

Alberta's Moratorium on Renewables

PRESENTED BY MICHELLE
STIRLING, COMMUNICATIONS
MANAGER

FRIENDS OF SCIENCE SOCIETY
©2023

PEMBINA institute

Subscribe Initiatives Events Careers

BLOG PUBLICATIONS

Alberta hits brakes on affordable electricity projects

Halting renewable energy will increase electricity rates while costing jobs and revenue for municipalities and landowners

Aug. 3, 2023

f t in



environmental defence

ISSUES BLOG ABOUT US REPORTS TAKE ACTION

For Immediate Release: August 03, 2023

Statement on the Government of Alberta's Moratorium on Renewable Energy Projects

Statement by Keith Brooks, Programs Director, Environmental Defence

Toronto | Traditional territories of the Mississaugas of the Credit, the Anishinaabeg, the Haudenosaunee, and the Huron-Wendat – At a time when over 100 wildfires are burning through Alberta, **the provincial government's moratorium on renewable energy** is another attack on climate action. This moratorium on renewable energy is bad for business, bad for the environment and bad for Albertans.

Scaling up renewable energy is essential to addressing the climate crisis. Alberta has been Canada's leading province for building renewable energy. Stopping now makes no sense. Albertans are already reaping the benefits of renewable energy: the creation of thousands of new jobs in communities across the province, billions of dollars in investments, and revenues for municipalities which are struggling with unpaid oil and gas taxes. This latest move threatens all of this.

Renewable energy is the cheapest source of new electricity generation. These new rules risk driving up the cost of energy bills at a time when Albertans are struggling with the cost of living crisis caused by dependence on fossil fuels.

Don't let Big Tech take away your news. [Subscribe](#)

CANADA'S NATIONAL OBSERVER

OPINION ANALYSIS CLIMATE SOLUTIONS SPECIAL REPORTS PODCASTS NEWSLETTERS CONVERSATIONS NEWS TEAM ABOUT

Danielle Smith opens a new front in her war against renewables

By Max Favocelli | Opinion, Politics | August 4th 2023

f t in



Alberta Premier Danielle Smith talks on fossil fuels at LNG2023 in Vancouver on July 15, 2023. Now, she's decided to stall major new wind and solar projects for six months. Photo by Max.

← Previous story [Listen to article](#)

Alberta's wind and solar industry is an unqualified success, one that's leading the country in new installations, attracting billions of dollars in investment and creating thousands of new jobs. Those new wind and solar farms produce electricity that's cost-competitive with natural gas even before the carbon price is factored in, and those costs are expected to be significantly cheaper than gas-fired power by 2030. And for some reason, a provincial government that prides itself on putting jobs and the economy above all other considerations is deliberately slamming the brakes on

Big News. Lots of Bluster.

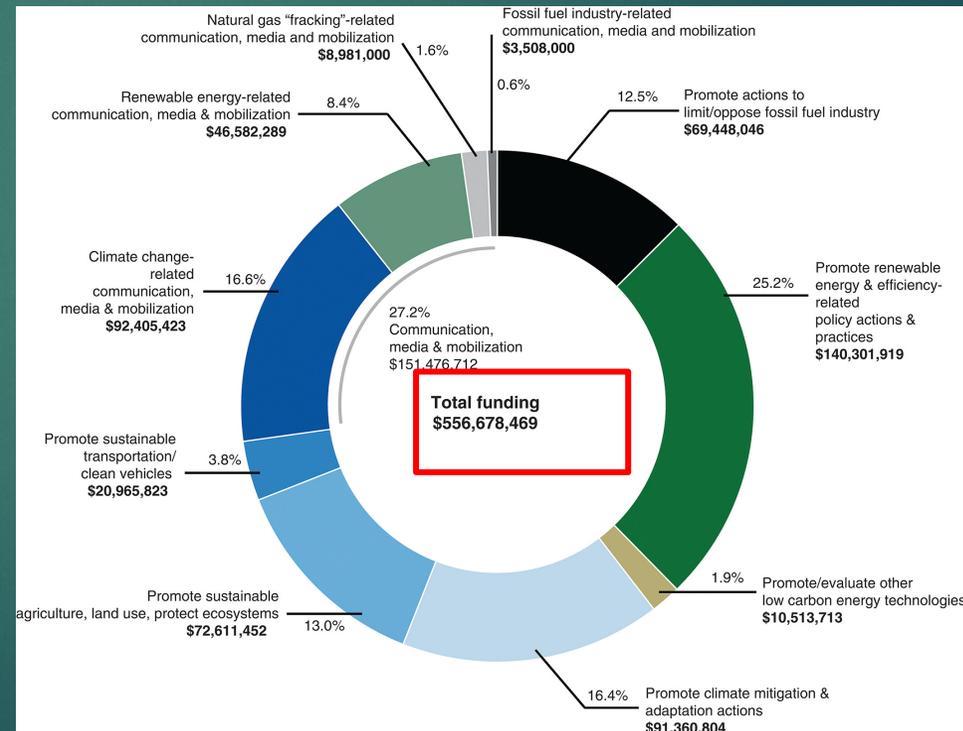
You'll Hear More Bluster from the Strathmere Group

- ▶ Parker Gallant: Pembina Institute, World Wildlife Fund, EcoJustice Canada, Nature Canada,* Sierra Club of Canada, Pollution Probe, Greenpeace, Environmental Defence, Equiterre, David Suzuki Foundation and the Canadian Parks and Wilderness Society.
- ▶ The Strathmere Group members: “*have over 358,000 members, 420 staff and annual budgets totaling over \$50 million.*”
- ▶ <https://parkergallantenergyperspectivesblog.wordpress.com/2020/09/08/the-strathmere-group-part-1/>
- ▶ **Boothroyd Communications: Strathmere Group (Greenpeace, Pembina Institute, WWF-Canada et al):** In 2014, we planned and facilitated the Toronto skills-building workshop *Campaigns and Communications 2014*, where directors from Canada's 12 leading environmental organizations learned from leading market researchers, journalists and organizers, and agreed to work on shared frames and messages in advance of the 2015 federal election. <http://www.boothroydco.com/clients-and-projects>

ClimateWorks Partners Fund ENGOs to push for Global Cap and Trade; Wind and Solar Generate RECs



https://web.northeastern.edu/matthewnisbet/wp-content/uploads/2018/05/Nisbet2018_ClimatePhilanthropy_WIREsClimateChange_Final.pdf





Contents lists available at [SciVerse ScienceDirect](#)

Energy

journal homepage: www.elsevier.com/locate/energy

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

L.D. Danny Harvey*

Department of Geography, University of Toronto, 100 St. George Street, Toronto M5S 3G3, Canada

ARTICLE INFO

Article history:

Received 3 June 2012

Received in revised form

28 November 2012

Accepted 2 December 2012

Available online 16 January 2013

Keywords:

Wind energy

Canada

Displacing fossil fuel and nuclear electricity

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).

© 2012 Elsevier Ltd. All rights reserved.

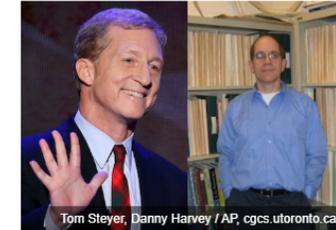
Steyer Panelist Wants Massive Tax Hikes, Smaller TVs

Experts: Panelist at NextGen event betrays environmental radicalism

[f](#) SHARE [t](#) TWEET [e](#) EMAIL

BY: [Lachlan Markay](#) [Follow @lachlan](#)

December 2, 2013 1:00 pm



Tom Steyer, Danny Harvey / AP, cgcs.utoronto.ca

[G+](#) [in](#) [v](#) [r](#) [p](#) [f](#)

The political activist group run by billionaire environmentalist Tom Steyer featured a Canadian speaker at a Monday event who has called for significant tax hikes and for people to give up their televisions to combat global warming.

Steyer's group, NextGen Climate Action, hosted Dr. Danny Harvey at a Monday event in Washington, D.C., titled "Can Keystone Pass the President's Climate Test?" Harvey has

previously called for massive amounts of government spending and significant levels of personal privation to stem "climate change."

Harvey, a geography professor at the University of Toronto, said in a [2010 interview](#) that he believes that climate change is a "moral" issue, and that consumers must give up numerous modern luxuries in an effort to stem the rise of global temperatures, which have not actually increased since the 1990s.

[Liberal.ca](http://liberal.ca)
 Liberal Party of Canada

Stay informed
 Sign up for email updates

Find your riding
 Enter postal code

Adobe Flash Player is no longer supported

The Liberal Team
 Prime Minister
 Cabinet
 Members
 Senators
 National Executive
 Staff
 Associations
 Committees

About Us
 History
 Philosophy
 Documents

Home >

2005 Biennial Convention

March 3 to 6, 2005, Ottawa, Ontario

[Return to policy resolutions](#)
[Print page](#) [Send to a friend](#)

TRANSPORTATION/INFRASTRUCTURE

[Transportation](#)
[Transporation](#)
[Gulf Ferry Service](#)
[East / West Power Grid](#)
[Port Infrastructure and Financing](#)

WHEREAS the assurance of good transportation links is

East / West Power Grid

WHEREAS Canada is committed to meeting its targets for greenhouse gas emissions set out in the Kyoto Protocol to the United Nations Framework Convention on Climate Change;

WHEREAS Canada has abundant renewable energy resources in the form of alternative fuels (such as ethanol and hydrogen), hydro-electricity and wind power;

WHEREAS there is a robust infrastructure in place that is able to transport electricity north-south to energy markets in the United States, but no such infrastructure exists to support the east-west transfer of electricity;

WHEREAS an east-west power grid will allow renewable energy initiatives that harness wind, small hydro-electric and biomass energy sources that would otherwise remain undeveloped;

BE IT RESOLVED that the Liberal Party of Canada urge the Government of Canada to support the construction of an east-west power grid that will be the "clean energy highway" of the future, and will make Canada a leader in renewable energy production and technology;

BE IT FURTHER RESOLVED that the Liberal Party of Canada advocate that the east-west power grid be supported through strategic infrastructure funding and through the provision of emission credits in Canada's energy emission trading system.

