

Clean Electricity Lessons for Canada... From Hawaii. Really??

Presented by Michelle Stirling
Friends of Science Society

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What's Wrong With This Headline?



*"Canada has **just 13 years** to achieve a formidable task: practically erase its electrical emissions while growing the grid to displace fossil fuels powering its cars, homes and factories."*

CBC is gaslighting you.

What On Earth

Canada is developing a clean electricity standard. Does Hawaii have lessons for us?



As Canada develops a nationwide law to green the grid, loopholes have experts concerned



Zoë Yunker · CBC Radio · Posted: Sep 04, 2022 4:00 AM ET | Last Updated: 3 hours ago



Isaac Moriwake, managing attorney for Earthjustice's Mid-Pacific Office, beside a rooftop solar panel in Hawai'i. Rooftop solar makes up a third of the U.S. state's renewable energy. (Matt Mallams/Earthjustice)

Gaslighting

Gaslighting is a technique that undermines a person's perception of reality.





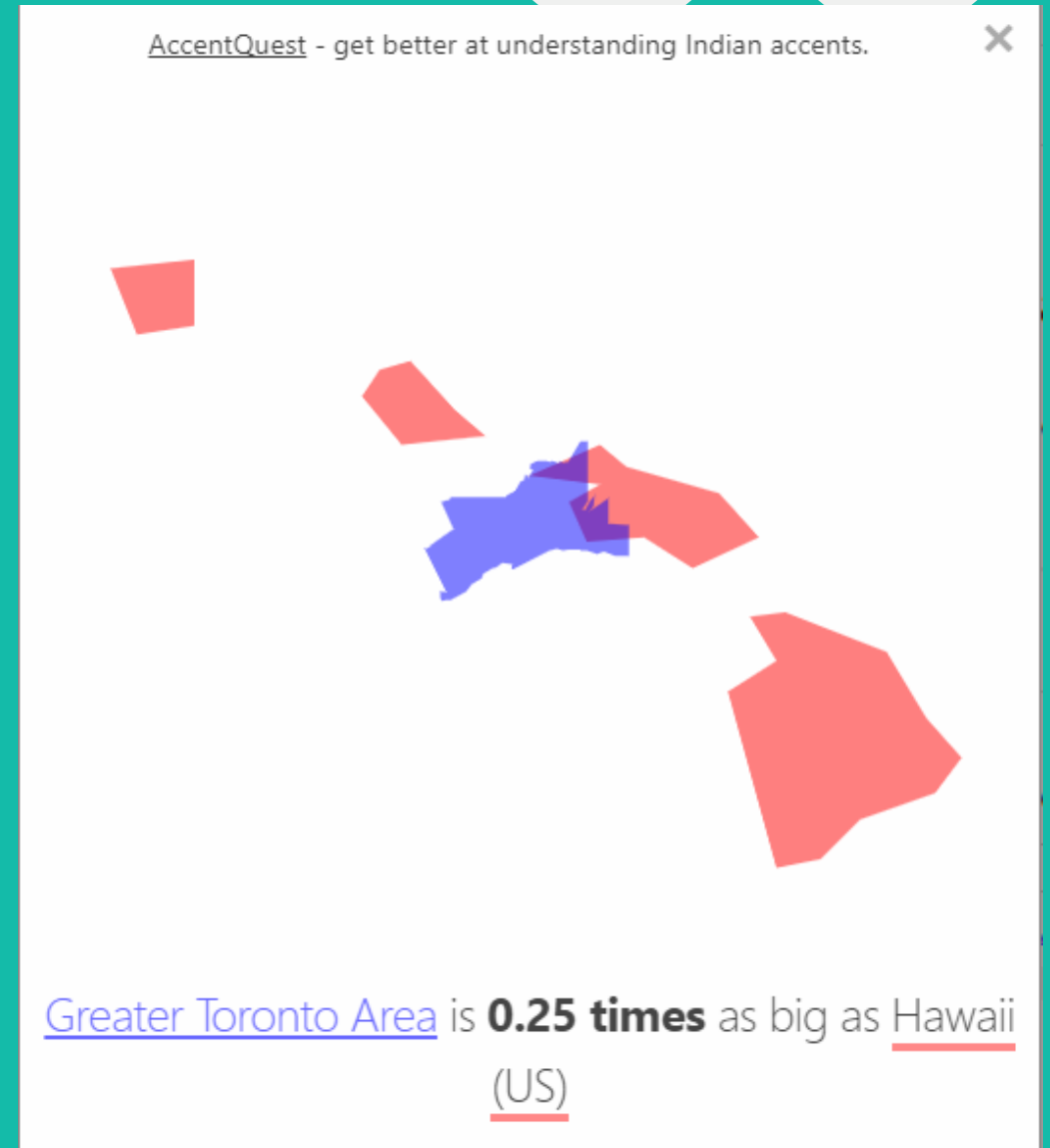
Hawaii (US) is **0.00 times** as big as Canada

Here's Canada Compared to Hawaii

Hawaii population: 1.42 million
Canada population: 38,654,738

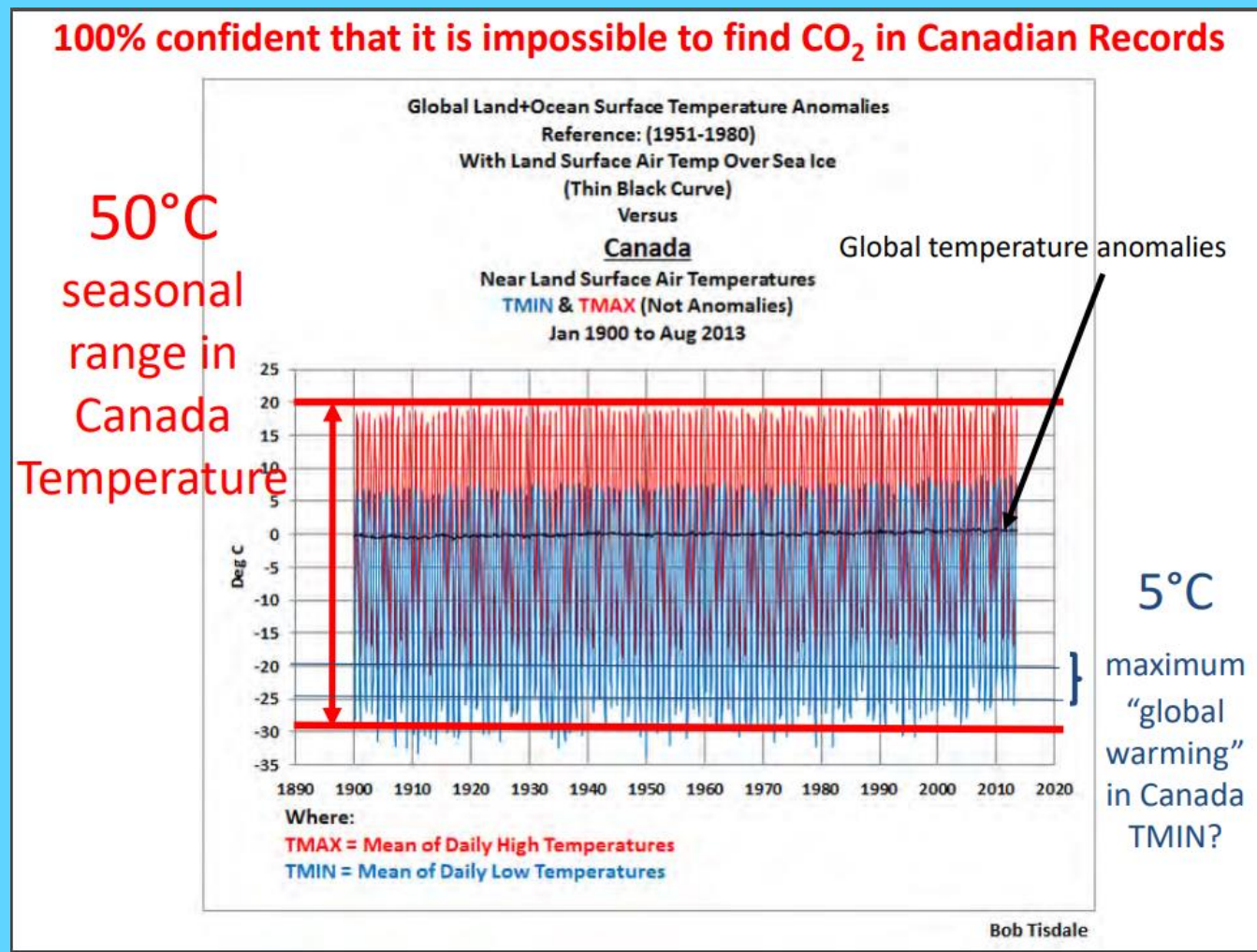
Hawaii is about the size of the GTA-Greater Toronto Area

- Metro area population of Toronto is **6,313,000**
- Hawaii population: 1.42 million



Comparing Weather Conditions

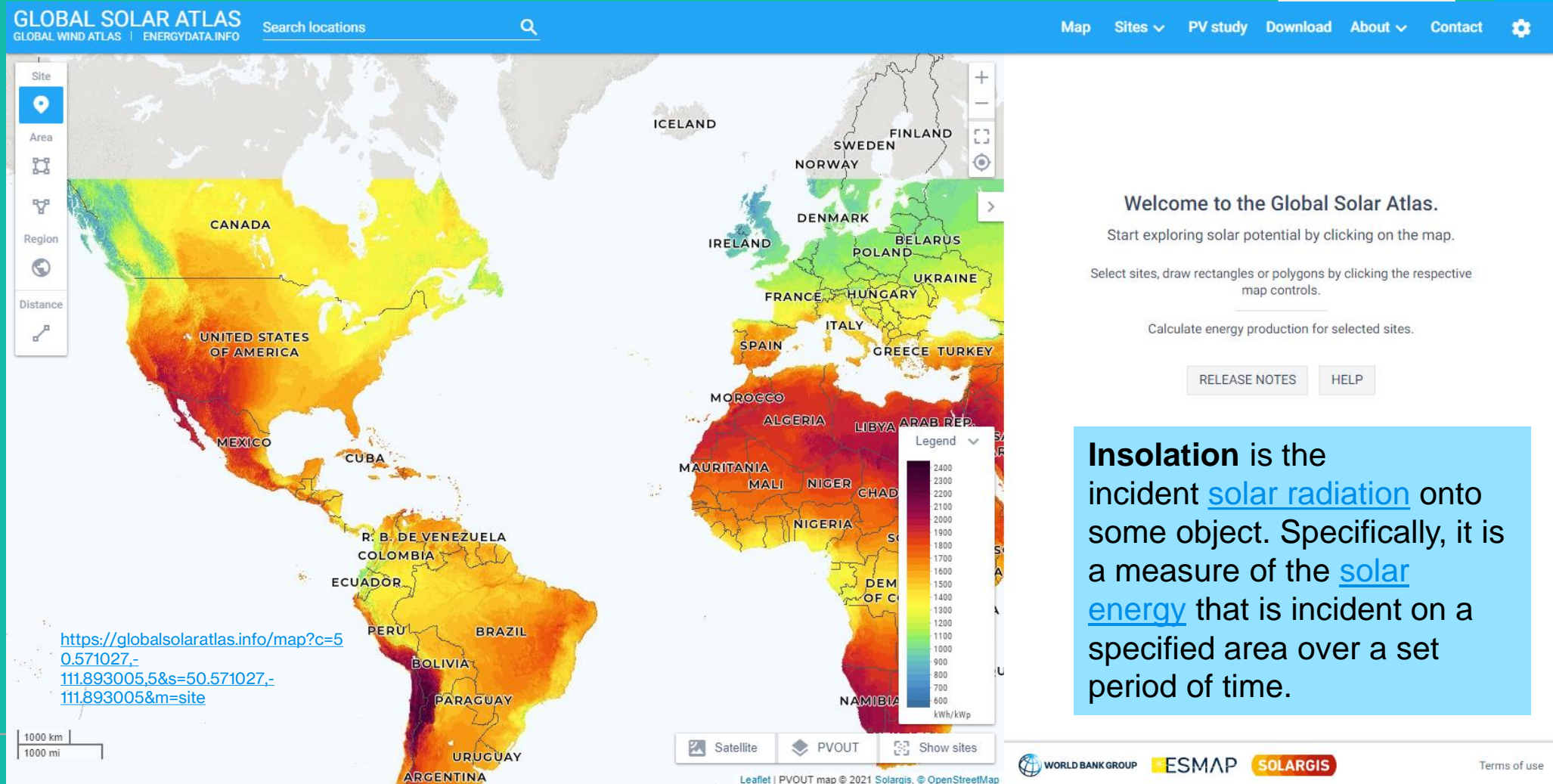
- **Weather in The Hawaiian Islands** is very consistent, with only minor changes in temperature throughout the year. There are really only two seasons in Hawaii: summer (*kaui*) from May to October and winter (*hooilo*) from November to April. The average daytime summer temperature at sea level is 85° F (29.4° C), while the average daytime winter temperature is 78° (25.6° C). Temperatures at night are approximately 10° F lower than the daytime.



