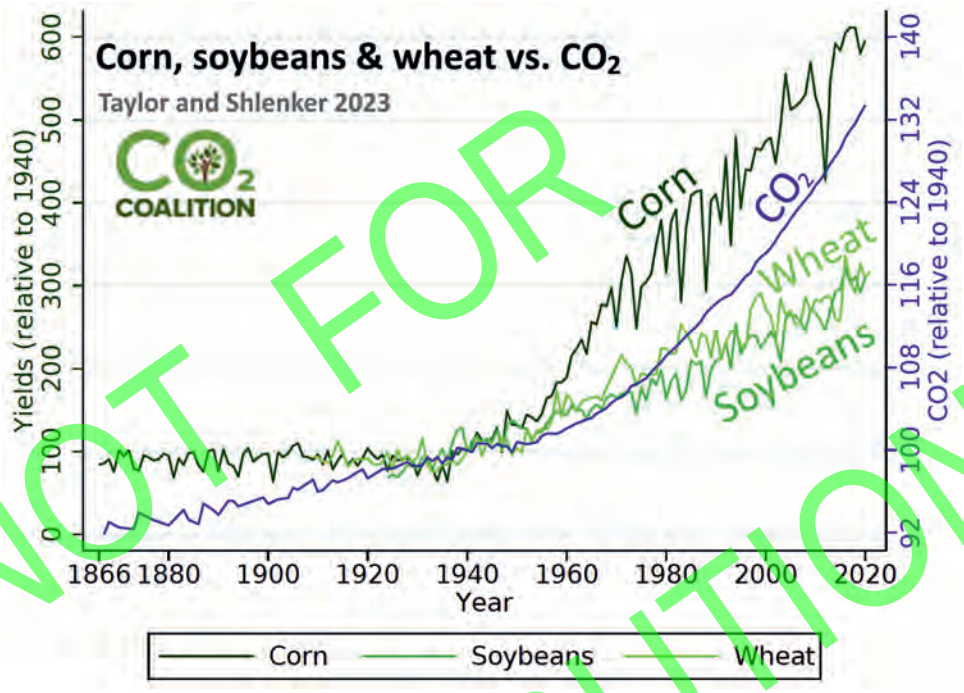


Figure 5.1: Increase in yields of corn, wheat and soybeans from 1866-2021 compared to rising CO_2 levels. Source: CO_2 Coalition

increase plant growth (and farmers' incomes) by anywhere from 40 to 77 percent or more (see Figure 5.3), higher levels of CO_2 also make plants more drought-resistant.[105]

105 "CO_2 growth means more plant growth." CO_2 *Coalition,* 2024.

Figure 5.2. Cereal Production, Utilization, and Stocks

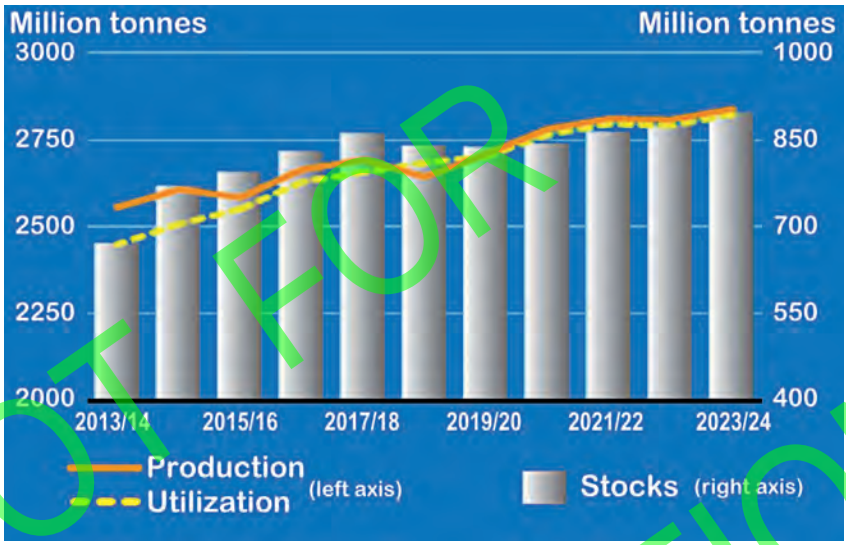


Figure 5.2: Increase in cereal production stocks from 2013-2024. Source: UN Food and Agriculture Organization, "World Food Situation," July 9, 2021.