(Manitoba)

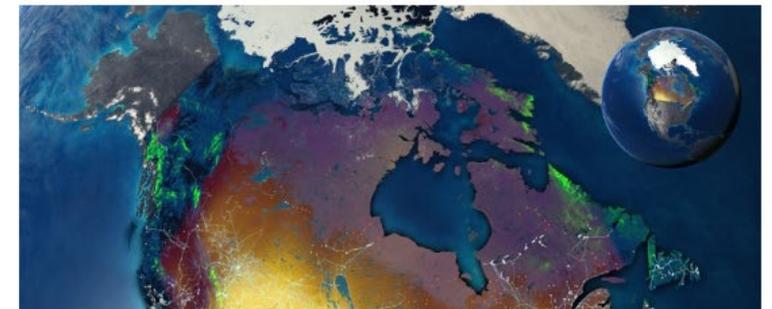
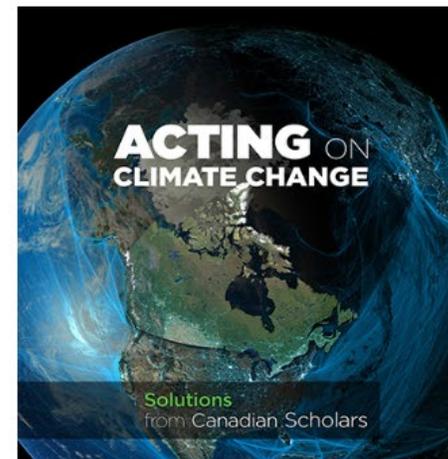
ACTING ON CLIMATE CHANGE: SOLUTIONS FROM CANADIAN SCHOLARS

Acting on Climate Change: Solutions from Canadian Scholars is a scholarly consensus on science-based, viable solutions for greenhouse gas reduction. It was produced by Sustainable Canada Dialogues, an initiative under the UNESCO- McGill Chair for Dialogues on Sustainability and the Trotter Institute for Science and Public Policy. Sustainable Canada Dialogues has mobilized over 60 Canadian scholars from every province, representing climate change expertise in areas from engineering to sociology.

[\[Download the summary\]](#)

[\[Download the position paper\]](#)

With its vast potential of renewable resources, Canada could reach 100% low-carbon electricity production in 2035. Download the map below!



Elizabeth May
 @ElizabethMay

We can't make change without viable alternatives. An east-west electricity grid will fuel Canada's transition to renewable energy. Sign the petition!

petitions.ourcommons.ca/en/Petition/De...

11:20 AM · Jun 24, 2020 · Twitter Web App

67 Retweets 10 Quote Tweets 129 Likes

the leap
manifesto

sign the
manifesto

who's on
board?

leap news

resources

blog

faq

get
involved

français

sign the manifesto >

so we need to leap.

This leap must **begin by respecting the inherent rights and title of the original caretakers of this land. Indigenous communities** have been at the forefront of protecting rivers, coasts, forests and lands from out-of-control industrial activity. We can bolster this role, and reset our relationship, by **fully implementing the United Nations Declaration on the Rights of Indigenous Peoples.**

“Small steps
will no longer
get us to where
we need to go.
So we need to
leap”.



Moved by the treaties that form the legal basis of this country and bind us to share the land “for as long as the sun shines, the grass grows and the rivers flow,” we want energy sources that will last for time immemorial and never run out or poison the land. Technological breakthroughs have brought this dream within reach. The latest research shows it is feasible for Canada to get 100% of its electricity from renewable resources within two decades^[1]; by 2050 we could have a 100% clean economy^[2].

We demand that this shift begin now.

There is **no longer an excuse for building new infrastructure projects that lock us into increased extraction decades into the future.** The new iron law of energy development must be: **if you wouldn't want it in your backyard, then it doesn't belong in anyone's backyard.** That applies equally to oil and gas pipelines; fracking in New Brunswick, Quebec and British Columbia; increased tanker traffic off our coasts; and to Canadian-owned mining projects the world over.

The LEAP
Manifesto

Lack of Dispatchable Capacity. Risk of Blackouts in Critical Times.

- Here is an excerpt from the AESO's Current Supply and Demand report taken at 23:59 on December 31, 2014. Dispatchable power = coal (6271) + gas (7143) + hydro (894) + other (409). Leaving off the "other" category, that's 14,308 MW.

Current Supply Demand Report

Legend
 DCR - Dispatched (and Accepted) Contingency Reserve
 MC - Maximum Capability

TNG - Total Net Generation
 *Indicates that the value reported in MC column actually represents the asset's MCR

Last Update : Dec 31, 2014 23:59
 All values listed are in MW

SUMMARY		GENERATION				INTERCHANGE	
		GROUP	MC	TNG	DCR	PATH	ACTUAL FLOW
Alberta Total Net Generation	9863	COAL	6271	5087	0	British Columbia	588
Net Actual Interchange	583	GAS	7143	3434	218	Montana	-3
Alberta Internal Load (AIL)	9280	HYDRO	894	180	125	Saskatchewan	0
Net-To-Grid Generation	7787	OTHER	409	294	0	TOTAL	583
Contingency Reserve Required	448	WIND	1434	868	0		
Dispatched Contingency Reserve (DCR)	481	TOTAL	16151	9863	343		
Dispatched Contingency Reserve -Gen	343						
Dispatched Contingency Reserve -Other	138						
LSSI Armed Dispatch	0						
LSSI Offered Volume	291						

- The second excerpt is from Dec. 22, 2022, 7:43AM. The dispatchable resource this morning is gas (10894) + hydro (894) + energy storage (70) + dual fuel (466) + coal (820). That's 13,144 MW. So, yes, we have 1000 MW less dispatchable power than we did in 2014.

Contingency Reserve

* Indicates a net-to-grid asset. The value reported in the MC column represents the asset's gross MW value
 * Indicates that the asset includes energy storage

Last Update : Dec 22, 2022 07:39
 All values listed are in MW

SUMMARY		GENERATION				INTERCHANGE	
		GROUP	MC	TNG	DCR	PATH	ACTUAL FLOW
Alberta Total Net Generation	11142	GAS	10894	9032	111	British Columbia	-420
Net Actual Interchange	-506	HYDRO	894	255	294	Montana	16
Alberta Internal Load (AIL)	11648	ENERGY STORAGE	70	0	68	Saskatchewan	-102
Net-To-Grid Generation	8226	SOLAR	1138	0	0	TOTAL	-506
Contingency Reserve Required	508	WIND	3618	280	0		
Dispatched Contingency Reserve (DCR)	579	OTHER	444	296	10		
Dispatched Contingency Reserve -Gen	483	DUAL FUEL	466	467	0		
Dispatched Contingency Reserve -Other	96	COAL	820	812	0		
LSSI Armed Dispatch	0	TOTAL	18344	11142	483		
LSSI Offered Volume	71						

Current Supply Demand Report

Legend

DCR - Dispatched (and Accepted) Contingency Reserve
MC - Maximum Capability

TNG - Total Net Generation
* Indicates that the value reported in MC column actually represents the asset's MCR

Last Update : Dec 31, 2014 23:59

All values listed are in MW

SUMMARY	
Alberta Total Net Generation	9863
Net Actual Interchange	583
Alberta Internal Load (AIL)	9280
Net-To-Grid Generation	7767
Contingency Reserve Required	448
Dispatched Contingency Reserve (DCR)	481
Dispatched Contingency Reserve -Gen	343
Dispatched Contingency Reserve -Other	138
LSSi Armed Dispatch	0
LSSi Offered Volume	291

GENERATION				
GROUP	MC	TNG	DCR	
COAL	6271	5087	0	
GAS	7143	3434	218	
HYDRO	894	180	125	
OTHER	409	294	0	
WIND	1434	868	0	
TOTAL	16151	9863	343	

INTERCHANGE		
PATH	ACTUAL FLOW	
British Columbia	586	
Montana	-3	
Saskatchewan	0	
TOTAL	583	

Source: The AESO

Contingency Reserve

* Indicates a net-to-grid asset. The value reported in the MC column represents the asset's gross MW value
^ Indicates that the asset includes energy storage

Last Update : Dec 22, 2022 07:39

All values listed are in MW

SUMMARY	
Alberta Total Net Generation	11142
Net Actual Interchange	-506
Alberta Internal Load (AIL)	11648
Net-To-Grid Generation	8226
Contingency Reserve Required	508
Dispatched Contingency Reserve (DCR)	579
Dispatched Contingency Reserve -Gen	483
Dispatched Contingency Reserve -Other	96
LSSi Armed Dispatch	0
LSSi Offered Volume	71

GENERATION				
GROUP	MC	TNG	DCR	
GAS	10894	9032	111	
HYDRO	894	255	294	
ENERGY STORAGE	70	0	68	
SOLAR	1138	0	0	
WIND	3618	280	0	
OTHER	444	296	10	
DUAL FUEL	466	467	0	
COAL	820	812	0	
TOTAL	18344	11142	483	