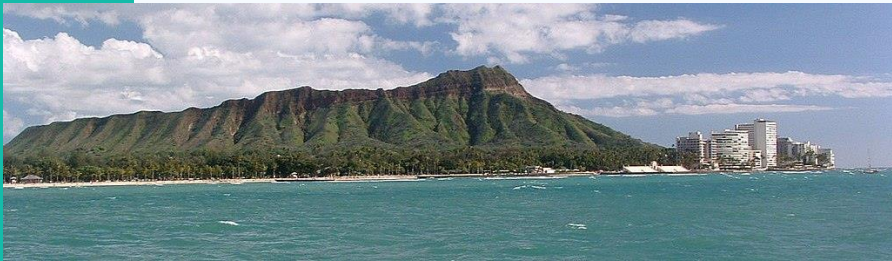
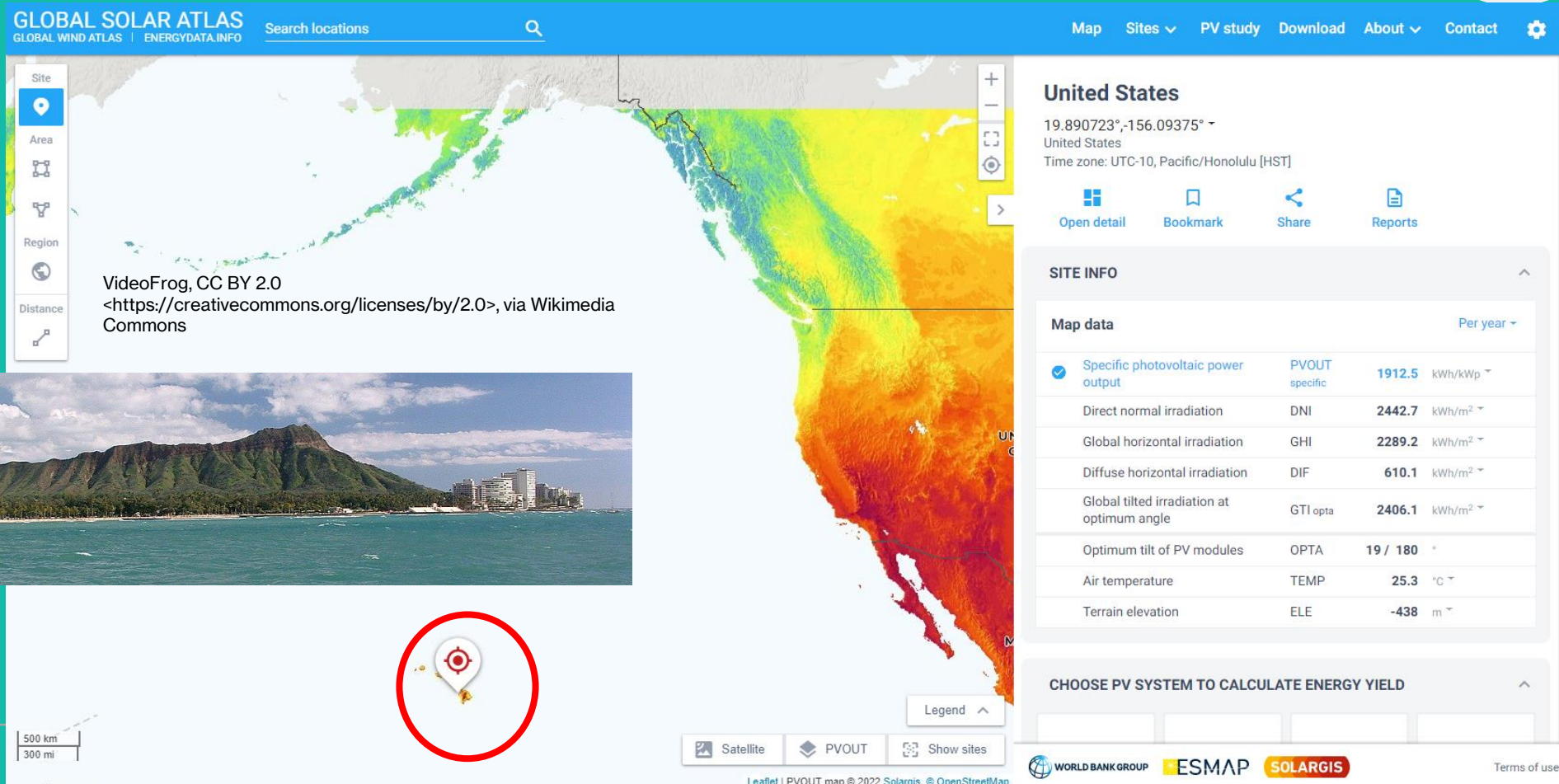
Why do Canadian Snowbirds go to Hawaii?



How about Solar Insolation?

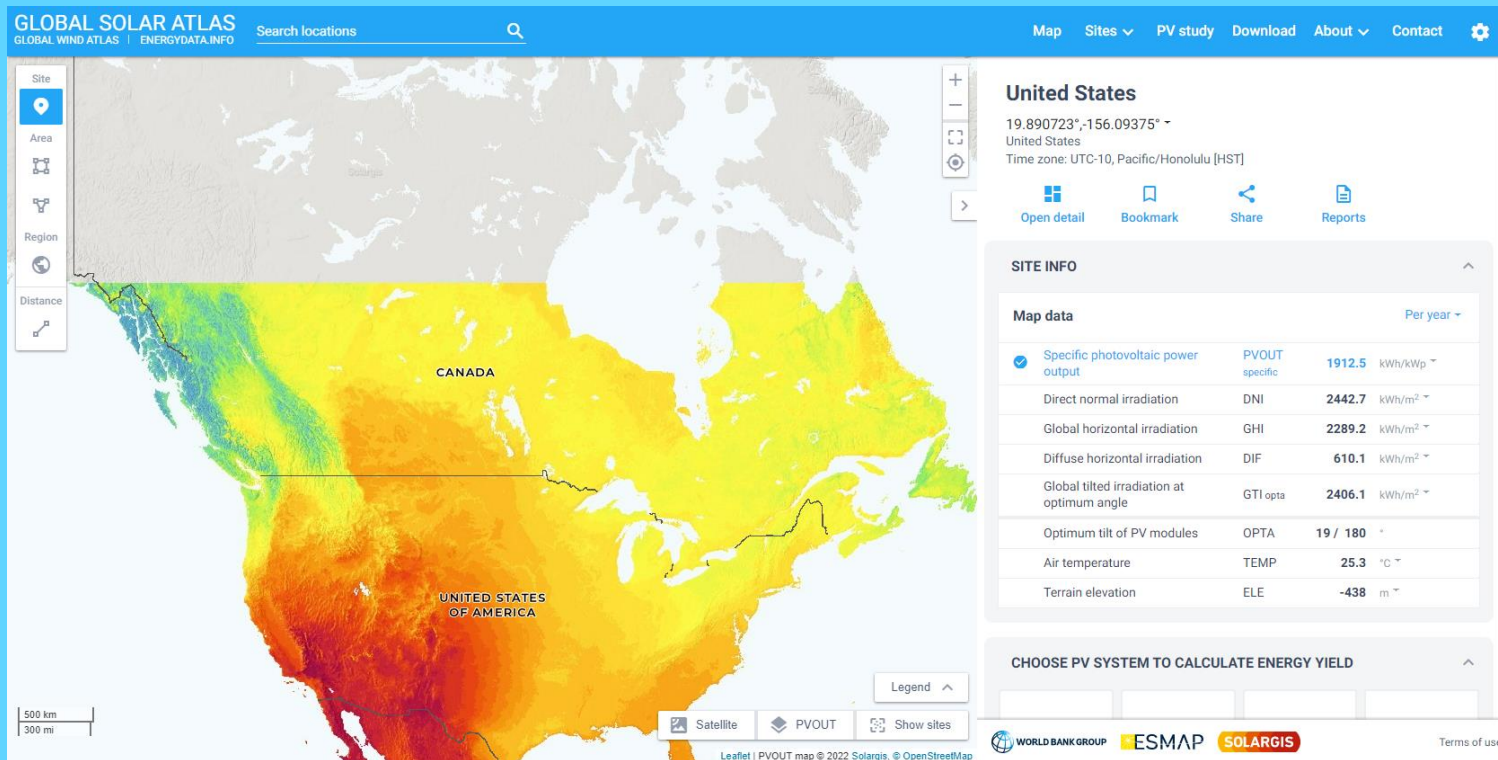


Hawaii is an Island 'near' the Equator in the Middle of the Pacific Ocean – Honolulu



2367 km (1470 miles) north of the equator and just over 4000 km southwest of North America

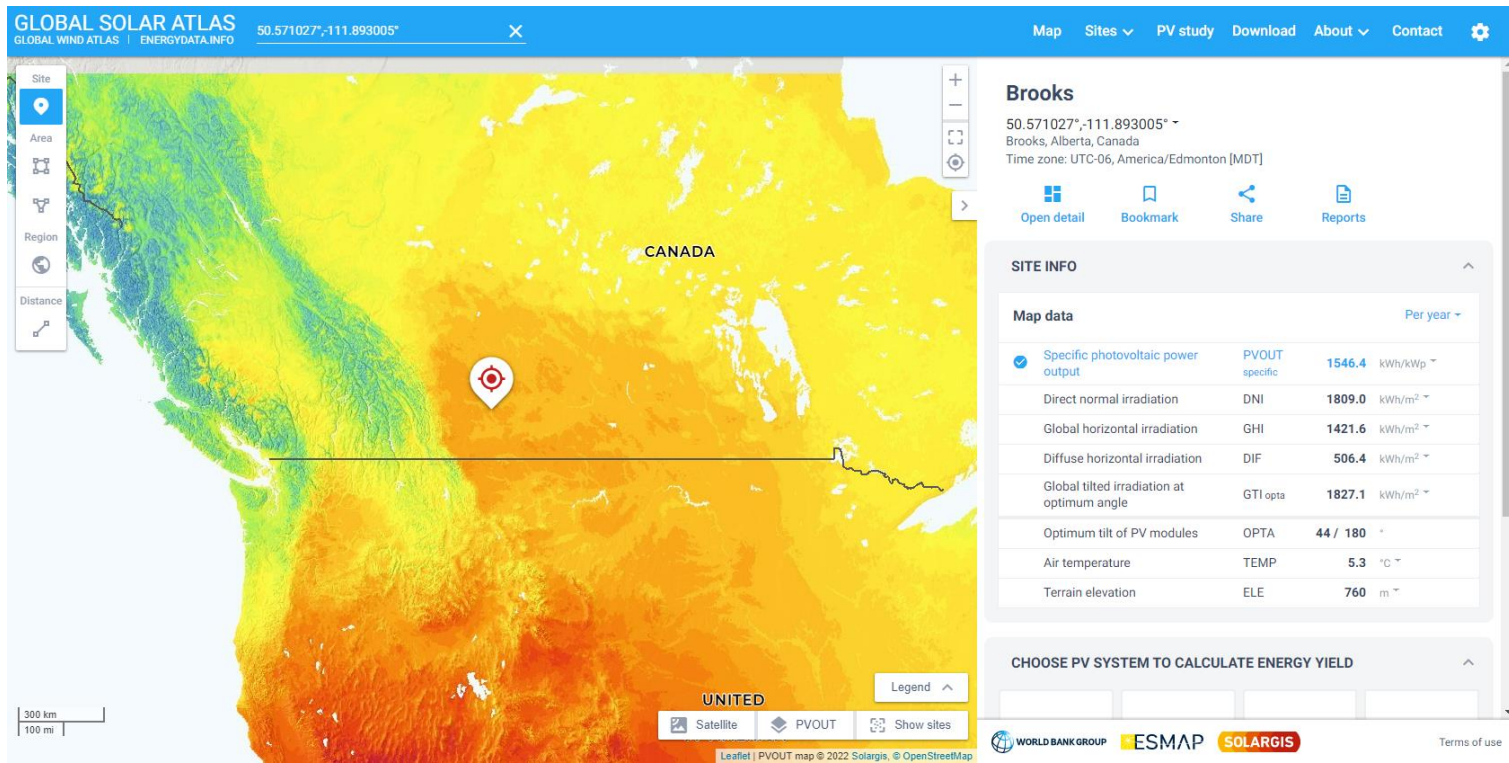
Canada is part of the Continental Plate. We are closer to the North Pole.