Figure 5.3. More CO_2 Means More Plant Growth

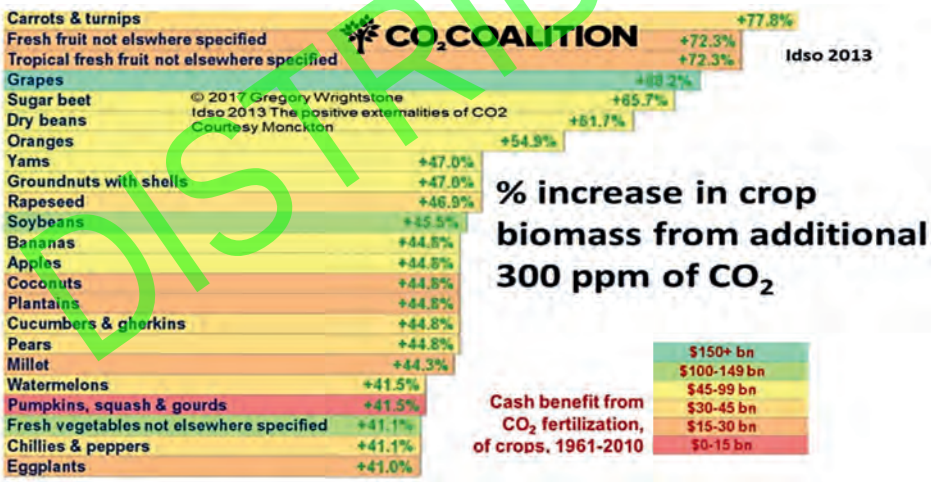


Figure 5.3: Increase in plant growth caused by 300 ppm increase in CO_2.
Source: CO_2 Coalition

Chapter 6

Warming Is Good for Civilization

For more than two million years, our planet has been in an ice age, in which glaciers have advanced and receded roughly every 100,000 years. For 80,000 to 90,000 of those years, on average, conditions on Earth have been cold, with large portions of North America, Europe, and northern Asia covered by glaciers; warmer interglacial periods typically only last for 10,000 to 20,000 years.

The most recent interglacial period, the Holocene, began about 12,000 years ago. Its arrival was accompanied by a warmer climate that allowed the development of agriculture and therefore human civilization. This was in part attributable to the release of CO_2, which increased from about 180 ppm during the depths of the last ice age, to 280 ppm at the beginning of the Industrial Revolution.

Over the past 12,000 years, the planet has warmed several times to temperatures as high or higher than at present (see Figure 6.1), and each warm period has been *good* for humanity.

The Holocene Optimum (about 8,000 years ago) saw the development of agriculture and the first proto-civilizations; in Europe, warm periods coincided with the creation of the Minoan civilization (3,500 years ago), Roman civilization (2,000 years ago), and Medieval civilization (1,000 years ago).

Regarding the European Medieval Warm Period, anthropologist Brian Fagan has written: "The generally stable weather of the Medieval Warm Period [MWP] was an *unqualified blessing* for the rural poor and small farmers."[106] [emphasis added]

Key Takeaways

- Global warming over the past 12,000 years has provided favourable conditions for the emergence of human civilizations.
- The historical record shows that humans thrive when the planet goes through one of its periodic warming spells, and suffer when the planet gets cooler (e.g., the dark ages and the Little Ice Age).
- Today may be the first time in history that people have feared, rather than welcomed, a warming climate. What we should fear is a return to glacial conditions, which would cause unimaginable suffering to humanity.