INTERCHANGE		
PATH	ACTUAL FLOW	
British Columbia	-420	
Montana	16	
Saskatchewan	-102	
TOTAL	-506	



GRID ALERT

December 20, 2022

The AESO is declaring an EEA-3 as of 16:47

4:45 PM
DECEMBER 20
2022

SUMMARY	
Alberta Total Net Generation	11396
Net Actual Interchange	-681
Alberta Internal Load (AIL)	12077
Net-To-Grid Generation	8566
Contingency Reserve Required	552
Dispatched Contingency Reserve (DCR)	555
Dispatched Contingency Reserve -Gen	453
Dispatched Contingency Reserve -Other	102
LSSi Armed Dispatch	95
LSSi Offered Volume	95

INTERCHANGE	
PATH	ACTUAL FLOW
British Columbia	-446
Montana	-173
Saskatchewan	-62
TOTAL	-681

Public Weather Alerts for Alberta

Click on a coloured region for the latest alert

GENERATION			
GROUP	MC	TNG	DCR
GAS	10894	9357	82
HYDRO	894	387	291
ENERGY STORAGE	70	0	68
SOLAR	1138	0	0
WIND	3618	47	0
OTHER	444	328	12
DUAL FUEL	466	466	0
COAL	820	811	0
TOTAL	18344	11396	453



DYING WITH RENEWABLES

Importing at a pool price of \$999/MW because there is not enough gas and coal capacity

Seven Grid Level 3 Energy Emergency Alerts in 2022 in Alberta

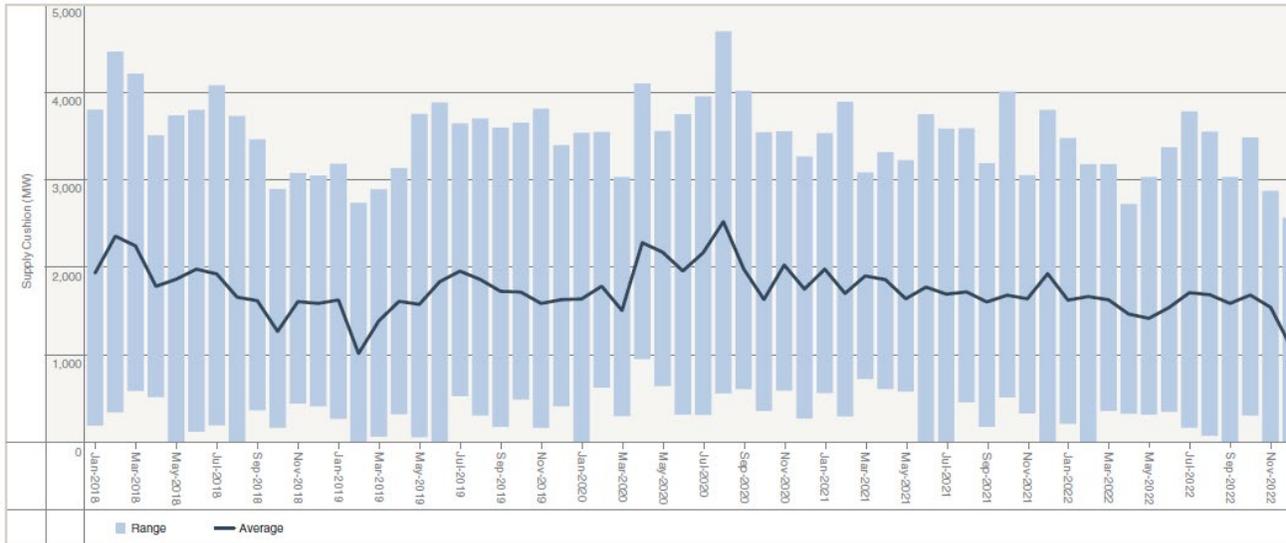
- ▶ there were seven Grid Alerts declared. When a Grid Alert is declared, the AESO is unable to meet minimum contingency reserve requirements and firm load interruption is imminent.
- ▶ During 2022, the AESO was able to manage the Grid Alerts such that no firm load was shed.
- ▶ The events occurred in the latter part of the year: two in September, one in November, and **four in December**.
- ▶ Each event occurred during a period of extreme seasonal demand and were accompanied by other precipitating factors including: intertie maintenance; low scheduled imports; unplanned thermal unit outages; thermal unit derates; **and low renewable generation**. One or more of these reasons led to each of the Grid Alert events.

▶ https://www.aeso.ca/assets/Uploads/market-and-system-reporting/2022_Annual_Market_Stats_Final.pdf



Reserve Margin is down; Demand is Up

FIGURE 21: Monthly supply cushion



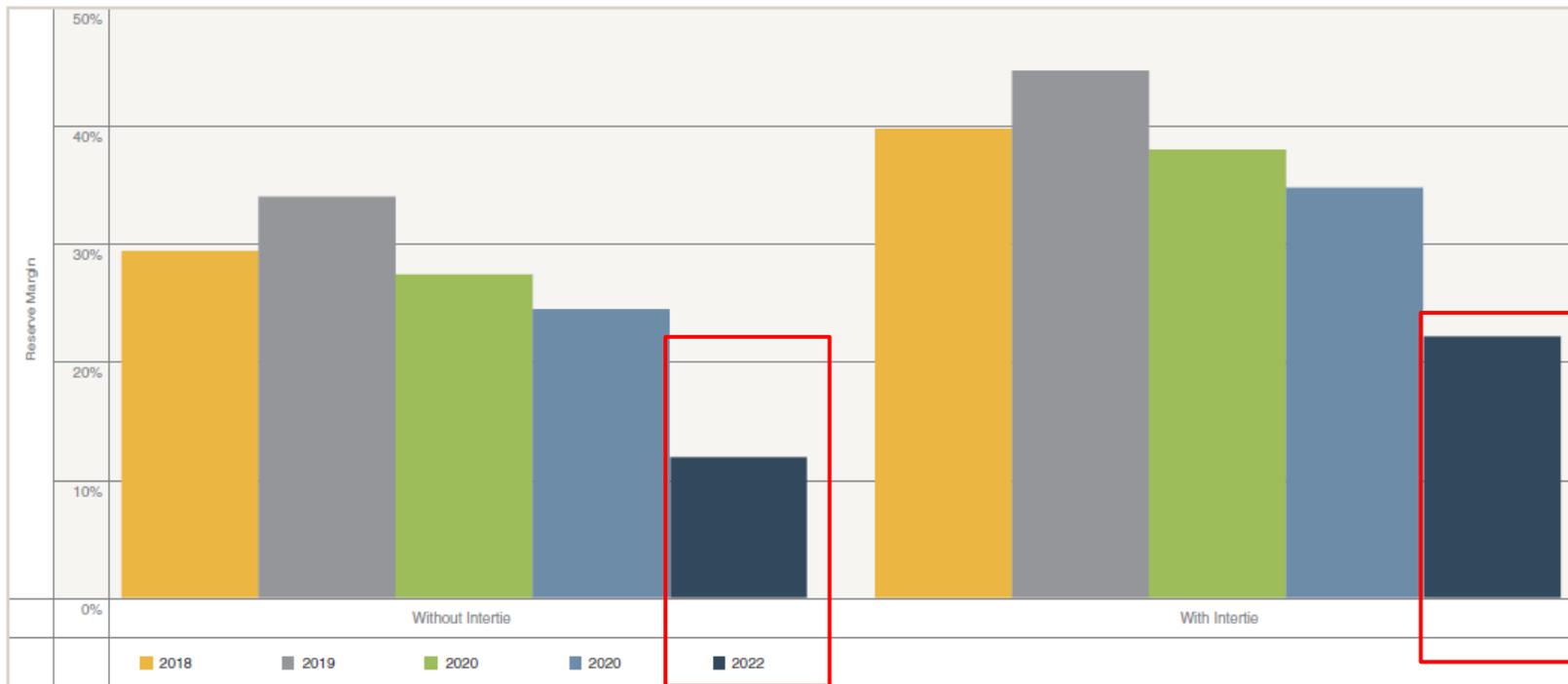
In 2022, Grid Alert events were declared seven times. ... high demand due to seasonally extreme temperatures and low wind generation accompanied each event.

The year-over-year decrease in the reserve margin was a result of approximately 670 MW less installed thermal unit capacity at year-end and an increase in the peak system load of approximately 460 MW.

Figure 22 shows the annual reserve margin over the past five years. In 2022, the annual reserve margin was 12 per cent without the inertia and 22 per cent with the inertia. [https://www.aeso.ca/assets/Uploads/market-and-system-reporting/2022 Annual Market Stats Final.pdf](https://www.aeso.ca/assets/Uploads/market-and-system-reporting/2022%20Annual%20Market%20Stats%20Final.pdf)

Low Reserve Margins!! Thankfully we have good neighbours!

FIGURE 22: Annual reserve margin



Intertie provides us with power – IF surplus is available – from Saskatchewan, Montana and/or BC

Too far. Too Fast.

Need to build additional conventional back-up generation

The study by the University of Calgary's School of Public Policy said the program has led to about \$100 million in payments to the province and saved another \$60 million in surrendered carbon offsets.