Lethbridge to North Pole
2,784.91 mi (4,481.89 km)

Lethbridge to Equator
3,433.49 mi (5,525.67 km)

The best solar insolation in Canada is in Southern Alberta



Brooks, Alberta is one of the sunniest places in Canada

GLOBAL SOLAR ATLAS
GLOBAL WIND ATLAS | ENERGYDATA.INFO

50.571027°,-111.893005°

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Brooks

50.571027°,-111.893005°
Brooks, Alberta, Canada
Time zone: UTC-06, America/Edmonton [MDT]

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SITE INFO

Map data

Per year

<input checked="" type="checkbox"/> Specific photovoltaic power output	PVOUT specific	1546.4 kWh/kWp
Direct normal irradiation	DNI	1809.0 kWh/m ²
Global horizontal irradiation	GHI	1421.6 kWh/m ²
Diffuse horizontal irradiation	DIF	506.4 kWh/m ²
Global tilted irradiation at optimum angle	GTI opta	1827.1 kWh/m ²
Optimum tilt of PV modules	OPTA	44 / 180 °
Air temperature	TEMP	5.3 °C
Terrain elevation	ELE	760 m

CHOOSE PV SYSTEM TO CALCULATE ENERGY YIELD

Leaflet | PVOUT map © 2022 Solargis, © OpenStreetMap





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United States

Honolulu, Hawaii

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 United States
 Time zone: UTC-10, Pacific/Honolulu [HST]




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Map data Per year ▾

<input checked="" type="checkbox"/>	Specific photovoltaic power output	PVOUT specific	1912.5 kWh/kWp ▾
	Direct normal irradiation	DNI	2442.7 kWh/m ² ▾
	Global horizontal irradiation	GHI	2289.2 kWh/m ² ▾
	Diffuse horizontal irradiation	DIF	610.1 kWh/m ² ▾
	Global tilted irradiation at optimum angle	GTI _{opta}	2406.1 kWh/m ² ▾
	Optimum tilt of PV modules	OPTA	19 / 180 °
	Air temperature	TEMP	25.3 °C ▾
	Terrain elevation	ELE	-438 m ▾





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SITE INFO

Map data Per year ▾

<input checked="" type="checkbox"/>	Specific photovoltaic power output	PVOUT specific	1546.4 kWh/kWp ▾
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	Air temperature	TEMP	5.3 °C ▾
	Terrain elevation	ELE	760 m ▾

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Hawaii – Quick Facts from the US EIA

QUICK FACTS

- Hawaii was the first state to set a deadline for having 100% of its electricity sales come from renewable energy, which is required to be achieved by 2045. In 2020, the state's power suppliers met the interim requirement that 30% of electricity sales come from renewables.
- Despite being among the five states with the lowest total energy consumption, Hawaii uses about 12 times more energy than it produces. More than four-fifths of Hawaii's energy consumption is petroleum, making it the most petroleum-dependent state.
- In 2020, solar power provided almost 17% of Hawaii's total electricity, primarily from the increase in generation from small-scale, customer-sited solar panel systems that nearly doubled since 2015.
- In 2020, the amount of Hawaii's coal-fired generation was the lowest since 1992, and coal fueled 11% of the state's electricity generation. The state's single coal-fired power plant is scheduled to close in 2022.
- Hawaii has the highest electricity retail price of any state and it is nearly triple the U.S. average rate, in part because the state relies on imported petroleum for 60% of its electricity generation.

Last Updated: February 17, 2022

Hawaii Runs on Fossil Fuels

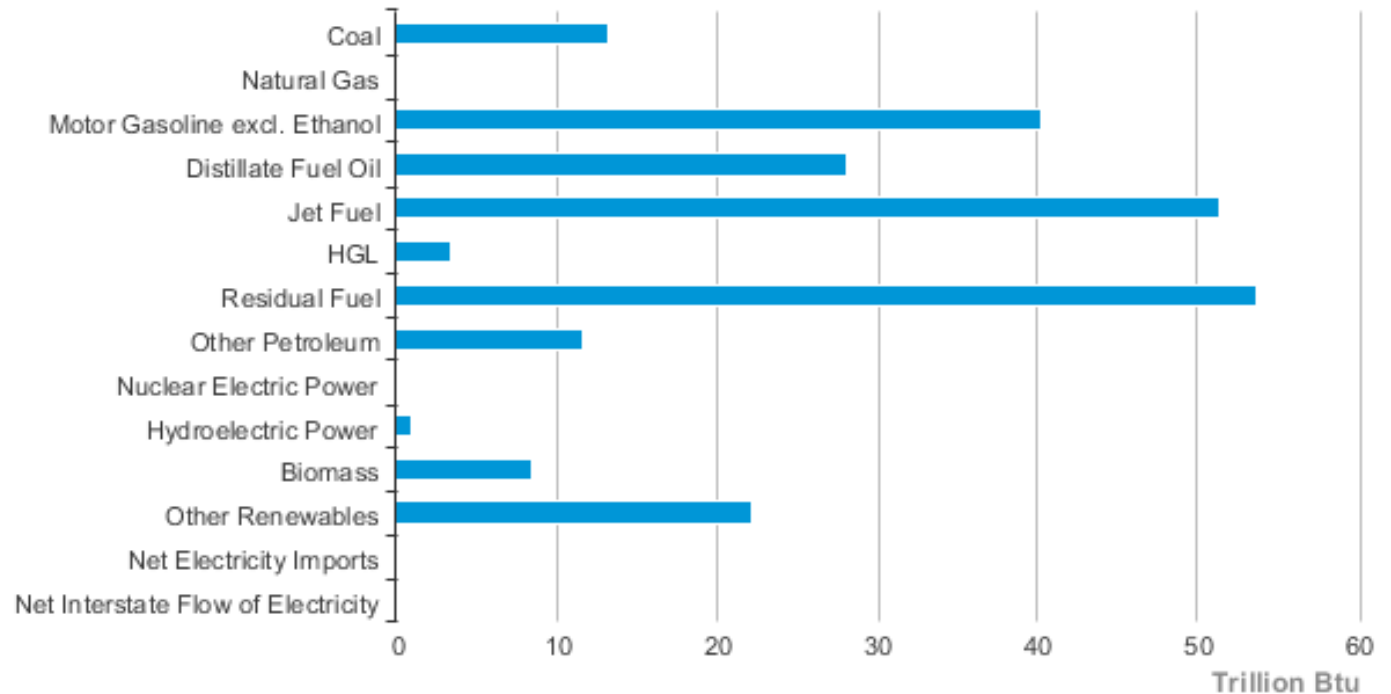


“The percentage of renewable energy on Hawaii's electricity grid (around 37 per cent) is about six times that of renewables on Canada's grid (around six per cent, as of 2019), not including hydro power in either case.”

•CORRECTION: “A previous version of this story stated that Hawaii produces six times as much renewable energy as Canada. It has been updated to reflect **Hawaii's percentage of its total electricity grid is about six times that of Canada's percentage of its grid, not six times the total amount of energy produced**, as well as to reflect that these percentages do not include hydro power.

•Sep 06, 2022 5:38 PM ET” [bold added]

Hawaii Energy Consumption Estimates, 2020

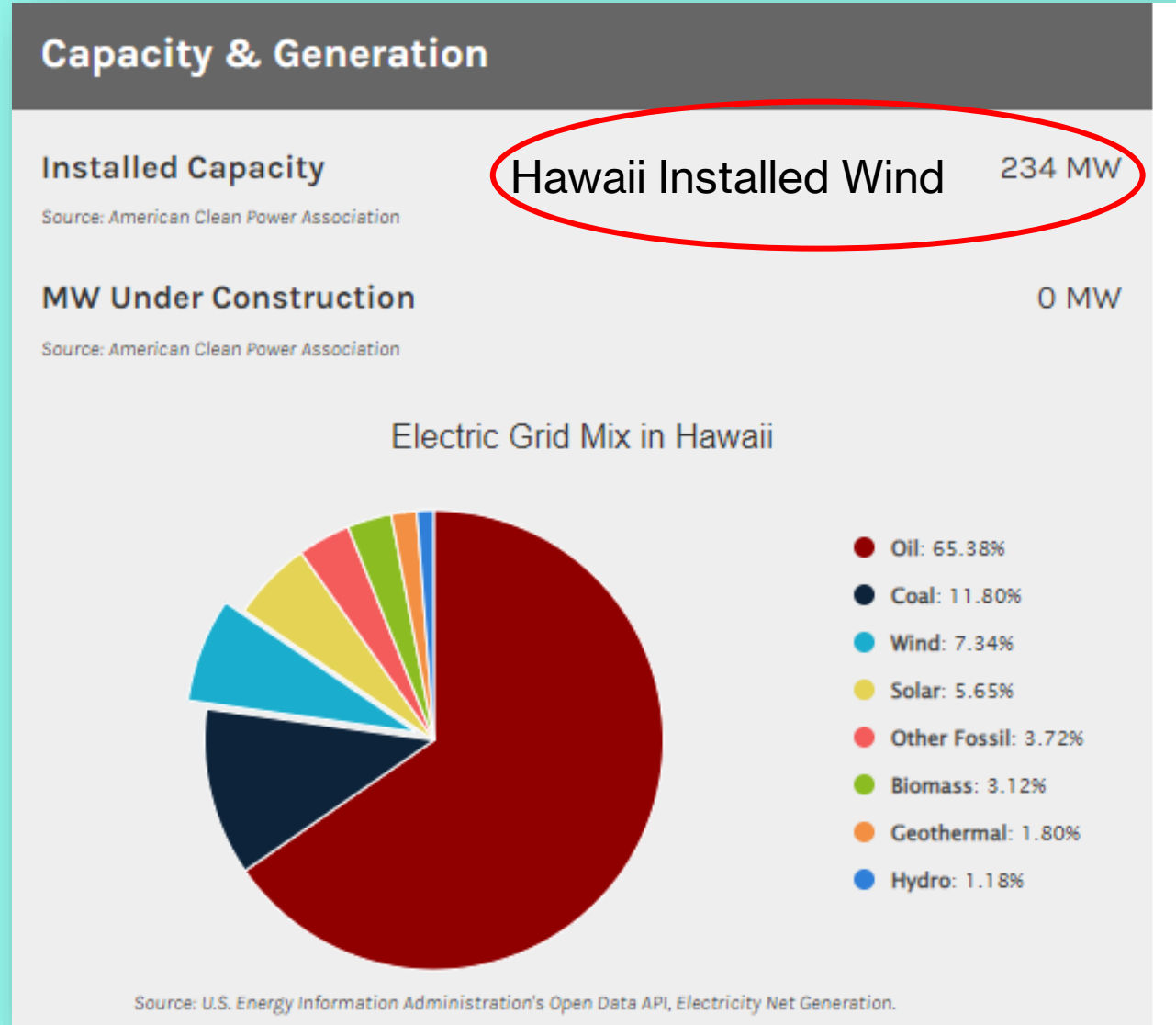


Source: Energy Information Administration, State Energy Data System

Hawaii Installed Wind 234 MW

Canada Installed Wind 14,304 MW

- CANADA:
- At the end of 2021, we had approximately **14,304 MW of installed wind energy capacity** and 2,399 MW of major solar energy capacity. Canada ranked 9th in the world for installed wind energy capacity and 22nd in the world for installed solar energy capacity at the end of 2020.
- <https://renewablesassociation.ca/by-the-numbers/>
- ***BTW Canada has 61 times the installed wind capacity of Hawaii***