106 Brian Fagan, *The Little Ice Age*. New York: Basic Books, 2000, pp. 15-16.

Figure 6.1. Greenland GISP2 Ice Core Temperature Data - 10,000-Year Cooling Trend

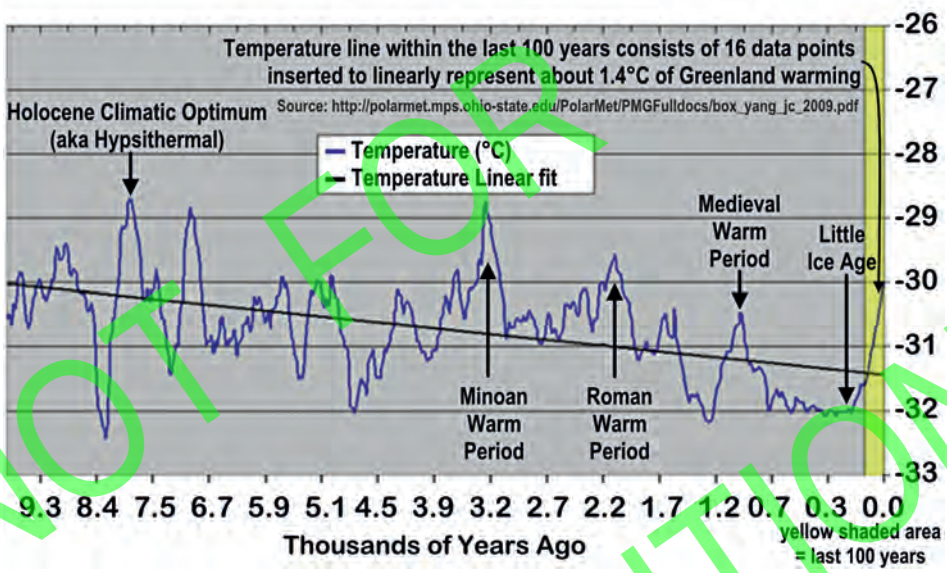


Figure 6.1: Temperature variations during the Holocene interglacial based on Greenland ice core data.
Source: National Oceanographic and Atmospheric Administration (NOAA); R.B. Alley, 2004.

Civilization also developed and flourished in China and elsewhere during the MWP and previous warmings. Note that none of these earlier warmings were caused by human-created CO_2 because industrial society, with its fossil fuel emissions, didn't occur until the 1800s, with a large increase beginning in the mid-1940s.

The Little Ice Age (1300s - 1800s) created tougher conditions for human beings, including pandemics like the Black Death in Europe, and numerous famines worldwide. When the planet began to warm again in the mid-1700s, civilizations in Europe and elsewhere had better conditions to develop and flourish.

Warm periods benefit humanity in many ways, including longer growing seasons, but also because fewer people die as a result of warm weather than cold weather, as discussed previously.

Section 5

What Are Our Best Options?

Chapter 1

What Are Our Best Options?

Key Takeaways

- Canada's current proposals to prevent climate change are costly and ineffective. Canadian energy and climate policies need to better balance environmental and other public policy considerations.
- Reforms should ensure that climate policies no longer increase the costs of energy to consumers while reducing their availability and reliability.
- Reforms should be fair to all consumer and producer groups and to all regions of the country and should not be driven by aspirational goals that will have no impact on the weather.

Canada's current climate policy seeks to reduce emissions of greenhouse gases, mainly from the combustion of hydrocarbons, to "net zero emissions" by 2050. The current government also has established a target of reducing annual CO_2 equivalent emissions to 40 to 45 percent below the 2005 level of 741 million tonnes (Mt), which equates to net emissions of 445-408 Mt by 2030. (See Section 1, Chapter 1). In addition, at COP28, Canada committed to eliminating fossil fuels from electricity generation by 2035, a target that Electricity Canada has serious reservations about the feasibility of attaining.[107] Resolution with the federal government had not happened by the date for printing of this booklet.

Canada's GHG emissions account for only 1.5 percent of the global total. According to the UN IPCC, for every trillion tonnes of carbon dioxide emitted by human activity, global surface temperature rises by 0.45 degrees C. (best estimate). Using this measure, all of Canada's 2022 emissions warmed the globe by 0.000247 degrees C., which is equivalent to 1 degree C. over 4,055 years.[108] This means that a complete and permanent elimination of all of Canada's emissions would have no measurable effect on the global climate. The federal government does not even attempt to estimate the ultimate climate effects of its policies.