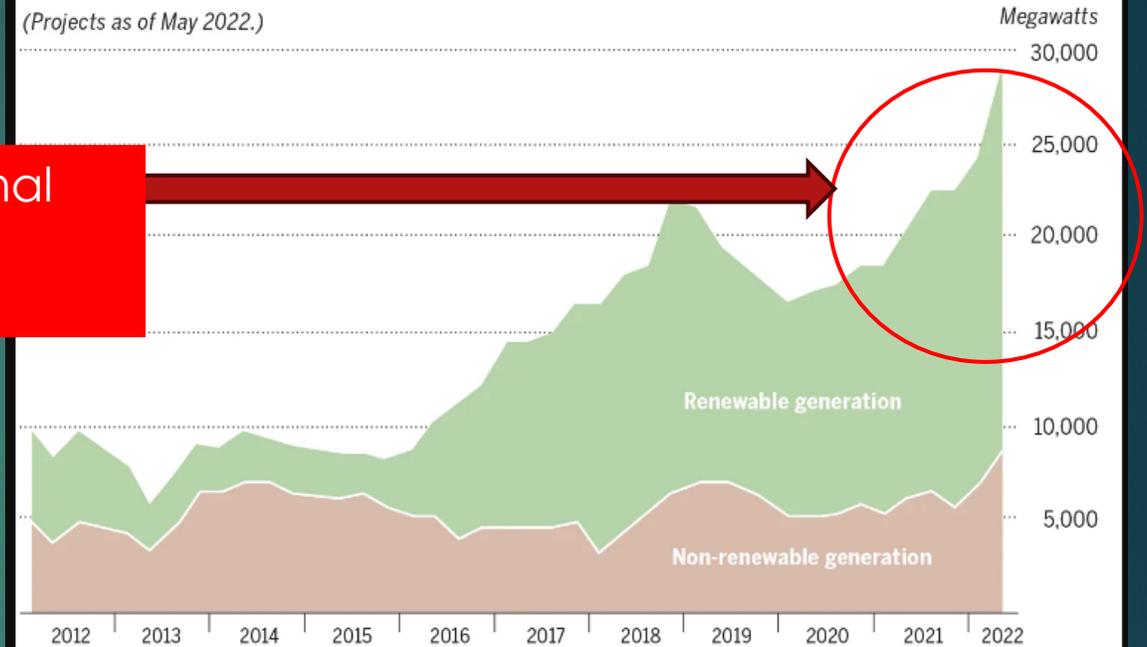
But will cost consumers BILLIONS.



<https://calgaryherald.com/opinion/columnists/varcoe-a-rush-in-alberta-province-sees-flood-of-renewable-projects-with-more-growth-to-come>

RENEWABLE POWER PROJECTS ON THE RISE

There is a growing lineup of proposed wind, solar and storage projects either being planned or under construction in Alberta. Here is how the generation capacity of those projects compares to proposed non-renewable projects:
(Projects as of May 2022.)



Breakdown of proposed and operational renewable generation and storage projects in Alberta, by intalled capacity in megawatts:

Stage	Solar	Wind	Storage
Operational	1,088	2,780	70
Under construction	1,188	2,359	2.9
Received AUC approval	1,309	1,043	312
Announced	10,529	5,462	5,415



How did we get here?

A Costly Diagnosis
 Subsidizing coal power with Albertans' health
 March 2013



Asthma.ca
 Asthma Society of Canada

Canadian Association of Physicians for the Environment

THE LUNG ASSOCIATION™
 Alberta & NWT

PEMBINA institute



ACCELERATED PHASE OUT OF COAL-FIRED POWER IN ALBERTA

We, the undersigned, support an accelerated phase out of coal-fired electricity generation in Alberta. Coal causes more pollution than any other source of electricity, including greenhouse gas pollution as well as air contaminants such as sulphur dioxide and mercury that pose health risks. Research shows the burning of coal contributes to over 100 deaths and more than 4,000 asthma episodes in the province each year.



We urge the Alberta government to develop and implement programs, policies and legislation to replace coal by ramping-up energy conservation and developing our world-class wind, solar and other renewable resources:



- BuEarth Renewables Inc.
- Bullfrog Power
- C Returns
- Carbon Busters
- Dandelion Renewables
- Great Canadian Solar Ltd.
- Greengate Power
- Howell Mayhew Engineering
- KCP Energy National Solar Distributors Inc.
- SkyFire Energy Inc.
- Alberta Green Economy Network
- Alberta Renewable Energy Alliance
- Alberta Wilderness Association
- Asqua Calgary
- Bow Valley Clean Air Society
- Broadbent Institute
- Calgary Climate Action Network
- Calgarian Citizens on Climate Change
- Central Athabasca Stewardship Society
- Child Wellbeing Institute
- Clean Energy Canada
- Coalition for a Healthy Calgary
- Council of Canadians
- CFWS Southern Alberta
- David Suzuki Foundation
- Eco-Air (Edmonton's Children's anti-idling Recruiters)
- Friends of Lily Lake
- Green Alternatives Institute of Alberta
- Greenpeace Canada
- KAIROS: Canadian Ecumenical Justice Initiatives, Calgary Committee
- Keepers of the Athabasca Watershed Society
- Mewasin Community Council
- National Asthma Patient Alliance
- Pembina Institute
- Public Interest Alberta

#ABcoal

albertacoalphaseout.ca

For more information on health impacts of coal, read *A Costly Diagnosis*: asthma.ca/pdf/costly-diagnosis.pdf

Acknowledgements

This research was made possible by generous financial support from the Oak Foundation, the Pembina Foundation as well as the Canadian Health and Environment Education and Research Foundation.

Foreign-funding to change policy





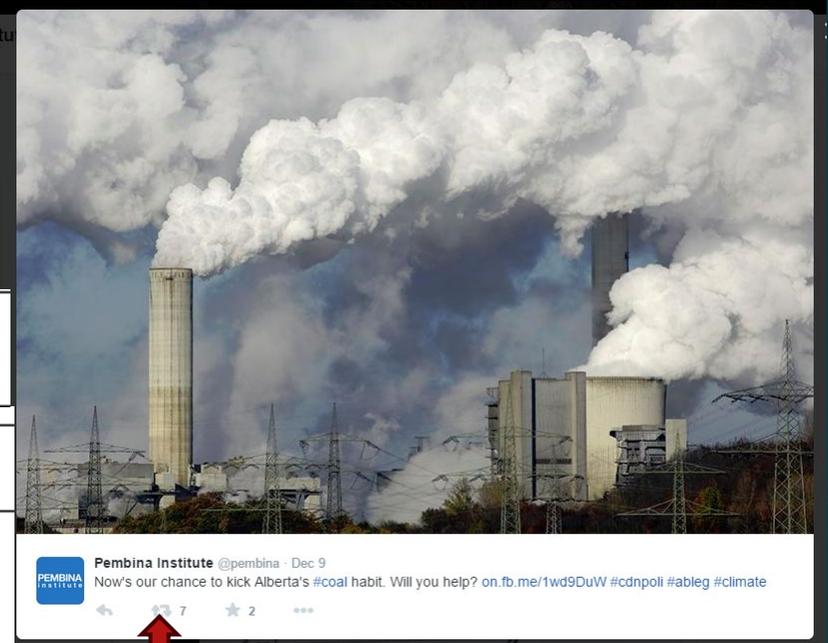
justice movements.



Pembina Institute	To develop scientifically accurate analysis of and raise awareness among the Canadian public on the need for slower and more environmentally responsible tar sands development. Pembina advances clean energy solutions through research, education, consulting and advocacy.	404'533	Canada	Environment	Climate Change	2012	24 months (1 Sep 2012-1 Sep 2014)
Pembina Institute	To cover the costs of organising and facilitating an international conference on renewable energy and the Clean Development Mechanism (CDM) that will be held in conjunction with COP11/MOP 1 in Montreal.	51'458	Canada	Environment	Climate Change	2006	7 months (1 Oct 2005-30 Apr 2006)
Pembina Institute	To elevate awareness of policies and targets for energy efficiency and renewable energy in Canadian national and provincial energy plans that will lead to: the regulation of large greenhouse gas emitters; the transformation of all energy-using sectors to high efficiency; the establishment of a major renewable energy infrastructure; and investment in low-carbon economies in developing countries.	479'678	United States	Environment	Climate Change	2007	24 months (1 Sep 2007-31 Aug 2009)
Pembina Institute	To establish federal and provincial policies in Canada that will support on-the-ground development of low-impact renewable energy, energy efficiency and conservation.	269'971	Canada	Environment	Climate Change	2005	24 months (1 Apr 2005-31 Mar 2007)
Pembina Institute	To ensure that emerging opportunities and interest in renewable energy and energy efficiency solutions are not thwarted by opposing forces; to develop and advocate for a suite of complementary sustainable transportation policies in key cities and provinces that reduce demand for fossil fuels and create cleaner and smarter transportation systems; and to equip US policy makers, media and environmental organisations with accurate and unbiased information about Canada's oil sands operations and climate policy.	484'106	Canada	Environment	Climate Change	2010	24 months (1 Sep 2010-31 Aug 2012)



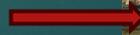
Pembina Institute	To develop scientifically accurate analysis of and raise awareness among the Canadian public on the need for slower and more environmentally responsible tar sands development. Pembina advances clean energy solutions through research, education, consulting and advocacy.	404'533
Pembina Institute	To cover the costs of organising and facilitating an international conference on renewable energy and the Clean Development Mechanism (CDM) that will be held in conjunction with COP11/MOP 1 in Montreal.	51'458
Pembina Institute	To elevate awareness of policies and targets for energy efficiency and renewable energy in Canadian national and provincial energy plans that will lead to: the regulation of large greenhouse gas emitters; the transformation of all energy-using sectors to high efficiency; the establishment of a major renewable energy infrastructure; and investment in low-carbon economies in developing countries.	479'678
Pembina Institute	To establish federal and provincial policies in Canada that will support on-the-ground development of low-impact renewable energy, energy efficiency and conservation.	269'971
Pembina Institute	To ensure that emerging opportunities and interest in renewable energy and energy efficiency solutions are not thwarted by opposing forces; to develop and advocate for a suite of complementary sustainable transportation policies in key cities and provinces that reduce demand for fossil fuels and create cleaner and smarter transportation systems; and to equip US policy makers, media and environmental organisations with accurate and unbiased information about Canada's oil sands operations and climate policy.	484'106



Pembina Institute @pembina · Dec 9
 Now's our chance to kick Alberta's #coal habit. Will you help? on.fb.me/1wd9DuW #cdnpoli #ableg #climate



This coal plant is not even in Alberta.