Hawaii – Net Electricity Generation by Source

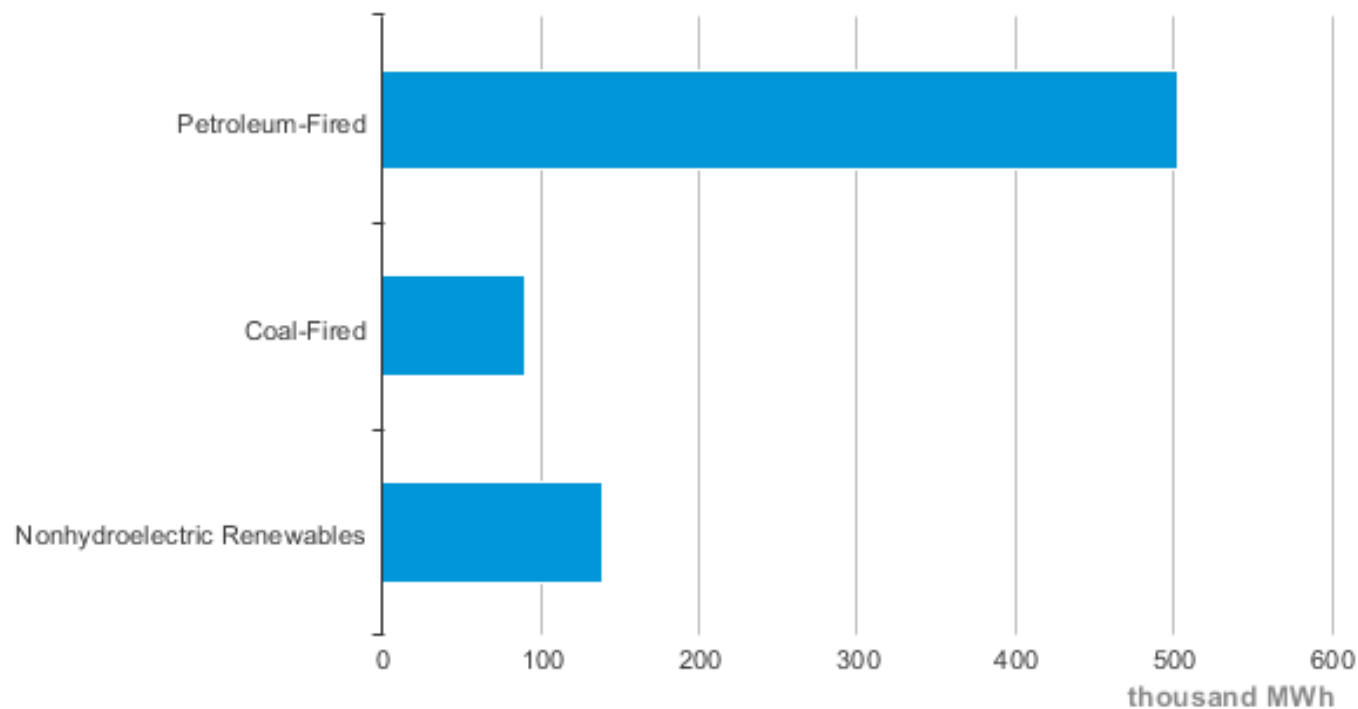
Hawaii produces 771 thousand MWh of electricity, or 0.2% of US output.

US generates *4,176.23 billion kWh*.

1 MWh = 1,000 kWh

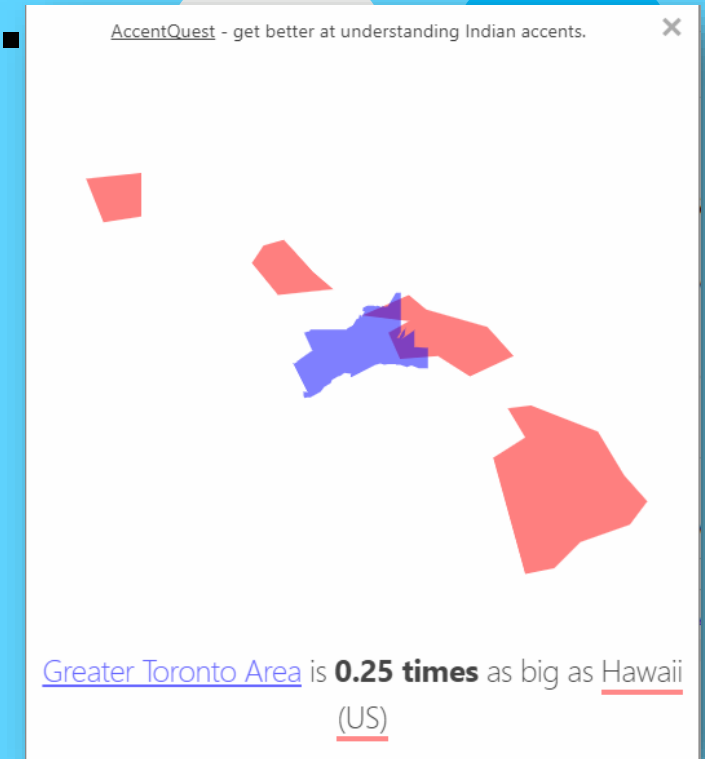
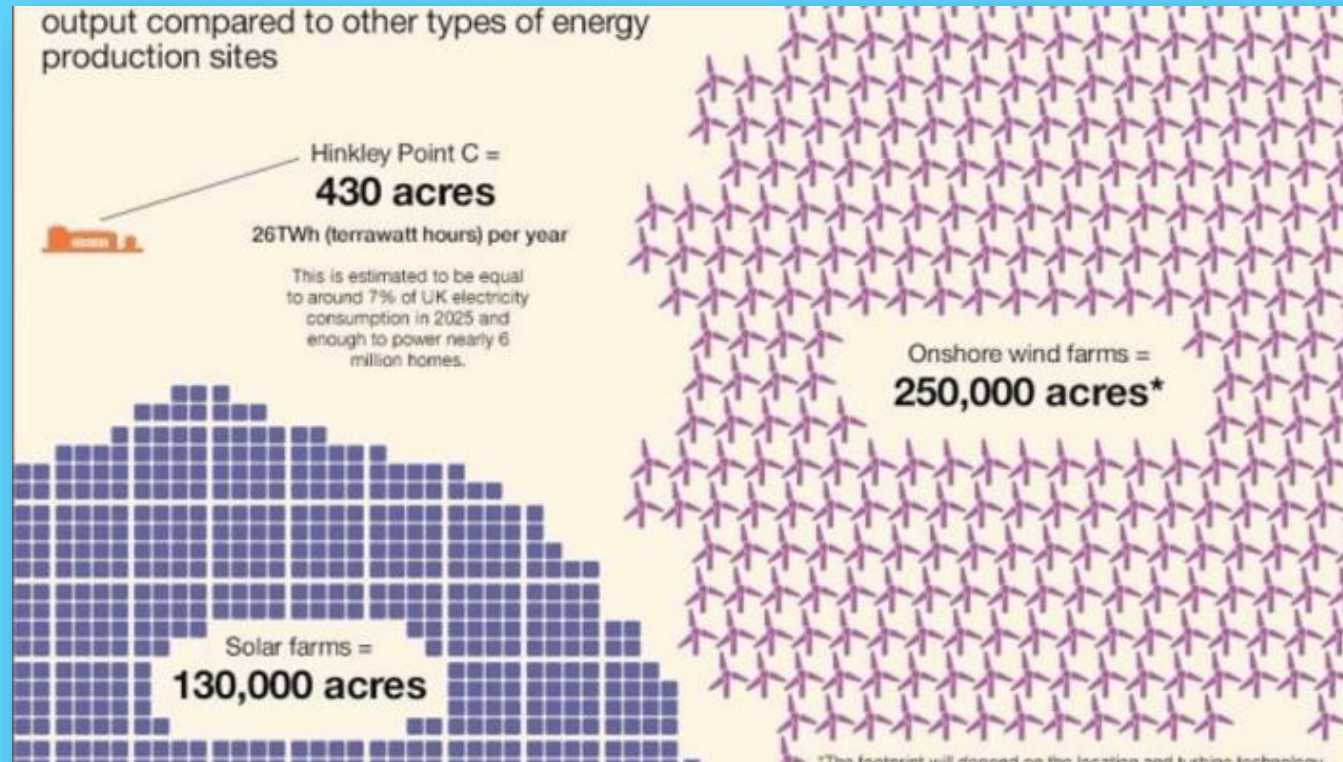
1 GWh = 1,000 MWh.

Hawaii Net Electricity Generation by Source, May. 2022



Source: Energy Information Administration, Electric Power Monthly

Wind and Solar Need Lots of Land.



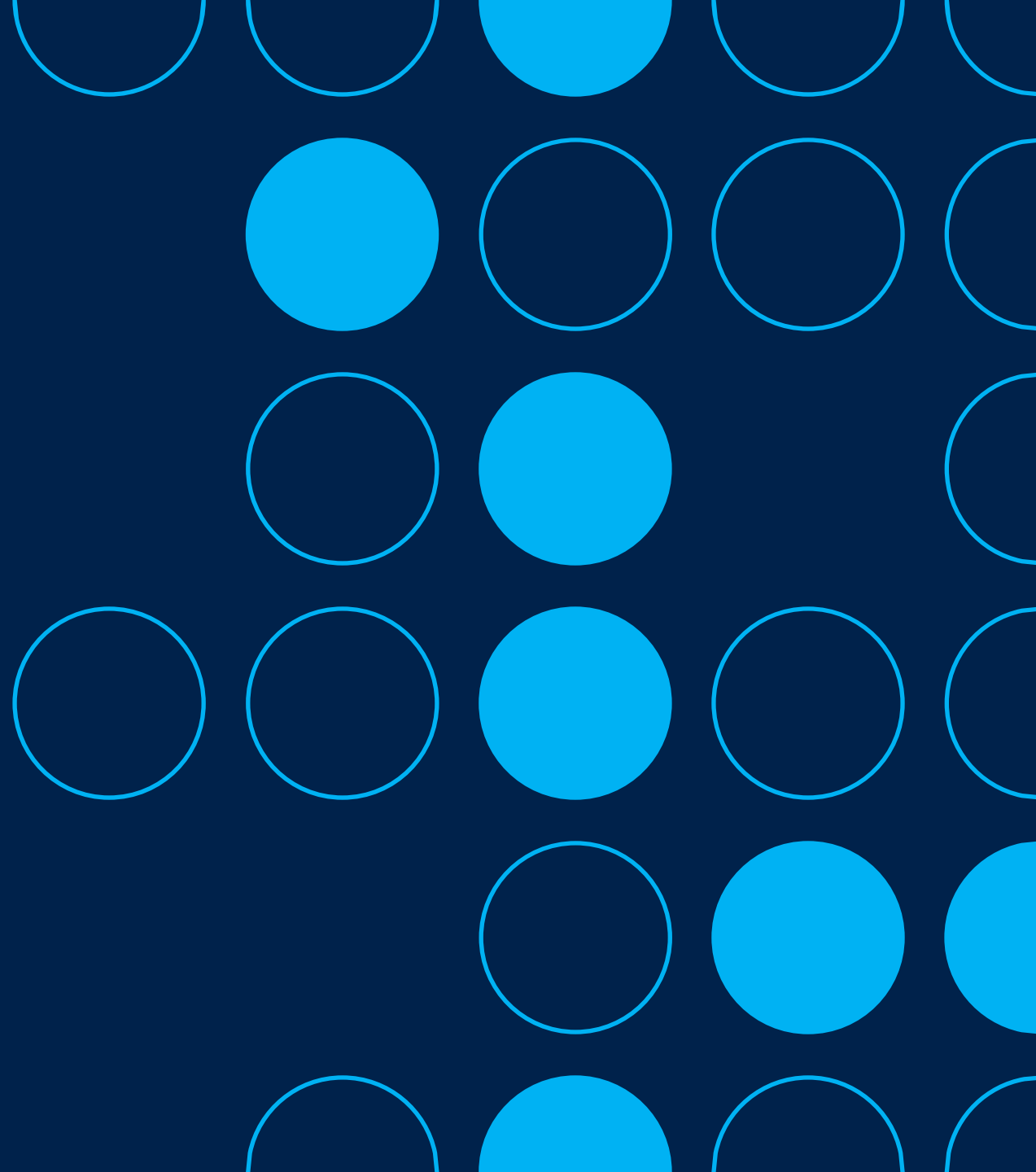
What of Geothermal?