107 Chris Varcoe, "Electricity Canada warns of 'flawed' design and 'severe affordability impacts' of Ottawa's Clean Electricity Regulations," *The Financial Post*, July 17, 2024, https://financialpost.com/opinion/columnists/electricity-canada-says-clean-electricity-regulations-flawed/wcm/4352b3ef-963d-432c-87fc-3a4a8a2069f6

108 Bjorn Lomborg. False Alarm: How Climate Change Panic Costs US Trillions, Hurts the Poor, and Fails to Fix the Planet, Basic Books, New York 2020

The upfront capital commitment of Canada's net zero policies is at least $90,000 per citizen (US $66,000), considering the $3.6 trillion total cost divided among a population of about 40 million. This is being funded by new debt on top of the existing federal debt of about $30,000 per Canadian. In addition to this burden, young Canadians seeking a home to raise a family will be forced to pay an additional $55,000 for housing due to net zero building code amendments.

The statutory measures that underpin net zero policies are being implemented without frank consultation with those who are most affected.[109] After 28 years of denying a hearing from those who question the "settled science," the international community is unilaterally forcing the world on a path forward that will negatively impact humanity for generations to come.

What disappoints *Canadians for Sensible Climate Policy* is that by their continued silence on this policy goal, the financial sector (who are custodians of our savings and investable wealth), seem to be in whole-hearted agreement with the absurd notion that humans can control climate.

Today, most of the major Canadian institutions support the net zero agenda. They accept the thesis that human GHG emissions are causing catastrophic long-term climate change and a harmful increase in extreme weather events. Most politicians are afraid to challenge the perceived climate consensus.

Therefore, we need a courageous group of "pathfinders" to lead the nation out of the costly, harmful, and ineffective policies the government and many politically connected companies are currently foisting upon Canada and the rest of the world. Creating pathfinders involves:

- Developing a critical mass of people who are well-informed and trained to speak about the need for policy reform before chambers of commerce, municipal councils, and boards of financial institutions like pension funds and insurance companies.
- Providing independent media with well-crafted articles and briefs to inform the public and make decision-makers aware of alternative views.
- Increasing the funds available to the organizations that promote climate realism.
- Eventually, concerted lobbying of elected officials who are prepared to seek changes in present climate policies.

Emissions reduction should not be the preeminent goal driving Canada's energy policies. Instead, the federal government should seek the optimal balance among actions that promote economic prosperity, social harmony, environmental quality, financial responsibility, energy security, and promotion of federal-provincial and

109 Robert Lyman. When will climate policy hit the wall? Friends of Science, October 19, 2023. https://blog.friendsofscience.org/2023/10/19/when-will-climate-policy-hit-the-wall-text-of-robert-lymans-presentation/

international relations, among others.

Important first steps include:

- Abandoning Canada's net zero agenda;
- Eliminating the carbon pricing regime;
- Assessing all other climate mitigation policies and programs according to rigorous cost-benefit analyses;
- Passing legislation to return the regulation of energy infrastructure and utility rate-making to neutral entities that operate independently from government;
- Abandoning the 2030 Emissions Reduction Plan, and leaving the establishment of building codes, zoning, and construction approvals in the hands of provincial and municipal governments;
- Repealing the Clean Electricity Regulations that now require the elimination of all hydrocarbon-based electricity generation by 2035.

These steps would enable Canada to adapt to any environmental changes that may occur in the future, in part by better ensuring continued economic growth and competitiveness. The wealthier a country is, the better able it is to adapt to extreme weather events and climate change, regardless of the direction or cause.

Energy & Climate at a Glance
Facts on 22 Prominent Climate Topics

"In Praise of Energy & Climate at a Glance: Canadian Edition

Canadians for Sensible Climate Policy have produced a very much needed and concisely stated review of the known facts and prospects of this controversy. Climate has been the subject of a great deal of cant and emotionalism based on unsubstantiated surmise, and has been a subject of a great deal of hysteria and disinformation. This is a rigorous, concise, and very authoritative and useful summary of this fiercely contested issue, and I recommend it unreservedly to anyone who wishes to be well informed and up-to-date on this important and timely subject."

- Conrad Black, former newspaper publisher, financier, historian, and columnist.

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