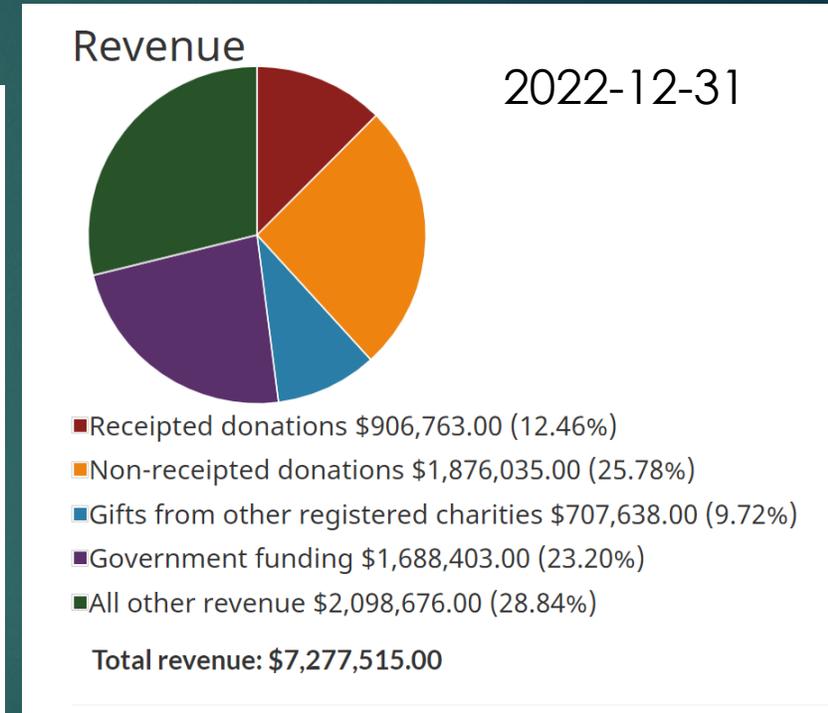
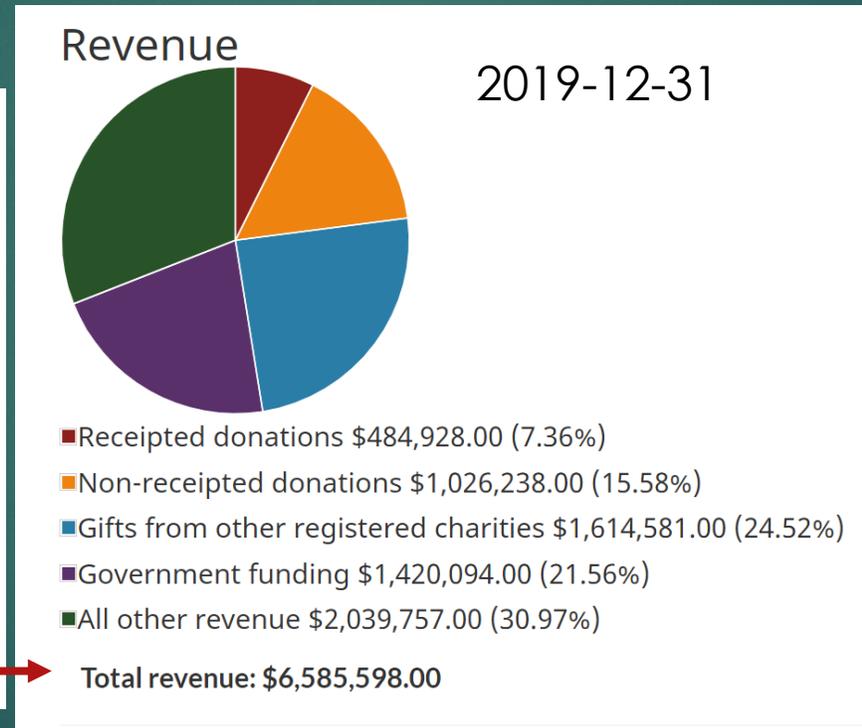
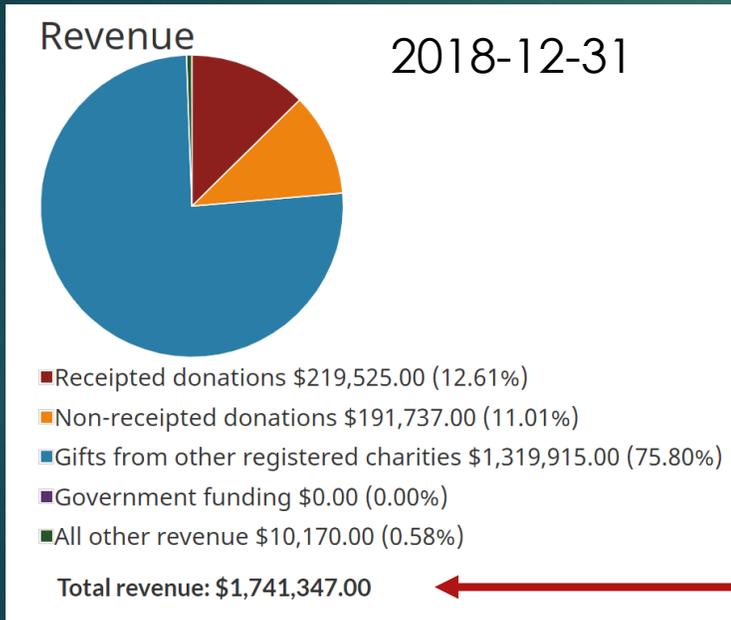
Genessee
<https://www.capitalpower.com/about-genessee/>



- Our Staff
- Board of Directors
- Our Partners
- Careers
- FAQ
- Financials
- Contact Us

\$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.

Pembina's Filings with Canada Revenue Agency



Coal phase-out gutted 30 communities; 7,000 jobs lost

BREAKING!
The Canadian government pledged up to **\$275 million** to fund the Coal Phase Out for other countries...



BUT HAS PROMISED ONLY \$35 MILLION FOR CANADIAN COAL JOBS THEY ARE PHASING OUT

SHARE IF YOU ARE TIRED OF TRUDEAU LEAVING CANADIANS BEHIND

Global NEWS **Calgary** **News & Radio Programs**

Change Location Newscasts, Radio, and Videos

World Canada Local Politics Smart Living Money Entertainment Health Commentary

BREAKING 37 secs ago **Elderly woman attacked with a sword in Bragg Creek**

CONSUMER November 18, 2015 5:31 am Updated: November 18, 2015 9

30 Alberta municipalities sound alarm over NDP plan to phase out coal power

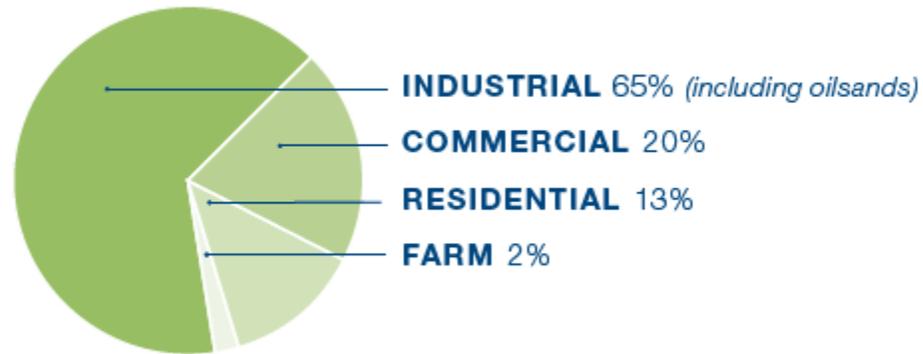
By Ian Bickis, The Canadian Press

AESO 2017 – Demand + Supply

We had energy security.