- This geothermal power plant provided about 30% of electricity demand on the Big Island (Puna) of Hawaii. (*prior to Kilauea eruption*)
- The Hawaii geothermal area includes the Puna Geothermal Venture, which is located about 21 miles south of Hilo on the Big Island of Hawaii. The facility is situated along the Lower East Rift Zone of the Kilauea Volcano.
- The Kilauea eruption in 2018 meant the bore holes had to be plugged before rivers of lava overran the facility, in order to prevent the escape of deadly H₂S gas.
- *Many Hawaiians hold traditional beliefs of the volcanic goddess Pele.*

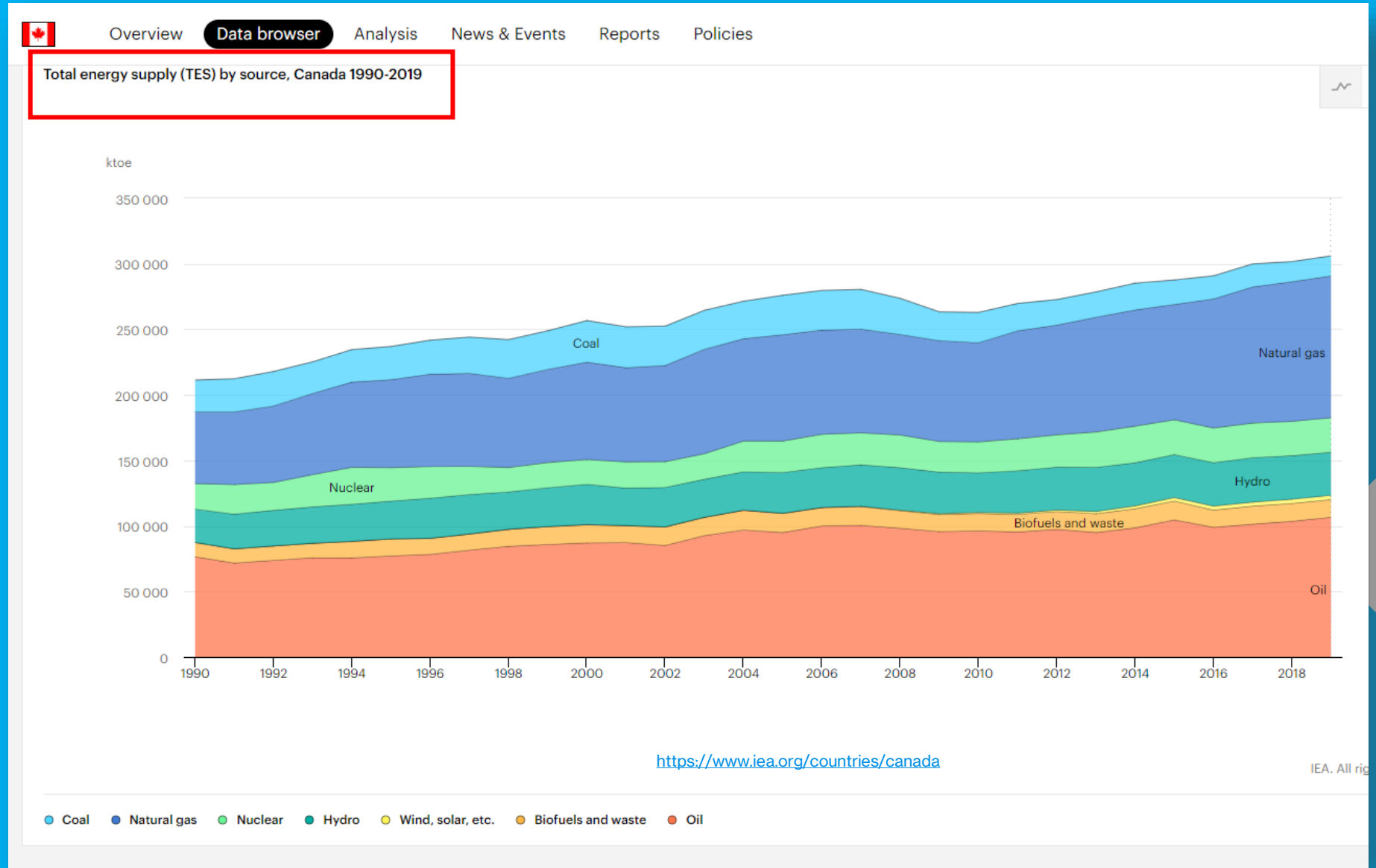
The screenshot shows the EIA website interface. At the top, the EIA logo and navigation links are visible. The main content area features a title 'Volcanic lava flows continue to affect geothermal power generation on Hawaii's Big Island' dated July 17, 2018. Below the title is a map of Hawaii (Big Island) with various power sources marked: petroleum, geothermal, wind, and hydro. A specific location, the Puna Geothermal Venture, is highlighted with a red box and a callout indicating it produces 80 megawatts. An inset map shows the 'approximate lava extent' in red. The article text discusses the shutdown of the Puna Geothermal Venture (PGV) power plant on May 3, 2018, due to lava flows from the Kilauea volcano. It notes that the PGV was the only geothermal plant on the island and produced about 29% of the island's electricity in 2017. The article also mentions that continuing eruptions in lower Puna have damaged transmission lines and equipment, leading to power outages, and that the utility, Hawaii Electric Light Co (HELCO), has implemented switching operations to reroute power.

<https://www.energy.gov/eere/geothermal/hawaii-geothermal-area#:~:text=This%20geothermal%20power%20plant%20provides,the%20Big%20Island%20of%20Hawaii.>

How about Canada?



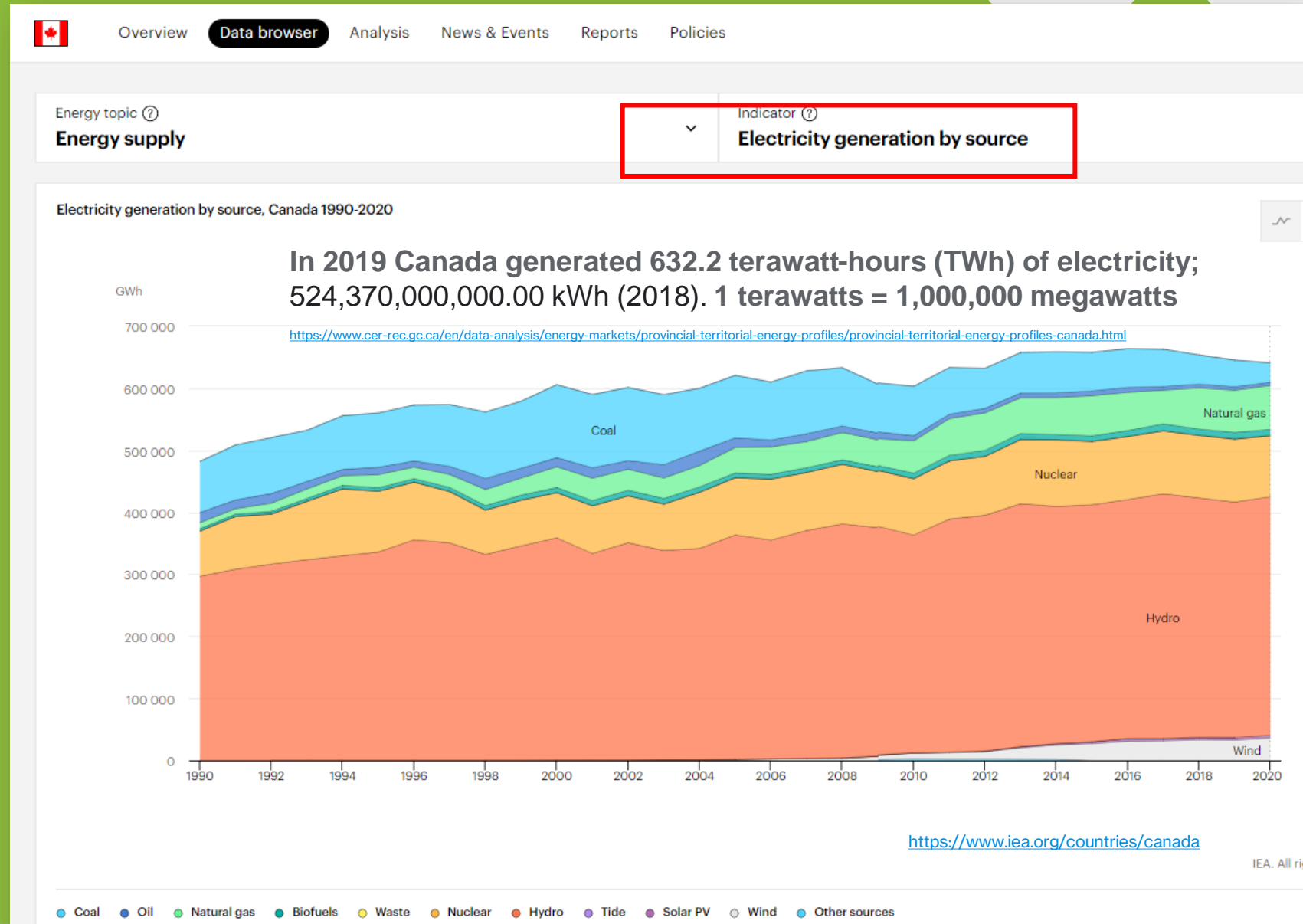
How about Canada?



In 2019, Canada produced 632.2 terawatt-hours (TWh) of electricity. More than half of the electricity in Canada (60%) is generated from [hydro sources](#). The remainder is produced from a variety of sources, including natural gas, nuclear, wind, coal, [biomass](#), solar, and petroleum

<https://www.cer-rec.gc.ca/en/data-analysis/energy-markets/provincial-territorial-energy-profiles/provincial-territorial-energy-profiles-canada.html>

CBC: "Natural gas poses a substantial threat to Canada's net-zero goals, suggests Jeyakumar."



In 2020, Canada had the fourth largest installed capacity of hydropower in the world.

- China – Total Installed Capacity: 356.4 GW. ...
- Brazil – Total Installed Capacity: 109.1 GW. ...
- US – Total Installed Capacity: 102.8 GW. ...
- **Canada – Total Installed Capacity: 81.4 GW. ...**
- India – Total Installed Capacity: 50.1 GW. ...
- Japan – Total Installed Capacity: 49.9 GW.



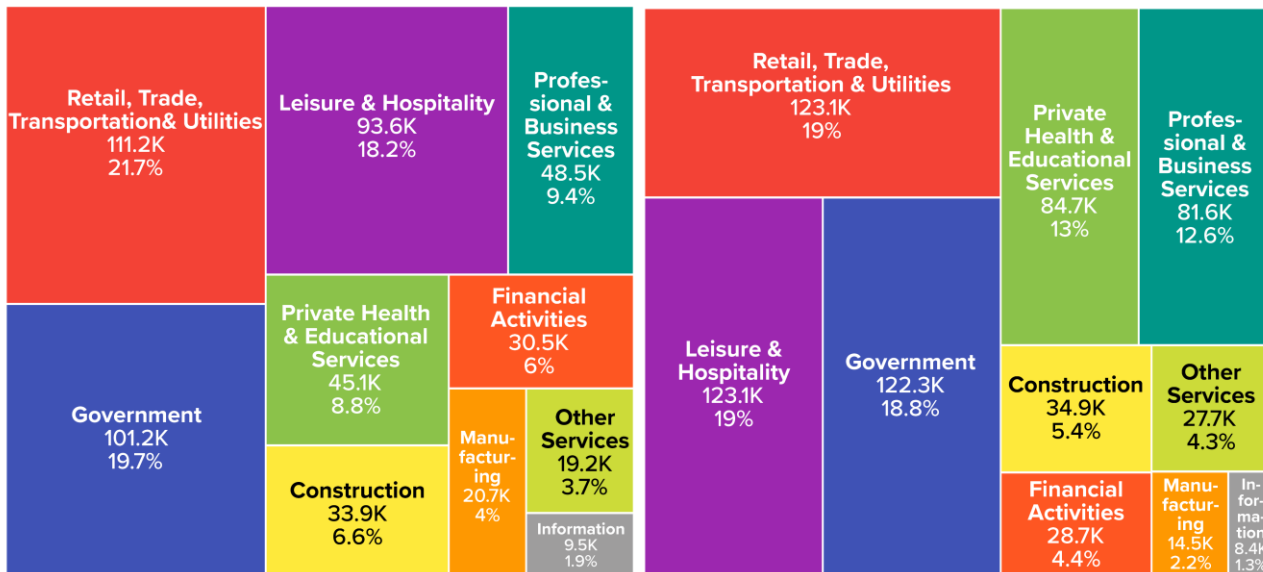
James Bay, Quebec Source: unknown

Compare

Breakdown of Hawaii Jobs by Industry

1990

2018

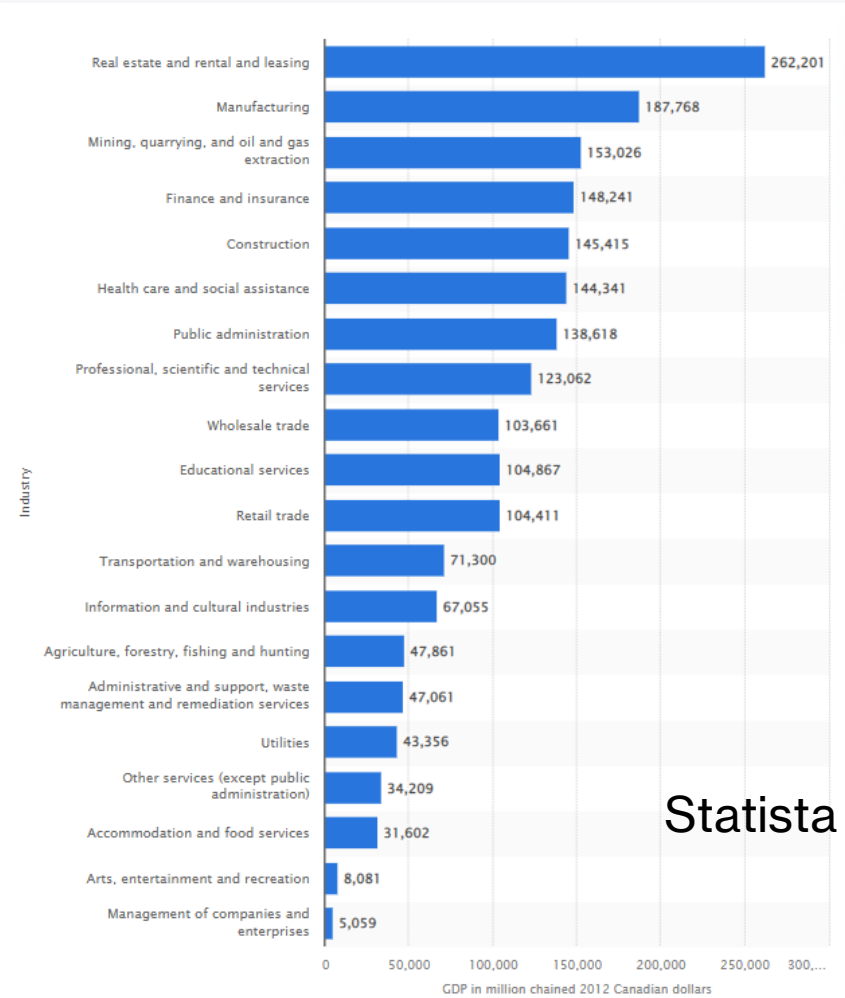


Graphic doesn't include agriculture jobs
 Source: Hawaii Dept. of Labor and Industrial Relations, Research and Statistics Office, CES Program

Carlie Procell/Civil Beat

Economy & Politics / Economy

Gross Domestic Product (GDP) of Canada in June 2021, by industry (in million chained 2012 Canadian dollars)



Statista

Mandating Renewables = #Billions4Blackouts for Canada

 **CBC report says:**

- *Unlike the state-based standards in the U.S, Canada's incoming national standard could provide a unifying role in a country where electricity is controlled provincially.*
- *Jeyakumar [Pembina Institute] thinks that policy signal is particularly important to support building interprovincial transmission to harmonize regions' renewable energy capacity. "The investments needed in doing something like this requires a national-level effort," she said.*

<https://blog.friendsofscience.org/2021/10/20/what-you-really-need-to-know-about-renewable-energy-that-the-pembina-institute-wont-tell-you-parts-a-and-b/>



National Wind-Hydro Grid? Hard NO.



[http://faculty.geog.utoronto.ca/Harvey/Harvey/papers/Harvey%20\(2013,%20Wind\).pdf](http://faculty.geog.utoronto.ca/Harvey/Harvey/papers/Harvey%20(2013,%20Wind).pdf)

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The potential of wind energy to largely displace existing Canadian fossil fuel and nuclear electricity generation

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ABSTRACT

The potential of wind-generated electricity to displace existing fossil fuel and nuclear generation in Canada is assessed by combining wind turbine power curves with data from the Canadian Wind Energy Atlas. There are many widely-scattered regions with capacity factors (average power output as a fraction of the rated output) greater than 0.4, and some greater than 0.5, that could supply many times the current electricity production from fossil fuel and nuclear powerplants in Canada. By linking multiple high-wind regions to the major demand centres with high voltage direct current transmission lines, the variation in the aggregate electricity output at time scales of one week or less would be greatly reduced, while variations at longer time scales can be largely offset through anti-phase operation of hydro-electric reservoirs. Assuming onshore and offshore wind farm capital costs of about \$2000/kW and \$3000/kW, respectively, onshore and offshore transmission line costs of \$0.5/kW/km and \$0.75/kW/km, respectively, and terminal costs of \$250/kW, the cost of electricity (financed at a real interest rate of 3%/yr) is 5–7 cents/kWh, which is less than the likely cost of electricity from new coal powerplants equipped to capture CO₂ (at least 9 cents/kWh) or from new nuclear powerplants (10–23 cents/kWh).

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1. Introduction

There is a strong scientific consensus that continued emissions of greenhouse gases and associated warming of the global climate poses serious risks to the well-being of human societies and ecosystems worldwide [1–3]. The atmospheric CO₂ concentration has increased from 280 ppmv prior to the industrial revolution to 392 ppmv by 2011 (a 40% increase), while other greenhouse gases have also increased in concentration due to human activities, resulting in the heat-trapping equivalent of a 70–90% increase in CO₂ concentration already (see Table 2.12 of [4]). There is comprehensive widespread independent evidence that the even-

mere 1 °C warmer than pre-industrial (during the previous interglacial period, about 120,000 years ago), sea level is estimated to have been 6.6–9.4 m higher than at present [7], while the last time the global mean climate was 2–3 °C warmer (during the early Pliocene, 5–6 million years ago), sea level was likely 15 m higher than present according to a recent estimate [8]. Clearly, large and rapid reductions in emissions of CO₂ and other greenhouse gases are required on a worldwide basis if these risks are to be significantly reduced, with near elimination of fossil fuel CO₂ emissions within this century. As the generation of electricity from fossil fuels accounts for about 25% of current global greenhouse emissions [9], near-elimination of electricity-related emissions will require

National Blackouts. Impossible Parameters. Ridiculous Costs.



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Power Generation Information on Difficulties of Instituting the Proposed Wind-Hydro National Grid Network in “Acting on Climate Change”

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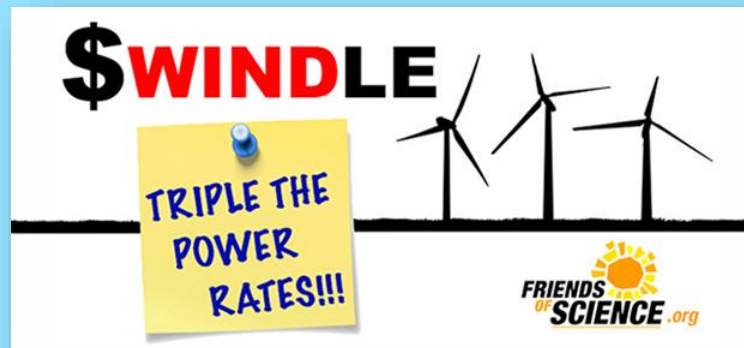
INFORMATIONS EN MATIÈRE DE PRODUCTION D'ÉNERGIE SUR LES DIFFICULTÉS D'ÉTABLIR UN RÉSEAU NATIONAL HYBRIDE ÉOLIEN...

<https://blog.friendsofscience.org/2015/09/29/power-generation-information-on-difficulties-of-instituting-the-proposed-wind-hydro-national-grid-network-in-acting-on-climate-change/>

<https://blog.friendsofscience.org/2015/09/29/power-generation-information-on-difficulties-of-instituting-the-proposed-wind-hydro-national-grid-network-in-acting-on-climate-change/>

Not so simple or ‘free.’

“Unfortunately, the Albertan consumers are used to an average price, based on AESO [2] reports, of only \$30/MW. Asking them to pay an almost 500% premium over that to justify constructing and connecting the concept line would appear to be fraught with difficulties.”



Design Considerations of a Real-World Interprovincial Energy Corridor Transmission Line

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Abstract—As an engineer sworn to provide benefits to society, the author presents herein an analysis of some of the probable benefits attributable to an idea, popular in some segments of society, for the establishment of a cross-Canada energy corridor containing both pipelines and power transmission line(s).

Keywords—power transmission; direct current; line losses

I. INTRODUCTION

For more than a decade various proponents, for various reasons, have proposed that a defined energy corridor should be designated from eastern Canada to western Canada. Eastern proponents see this as an opportunity to replace coal fired electricity generation with their apparently abundant hydro and renewable based power. Western proponents see it as an opportunity to construct pipelines allowing oil and gas to be delivered to Eastern Canada.

While there are existing oil and gas pipelines delivering products at least as far east as Ontario, new pipelines farther east have been stymied by political objections for more than a decade now.

On the other hand, there are no, zero, power transmission lines connecting even Ontario to Saskatchewan or Alberta. Thus, no opportunities exist to use electricity sourced from renewables and non-fossil fueled sources in Quebec or Ontario to replace fossil fueled sources in Saskatchewan or Alberta.

This paper examines what such a power transmission line

II. CONCEPTUAL DESIGN

A. Summary

The design concepts presented below are not intended to be exhaustive in scope sufficient to allow construction, but merely functional so that realistic estimates of performance, cost, and schedule, may be made to inform later discussion.

B. Starting Point

The area around Sudbury, Ontario has much experience with heavy industrial activities and consequently has a number of various capacity transmission lines already present, so without more specificity, this area is chosen as the starting “point” for the first energy corridor power transmission line.