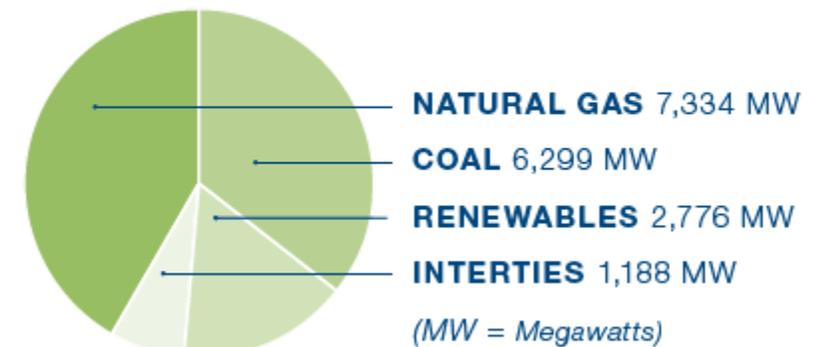
DEMAND

➤ Who consumes Alberta's electricity (2016 data)

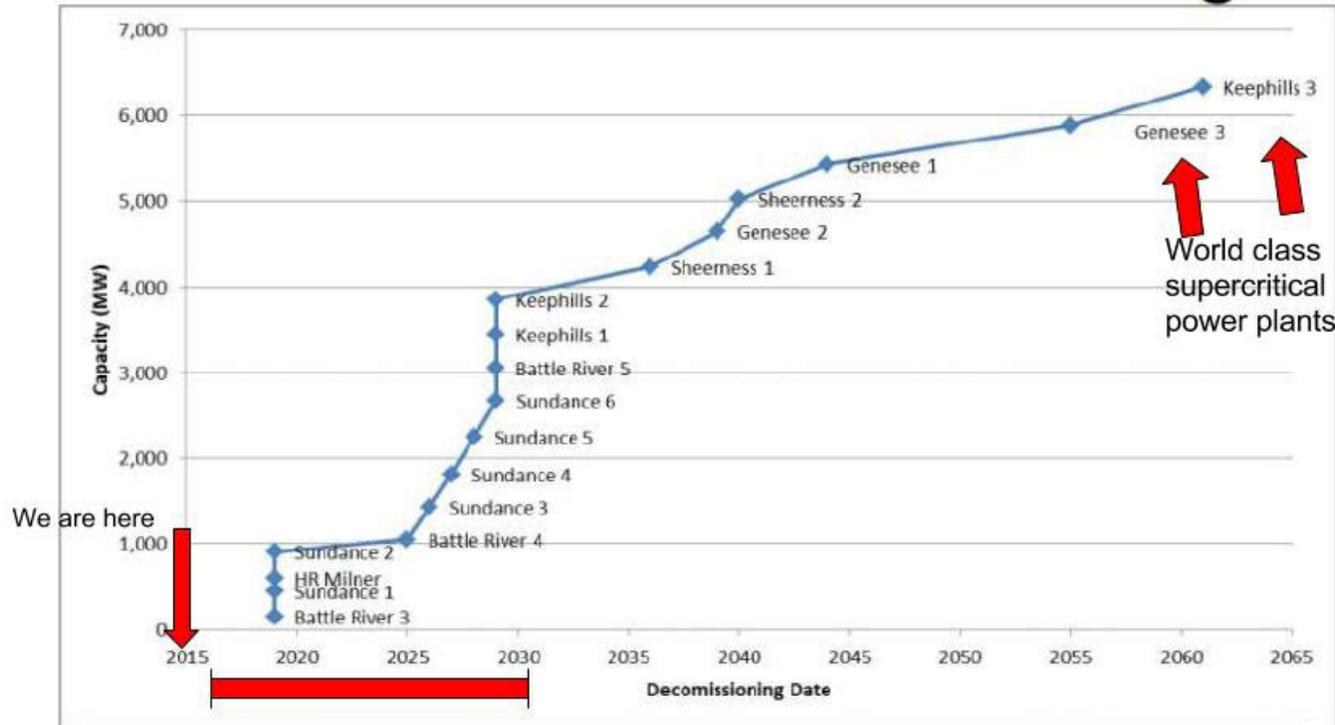


SUPPLY

➤ Our sources of electricity (2016 data)



Alberta Plant Decommissioning



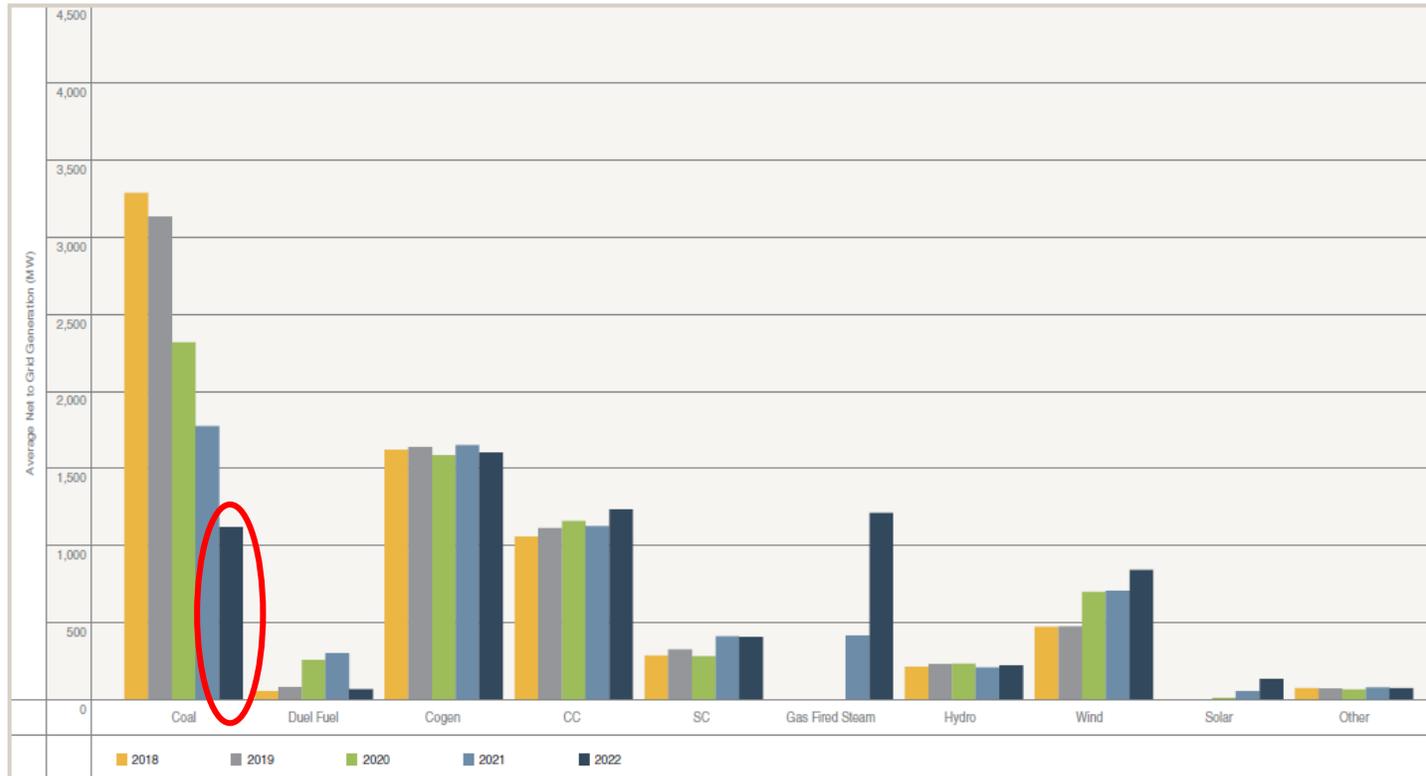
Early phase-out of coal-fired power plants would cost Alberta >\$11 BN (to transition to nat. gas) + hundreds of millions or billions to compensate coal owners, shareholders, employees, who have agreed to the the federal retirement schedule above.

What is the message to investors when Alberta tries changing Ottawa's word?

Prior to NDP push for early coal phase-out of ALL coal assets, the newest plants were going to be able to remain online to the end of their useful life. This would have provided Alberta with Energy Security. The oldest plants were already scheduled to be decommissioned.

Ironically, King Coal is still King

FIGURE 14: Annual average net-to-grid generation by technology



In 2022, [with only 820 MW of coal operational] coal assets had a capacity factor of 92 per cent—meaning for every 100 MW of installed capacity, coal assets generated 92 MW each hour.

About that NetZero 2035...

- ▶ Here is a definitive statement from an engineer at the AESO as to the annualized wind and solar generation in Alberta in 2022

*For 2022 the total wind generation was 7,314 GWh and the solar generation was 1,165 GWh. These **wind and solar generation represent 8.8% and 1.4% of the electricity generated in Alberta respectively.***

- ▶ So fossil fuel based generation is still above 80%. So much for net zero electricity in Alberta by 2035 !!