C. Termination Point

A number of existing and former coal-fired power stations exist in south-central Alberta. For the purposes of this design, and ease of access, the area around Brooks, Alberta is chosen as the termination “point” for this first line.

D. Length of Line

The two named locations are served by the trans-Canada

Quebec Hydro resources are not unlimited. Neither are BC's.

How COVID-19 is reshaping Canada [Read More>](#)

FINANCIAL POST

pandemic it was actually growing three times faster than population – Quebec would need around 37,350 MW just to recharge its converted electrical automotive fleet every day. That's almost as much as the province's peak demand in winter!

<https://financialpost.com/opinion/if-oil-and-gas-are-dead-so-is-much-of-quebecs-economy>

Apr 23, 2019

Report: BC Hydro acts to address record low reservoir levels

VANCOUVER: Despite extreme weather leaving reservoirs at record low levels over the winter and challenges related to the Enbridge gas pipeline explosion, BC Hydro managed to meet the electricity demand while keeping rates low over the past several months.

A new BC Hydro report titled "[Generational challenge: How B.C.'s generation system is adapting to extreme weather and unforeseen events](#)" found the past 12 months demonstrate how extreme weather in B.C. can impact BC Hydro's reservoir levels. While BC Hydro has a lot of experience managing reservoir levels in low water years, October brought an unexpected challenge – the catastrophic Enbridge pipeline explosion – which impacted wholesale market prices by creating an increased demand for electricity to replace gas-generating units that would have otherwise been able to run, and required BC Hydro's planners to secure a sufficient supply of electricity to meet the needs of British Columbians over the winter.

Following a dry summer, BC Hydro's reservoirs were below normal, and by October, its two biggest reservoirs – Williston on the Peace River and Kinbasket on the Columbia River – reached record seasonal lows. In fact, dry conditions in the Williston basin resulted in four consecutive months of low inflows, with September, October and November being the third, second and fourth lowest in 60 years.

https://www.bchydro.com/news/press_centre/news_releases/2019/report-reservoir-levels.html

Why not store wind and solar excess power in batteries?

- Let's assume we want to supply these dozen homes with solar and batteries only. Here's a picture of TransAlta's \$16 million, 20 MWh battery energy storage facility being built near Pincher Creek. According to the [Calgary Herald article](#) from which this picture was taken, [6] the project consists of three Tesla lithium ion battery storage groupings and is slightly smaller than a soccer pitch.
- So, the cost of battery backup for each home's solar energy system would be \$1.3 million—and that would have to be repeated every ten years, which is the expected battery life. Now, imagine one of these for every dozen homes in your neighbourhood.

<https://blog.friendsofscience.org/2021/05/04/electricity-from-the-sun-reality-versus-fantasy/?highlight=electricity%20from%20the%20sun>



Electric Vehicle Standard demands 10,000 additional MW in power generation for Canada

- At perfect efficiency, impossible, more than 10,000 megawatts of additional electrical generation capacity are required for Canada to be 100% electric passenger cars by 2040.
- At the present time, there are two large power projects being built in Canada, Site C in BC and Muskrat Falls in NL. Combined, they have a capacity of 1,924 megawatts, if they meet their design capacity.

<https://blog.friendsofscience.org/2019/05/13/electric-vehicle-considerations-for-canada/>

- The existing projects have taken or will take more than five (5) years to reach production.
- There are no other large power generation projects even being contemplated in Canada currently. **To meet the 2040 stated objective at least eight (8) more projects, of about the sizes being built, are required.**
- In addition to the power generation, large amounts of additional electrical infrastructure will be needed to deliver the newly generated power to locations where it will be needed. None is planned now. *(Costs are in the **hundreds of billions or trillions** – the 500 kV transmission line from Calgary to Pincher Creek wind farms cost \$2.2 billion dollars. Additional upgrades would be required for most distribution lines (within neighbourhoods) and transformers and the IT infrastructure at the electric system operation, which may be in the 9 figures.)*

What of Geothermal for Canada?

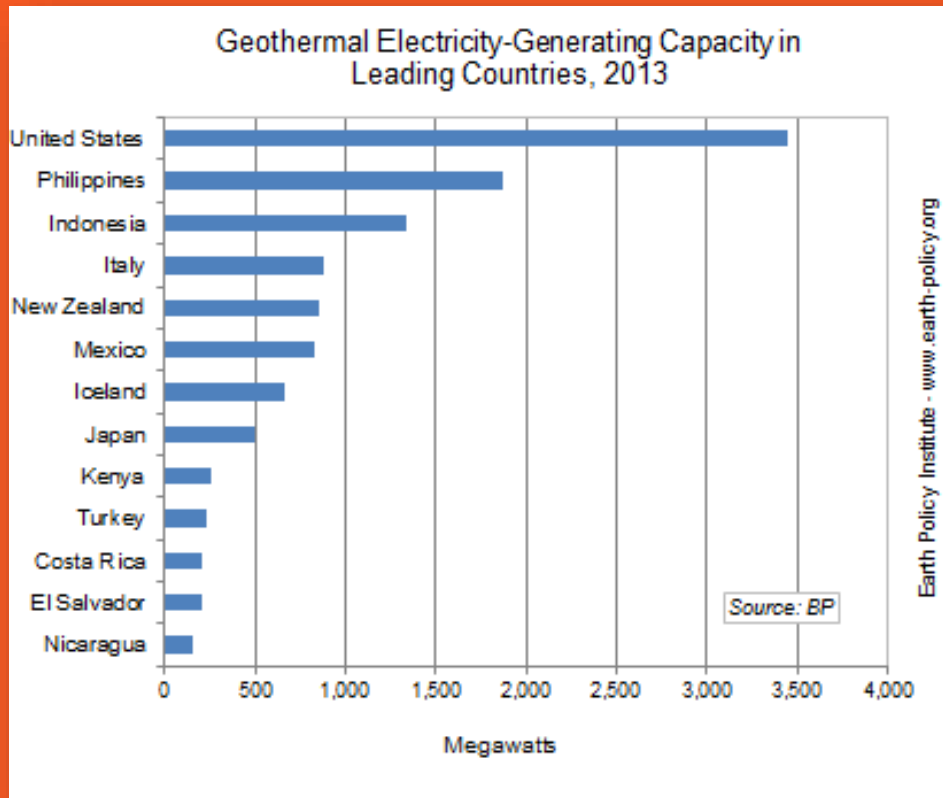
- ...as with many 'nature-driven' power generation proposals like wind and solar, proponents often say geothermal will tap into 'free' energy from the earth. A study by Majorowicz and Grasby (2019) indicates that geothermal energy simply cannot compete with the power generation provided by conventional fossil fuels, and **the costs are exorbitant**, except in certain unique geographic situations.
- Best geothermal resources are far from urban hubs.
- Canada's extreme temperature differential compounds the challenges.

Geothermal for Alberta? A Case for Caution



Friends of Science Society
6/20/2016 Rev Aug. 12, 2019

USA is the largest producer of geothermal in the world. Still, it only provides 0.4%



U.S. utility-scale electricity generation by source, amount, and share of total in 2021¹

Preliminary data as of February 2022

Energy source	Billion kWh	Share of total
Total - all sources	4,116	
Fossil fuels (total)	2,504	60.8%
Natural gas	1,575	38.3%
Coal	899	21.8%
Petroleum (total)	19	0.5%
Petroleum liquids	11	0.3%
Petroleum coke	7	0.2%
Other gases ³	11	0.3%
Nuclear	778	18.9%
Renewables (total)	826	20.1%
Wind	380	9.2%
Hydropower	260	6.3%
Solar (total)	115	2.8%
Photovoltaic	112	2.8%
Solar thermal	3	0.1%
Biomass (total)	55	1.3%
Wood	37	0.9%
Landfill gas	10	0.2%
Municipal solid waste (biogenic)	6	0.2%
Other biomass waste	2	0.1%
Geothermal	16	0.4%
Pumped storage hydropower⁴	-5	-0.1%
Other sources⁵	12	0.3%

¹ Utility-scale electricity generation is electricity generation from power plants with at least one megawatt (or 1,000 kilowatts) of total electricity generating capacity. Data on fossil electricity generation...

Carrots and Sticks don't change physics.

- She said the federal government's promised Clean Electricity Standard, which aims to support a net-zero electricity grid by 2035, will send another clear signal to investors and will incentivize spending on grid upgrades and intertie projects.
- "What this is going to do is put in regulatory carrots and sticks to make sure the grid decarbonizes," Jeyakumar said. "This is how policy can be really impactful."
- <https://www.ctvnews.ca/mobile/climate-and-environment/nation-building-investments-in-electricity-grid-needed-to-reach-net-zero-experts-say-1.5848490?cache=/7.406091/7.406091?contactForm=true>



Binnu Jeyakumar is the program director of electricity at the Pembina Institute. (Pembina Institute)

Ask the fundamental question. Why are we doing this?

- The annual emissions from cigarette smoking in Communist China is 36-million tonnes CO₂e
- ...which eclipses Hawaii's 21 million tonnes CO₂.
- The entire CO₂ emissions from domestic Canadian livestock is only 8-million tonnes CO₂e.
- As a tiny **island state**, Hawaii may benefit from some renewables.
- Canada is not tiny, not an island, is in a critically cold/hot climate, is a producer and manufacturer of goods that require high quality, affordable, reliable power that only conventional sources can deliver – coal, natural gas, hydro and nuclear.
- Likewise, Canadians need reliable, affordable power to survive seasonal extremes of temperature.

Canadian GHG emissions constitute a tiny part of global GHG emissions

In 2019, Canada carbon dioxide (CO₂) emissions were 556 megatonnes (Mt) which is equal to 1.6 per cent of global emissions.

China's CO₂ emissions in 2019 were 9,826 Mt (according to British Petroleum data). In other words, China emits in one month (819 Mt/month) about what Canada emits in one and a half years. The average growth in emissions in China over the past decade is 212 Mt per year. Thus, Canada's annual CO₂ emissions represent only 2.6 times China's emissions *growth*. **If someone could instantaneously wipe Canada off the map, so that it produced zero emissions forever after, this would have a modest-to-negligible effect on global carbon dioxide concentrations in the atmosphere in 2100, and it would make no difference whatsoever as to whether the IPCC emissions reduction targets (i.e. 1.5 degrees or 2 degrees C.) were met.**

Let that sink in.



<https://blog.friendsofscience.org/wp-content/uploads/2020/08/Futile-Folly-aug-2020-Reissued-FINAL.pdf>

Image licensed from Shutterstock.

Why do so many Canadian 'snowbirds' spend Christmas holidays in... Hawaii?

Sun. Tropical warmth. Seas.

In 2019, prior to the pandemic, a total of 540,103 Canadians visited the Hawaiian Islands.



Foreign funded interests interfering in Canadian energy policies

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\$65,000	2018	Green Coast Enterprise Services, L3C
\$258,250	2018	Western Conservation Foundation
\$47,485	2018	New Jersey Climate Adaptation Alliance, a project of Rutgers University Foundation
\$525,000	2018	Pembina Institute for Appropriate Development <small>To support education and outreach to build a clean energy future.</small>
\$19,925	2018	Wildlife Management Institute, Inc.
\$172,000	2018	Citizens Action Coalition Education Fund Inc.
\$50,000	2018	Leadership Counsel for Justice and Accountability
\$123,000	2018	Environment California Research and Policy Center, Inc.

Has No One Read the Deloitte Report?

- Over the period under review, those 31 ENGOs accumulated over \$2.5 billion in assets, received \$897.5 million in foreign funding and received \$2.1 billion in government funding.
- Environmental Law Organizations, as a separate group, accumulated almost \$11 million in assets, had foreign funding of \$21.5 million and received \$7.8 million in government funding.

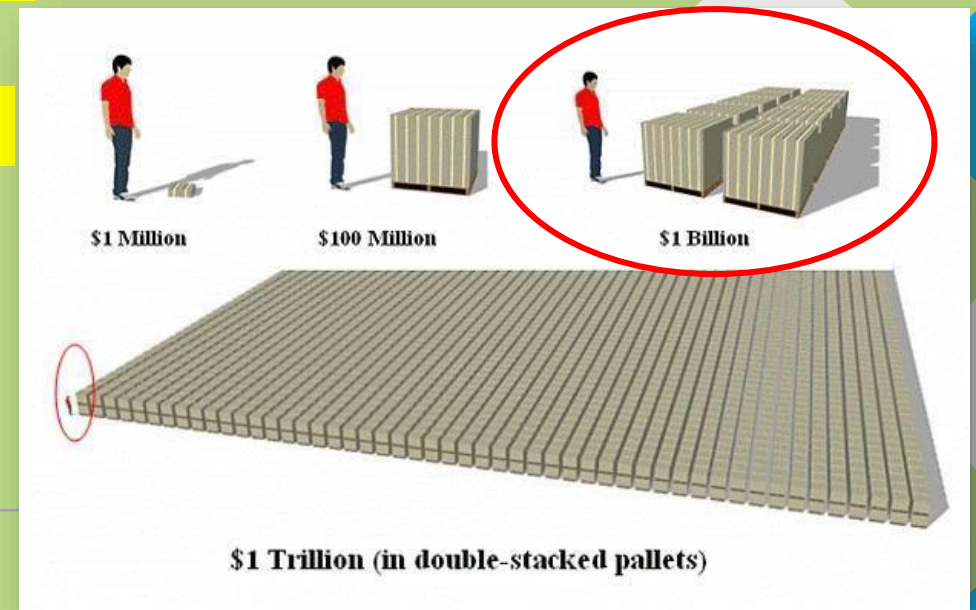
Deloitte.



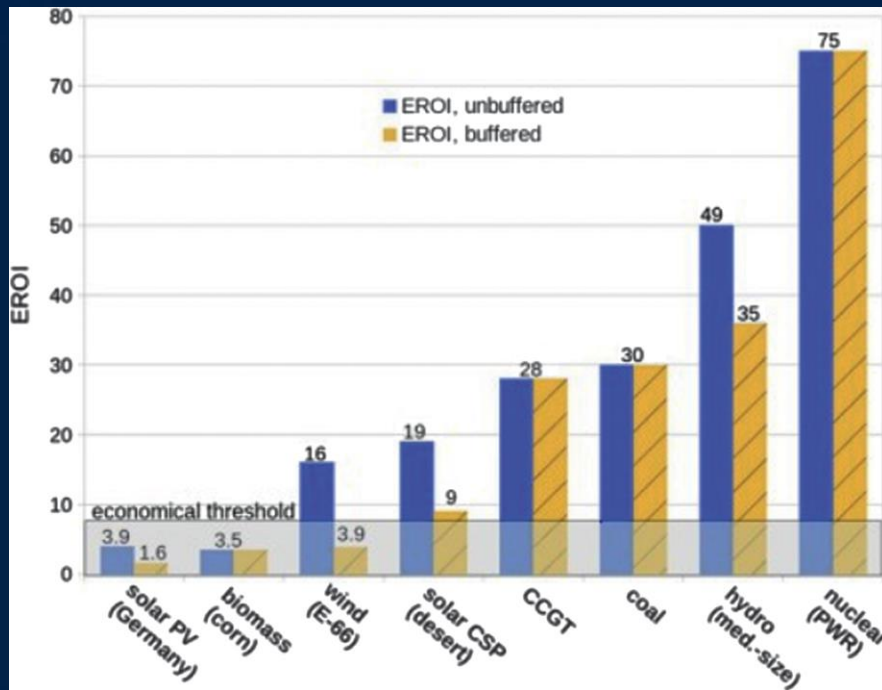
Accuracy. Fairness. Balance. Impartiality. And integrity.



- CBC's [Journalistic Standards and Practices](#). (JSP)
 - “The JSP is not merely a guide for the people who work at CBC/Radio-Canada. It is a key component of our promise to Canadians that the work we do is, first and foremost, a public service.”
 - *CBC receives over \$1 billion in annual funding from Canadian taxpayers*
- <https://www.cbc.ca/news/editorsblog/mcguire-journalistic-standards-practices-1.4623060>
 - <https://cbc.radio-canada.ca/en/vision/governance/journalistic-standards-and-practices>



What is the value of 'clean electricity'?



CLIMATE · Published November 25, 2014 · Last Update October 21, 2015

Google engineers say renewable energy won't solve climate change

By Maxim Lott | Fox News

<https://www.cambridge.org/core/journals/mrs-energy-and-sustainability/article/lessons-from-technology-development-for-energy-and-sustainability/2D40F35844FEFEC37FDC62499DDBD4DC>

<https://www.foxnews.com/science/google-engineers-say-renewable-energy-wont-solve-climate-change>

**“CO₂ is not a control knob
that can fine tune climate...”**

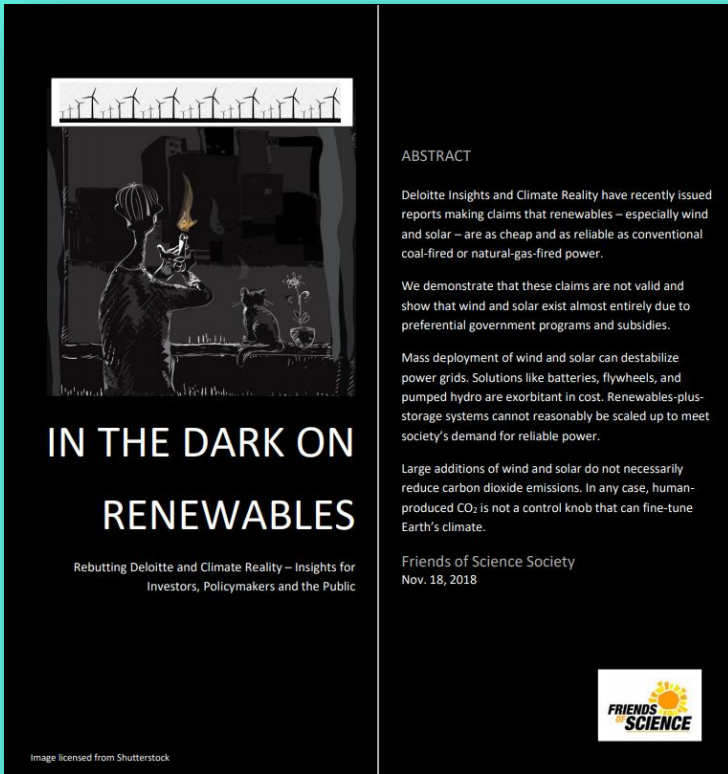


Judith Curry
Atmospheric Scientist
Georgia Tech


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PATTISON

Additional Resources



**IN THE DARK ON
RENEWABLES**

Rebutting Deloitte and Climate Reality – Insights for
Investors, Policymakers and the Public

Image licensed from Shutterstock

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ABSTRACT

Deloitte Insights and Climate Reality have recently issued reports making claims that renewables – especially wind and solar – are as cheap and as reliable as conventional coal-fired or natural-gas-fired power.

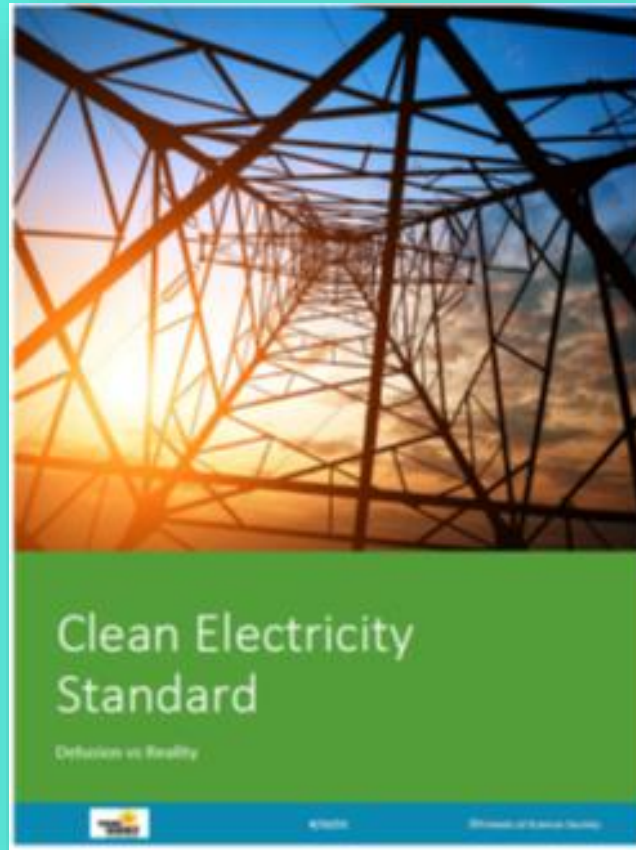
We demonstrate that these claims are not valid and show that wind and solar exist almost entirely due to preferential government programs and subsidies.

Mass deployment of wind and solar can destabilize power grids. Solutions like batteries, flywheels, and pumped hydro are exorbitant in cost. Renewables-plus-storage systems cannot reasonably be scaled up to meet society's demand for reliable power.

Large additions of wind and solar do not necessarily reduce carbon dioxide emissions. In any case, human-produced CO₂ is not a control knob that can fine-tune Earth's climate.

Friends of Science Society
Nov. 18, 2018

<https://blog.friendsofscience.org/2018/11/18/in-the-dark-on-renewables-rebutting-deloitte-insights-and-climate-reality/>

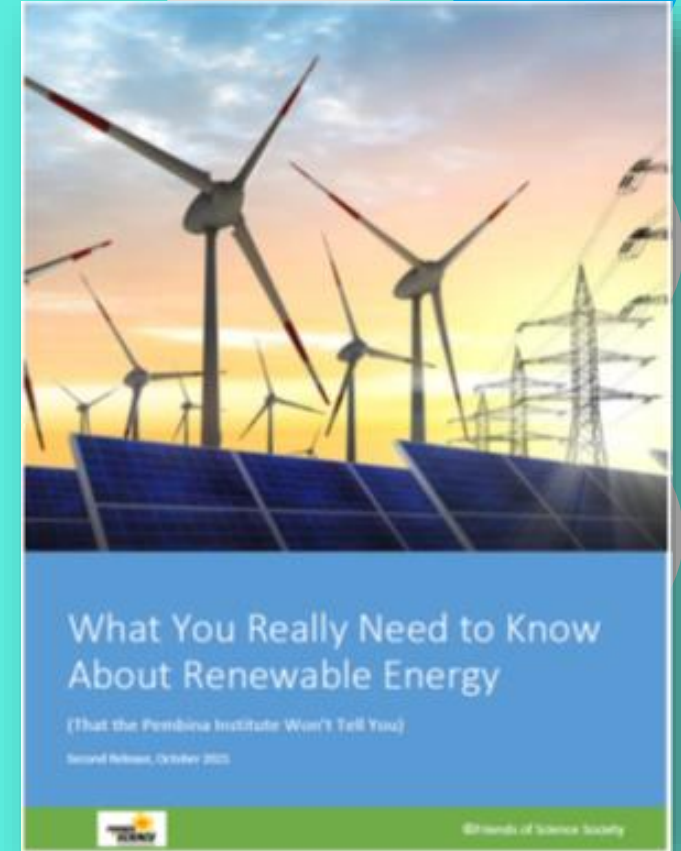


**Clean Electricity
Standard**

Delusion vs. Reality

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<https://blog.friendsofscience.org/2022/04/15/clean-electricity-standard-net-zero-2030-reality-vs-delusion/>



**What You Really Need to Know
About Renewable Energy**

(That the Pembina Institute Won't Tell You)

Second Edition, October 2021

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<https://blog.friendsofscience.org/2021/10/20/what-you-really-need-to-know-about-renewable-energy-that-the-pembina-institute-wont-tell-you-parts-a-and-b/>

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About Friends of Science Society

- Friends of Science Society is an independent group of earth, atmospheric and solar scientists, engineers, and citizens that is celebrating its 20th year of offering climate science insights. After a thorough review of a broad spectrum of literature on climate change, Friends of Science Society has concluded that the sun is the main driver of climate change, not carbon dioxide (CO₂).

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