Issues with Renewables+ #NetZero

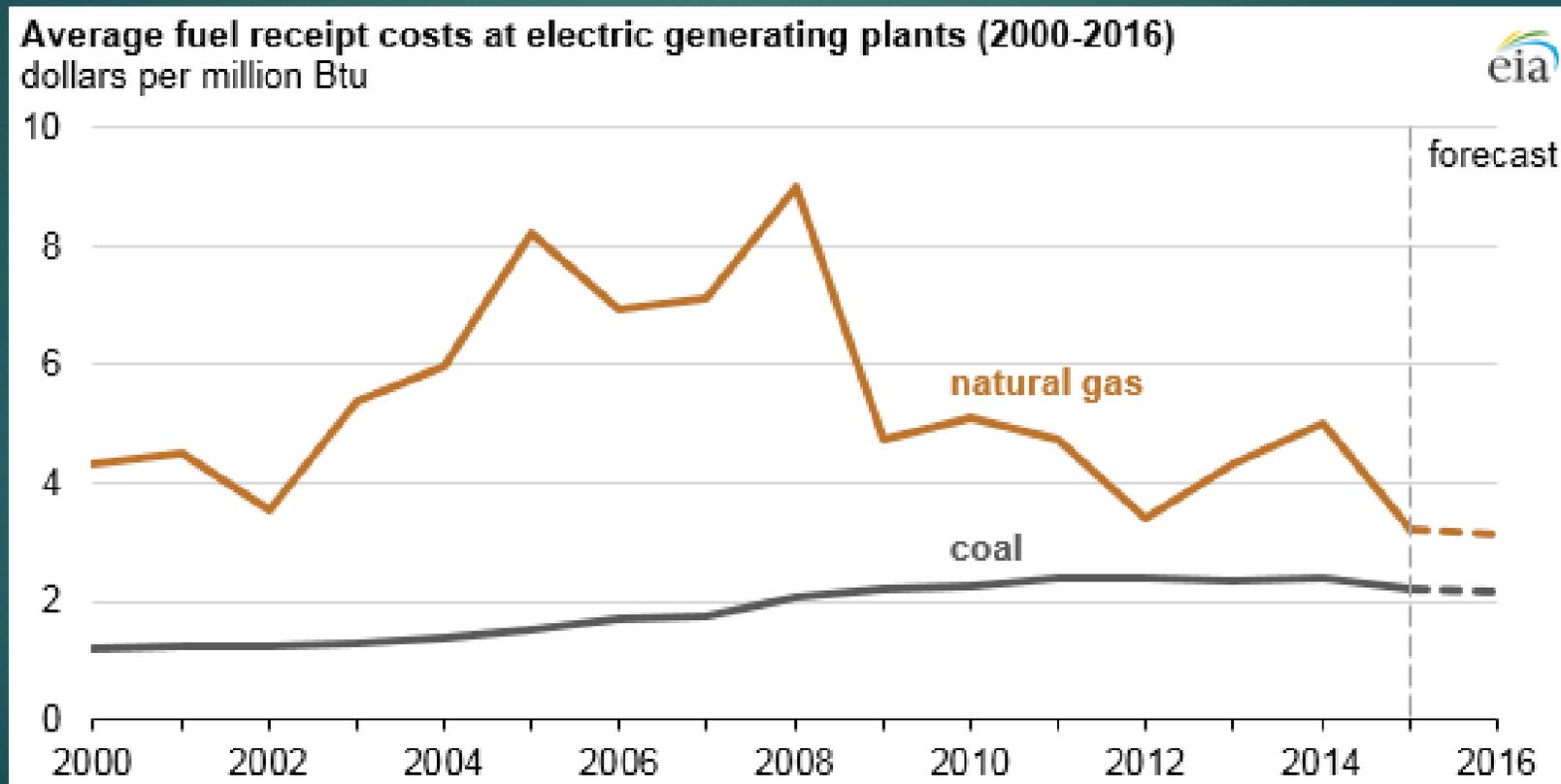
- ▶ Alberta has a 1,000 MW shortage of dispatchable power generation (versus what we had in 2015)
- ▶ Population is growing; industry is growing – more reliable power needed overall
- ▶ Niche markets like Electric Vehicles and ‘decarbonization’ for homes (i.e. moving to electrical heating instead of gas) will substantially drive-up demand
- ▶ Anti-natural gas ENGOs want to shut down natural gas use; Alberta’s grid is mostly natural gas fired today; 2 x ~1,000 MW new gas plants will soon go on-line
- ▶ Equipment and material supply chains may not be there for #NetZero plans
- ▶ Transmission and distribution upgrades are costing consumers a fortune
- ▶ Unreliable wind and solar drive-up power prices – they are not free or affordable
- ▶ Blackouts cause tremendous economic and reputational damage; can have catastrophic health consequences depending on how long they last.

Did we save the planet?

The problem with wind is its randomness, wind is completely uncorrelated with demand. If the Alberta gov't adds another 5,000 MW then the total wind capacity would be ~6,500 MW. Typically this amount of wind would randomly experience 80% or higher ramps one or more times per week. This would be the equivalent of ramping 6.5 Shepard natural gas plants from off to full to off again. These plants are unable to do this over the long term. They may end up having to put in simple cycle units instead which, from a CO₂ perspective, would pretty much defeat the purpose of adding wind. But it's never really been about reducing CO₂, it's all about building wind. And now solar with the new government statement about going 50% solar.

Energy Security:

Alberta owns 800 years of high quality, low-sulphur coal, surface mined.



ENERGY ENERGY

The global wind industry close to deflagration!

Fabien Bougle Tuesday, July 11, 2023 3:30 a.m.

On June 22, the announcement by Siemens Energy of serious difficulties linked to the aging of the components necessary for the manufacture of its wind turbines had the effect of a veritable bombshell, panicking international finance. In one day, the action of the world's second largest manufacturer of wind turbines fell 37% on the Frankfurt Stock Exchange, a loss in value of 8 billion euros.



INVESTIGATIONS AND ENERGY



An expert in energy policy, he is the author, among other things, of the book *Eoliennes: The dark side of ecological transition* published by Éditions du Rocher.

THE BLOGS WHAT IS THIS ?

Factual opens a blogging space, separate from the editorial office and with free access. We welcome guest bloggers, whom we have selected for the strength of their testimony or the acuity of their view of the world and society. We invite experts from multiple specialties (geopolitics, defence,

A composite image showing hands holding wheat stalks over a financial chart with a red arrow pointing to a peak. The background is a warm, golden light, possibly a sunset or sunrise over a field. The hands are in the foreground, holding several stalks of wheat. The financial chart is overlaid on the image, showing various data points and trends. A red arrow points to a peak in the chart. The overall theme is the intersection of agriculture and finance.

Alberta's Quality Farmland at Risk

Leaching of toxic elements, lack of decommissioning obligations or recycling

What to do with the waste? Working life ~20 years.



In addition to the landfill in Casper, landfills in Lake Mills, Iowa and Sioux Falls, South Dakota accept the discarded blades – but few other facilities have the kind of open space needed to bury the massive blades.



Neodymium Miners

Victims of the West's Obsession with 'Green'

Villagers Su Bairen, 69, and Yan Man Jia Hong, 74, stand on the edge of the six-mile-wide toxic lake in Baotou, China that has devastated their farmland and ruined the health of the people in their community

Read more: <http://www.dailymail.co.uk/home/moslive/article-1350811/in-China-true-cost-Britains-clean-green-wind-power-experiment-Pollution-disastrous-scale.html#ixzz2REAGHFNb>

Follow us: [@MailOnline on Twitter](#) | [DailyMail on Facebook](#)



Wind Turbines burst into flames – Firefighters are helpless



So are eagles and raptors

Enron's wind roots - Alberta

Mike, we are a green energy company, but the green stands for money — *Jeffrey Skilling, President, Enron*

Enron tested ploy in Alberta

Bankrupt firm manipulated provincial electricity system, evidence suggests

canada.com News

Enron tested ploy in Alberta
Bankrupt firm manipulated provincial electricity system, evidence suggests

Jason Markusoff
The Edmonton Journal

February 5, 2005

EDMONTON - Newly unearthed evidence suggests Enron Corp. manipulated the Alberta electricity system during deregulation's early stages to reap revenues of \$45 million in a single day, part of a scheme code-named "Project Stanley," likely a nod to the Stanley Cup trophy.

Enron made **\$45 million** in one day in Alberta. Wind power has been subject to questionable and corrupt practices in many jurisdictions.

60 tonnes of concrete 'reclaimed'

Ask Us

Q: How is the reclamation process proceeding at the Taylor wind facility?
— David and Dena Taylor, Landowners

A: TransAlta is a leader in wind power generation and is one of the first companies in Canada to be involved in decommissioning a wind facility site.

In 2011, TransAlta advanced the decommissioning process by removing turbines and ancillary structures; completing Phase I, II and III Environmental Site Assessments, as well as removing concrete foundations. Most of the concrete foundations removed will be re-used at a nearby hydro facility as erosion control material for the spillway. This resulted in avoiding putting approximately 60 tonnes of concrete in a landfill facility.

Renewable Energy Jobs – For Other Countries

JUNE 10, 2019 / / 1 COMMENT

Contributed by Robert Lyman ©2019

Robert Lyman is a former public servant of 27 years and prior to that was a diplomat for 10 years.

“For the most part, that is the Chinese-American economic relationship.

The Chinese sell, the Americans buy, and the jobs move one way – to China.”

-Stephen Harper

1. Trina Solar
2. Yimgli Green Energy
3. Canadian Solar
4. Jinko Solar
5. JA Solar
6. Sharp Solar
7. Renesola
8. First Solar
9. Hanwha Solar
10. Sun Power and Kyocera

Don't be confused by the names. Canadian Solar has its headquarters in Canada, but its manufacturing base is in China. In fact, six of the top ten solar panel manufacturers are Chinese, the results of a deliberate strategy by the Chinese government to dominate the market.

<https://blog.friendsofscience.org/2019/06/10/renewable-energy-jobs-for-other-countries/>

Alert me about Wind



LATEST BLOG | SEARCH BLOG | ABOUT

Foreign dominance of manufacturing characterizes the production of wind turbines as well, only in that case the centre is Europe. While the Asia-Pacific region (mainly China, India and Japan) is the largest wind turbine market in terms of installed wind power capacity with a 45% share in 2017, the following are the 10 largest wind turbine manufacturers and their manufacturing bases.

1. Vestas (Denmark)
2. Siemens Gamesa (Germany)
3. Goldwind (China)
4. Enercon (Germany)
5. Nordex Group (Germany)
6. GE (United States)
7. Senvion (Germany)
8. United Power (China)
9. Envision Energy (China)
10. Suzlon (India)

Is Alberta propping up a dying industry?

So, Canadian firms rank nowhere near the top in terms of manufacturing either solar or wind equipment. Worse, the tendency of China's government to over-build capacity and to decide by regulation what domestic demand will be leads to periodic massive surpluses that depress product prices and drive western companies out of business. This makes manufacturing renewables a very risky business.

wind's giants battered but unpowed, energy transition 'war footing' and Big Oil on the march

Energy Transition
25 March 2022 16:47 GMT



'We're all in trouble' | Wind turbine makers selling at a loss and in a 'self-destructive loop', bosses admit

Price pressures from auctions, higher raw-material and logistics costs, plus the Ukraine war, have led to an unsustainable situation, top executives from GE, Nordex and Enercon tell WindEurope 2022

5 April 2022 19:52 GMT UPDATED 8 April 2022 14:30 GMT <https://www.rechargenews.com/wind/were-all-in-trouble-wind-turbine-makers-selling-at-a-loss-and-in-a-self-destructive-loop-bosses-admit/2-1-1197217>
By **Bernd Radowitz**

'life in analyst

'annual

Raw material and logistics inflation coupled with downward price pressures from auctions have led to an unsustainable situation where wind OEMs are selling at a loss, with the sector unable to deliver Europe's planned tripling of wind capacity by 2030, industry leaders have warned.



'Russian invasion driving up wind sector costs just as they were starting to

"The state of the supply chain is ultimately unhealthy right now," GE Renewable Energy chief executive for onshore wind, Sheri Hickok, told a panel at the WindEurope 2022 conference in Bilbao on Tuesday.

"It is unhealthy because we have an inflationary market that is beyond what anybody anticipated even last year. Steel is going up three times."

Solution? Nope. Wind and Solar contribute to regional atmospheric warming.



FOX NEWS channel

U.S. World Opinion Politics Entertainment Business Lifestyle TV Radio More :

Hot Topics Trump celebrates midterm results Election Night results Dad: Murdered mom 'deserved it'

ADVERTISEMENT

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

Google engineers say renewable energy won't solve climate change

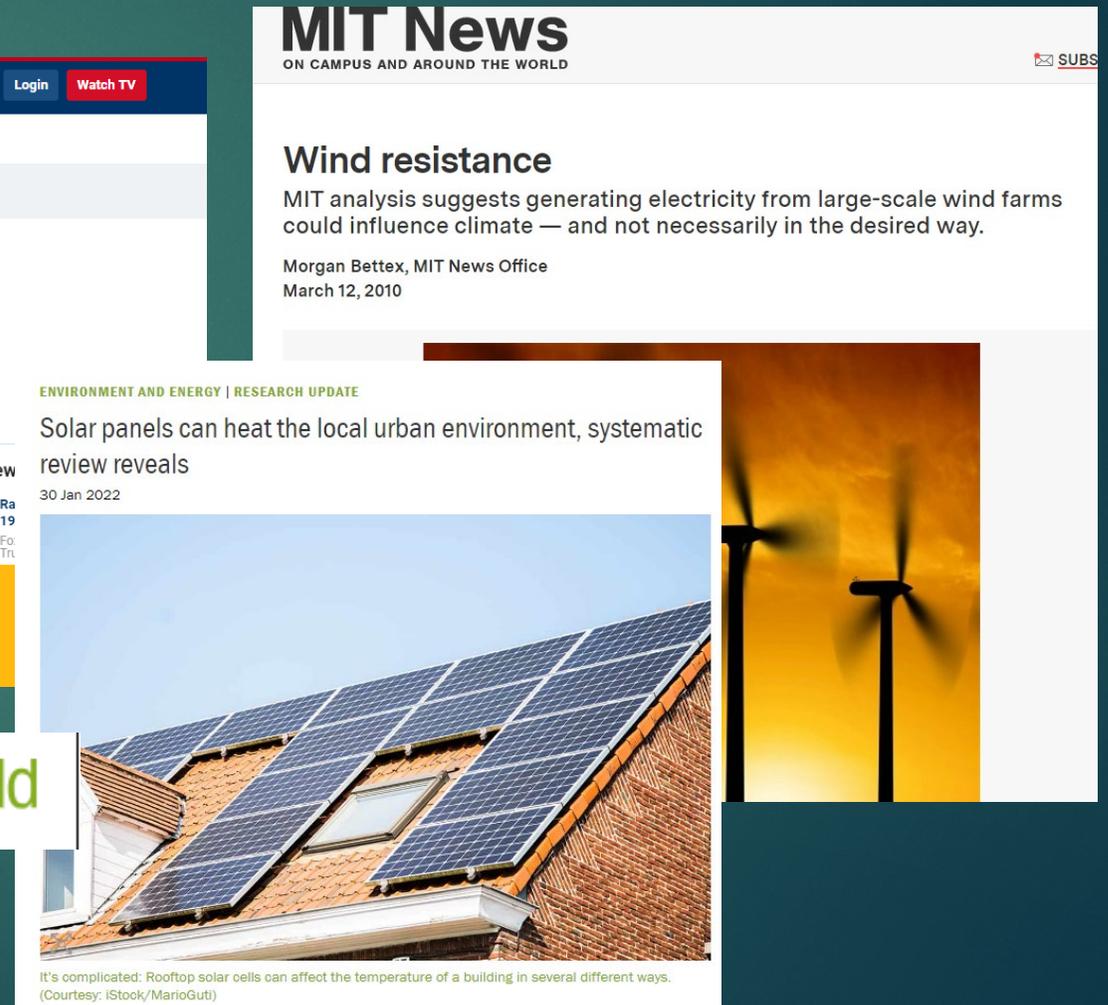
By Maxim Lott | Fox News

WATCH LIVE

President Trump holds post-midterm election news conference

Want to get these alerts sent to you directly? [Click here.](#)

physicsworld



MIT News
ON CAMPUS AND AROUND THE WORLD

Wind resistance

MIT analysis suggests generating electricity from large-scale wind farms could influence climate — and not necessarily in the desired way.

Morgan Bettex, MIT News Office
March 12, 2010

ENVIRONMENT AND ENERGY | RESEARCH UPDATE

Solar panels can heat the local urban environment, systematic review reveals

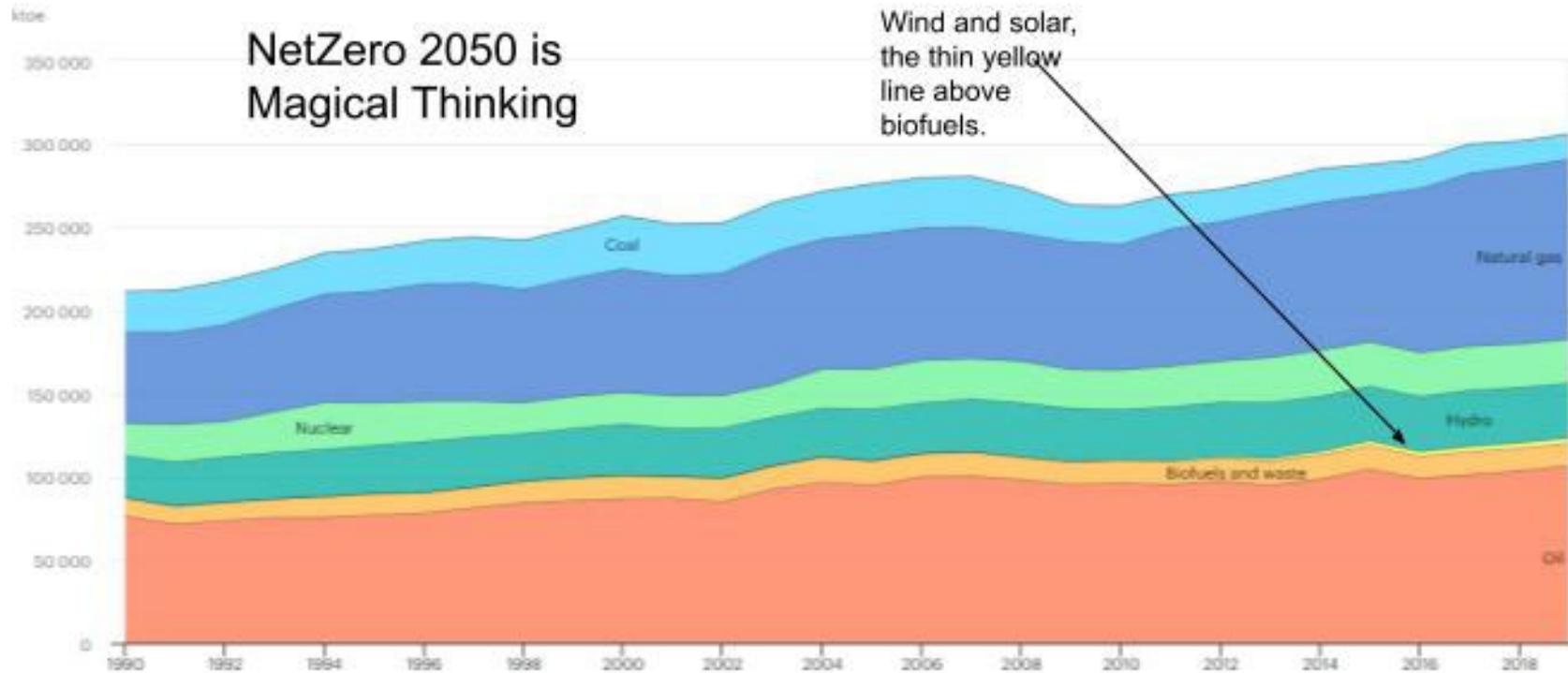
30 Jan 2022



It's complicated: Rooftop solar cells can affect the temperature of a building in several different ways. (Courtesy: iStock/MarioGuti)



Total energy supply (TES) by source, Canada 1990-2019

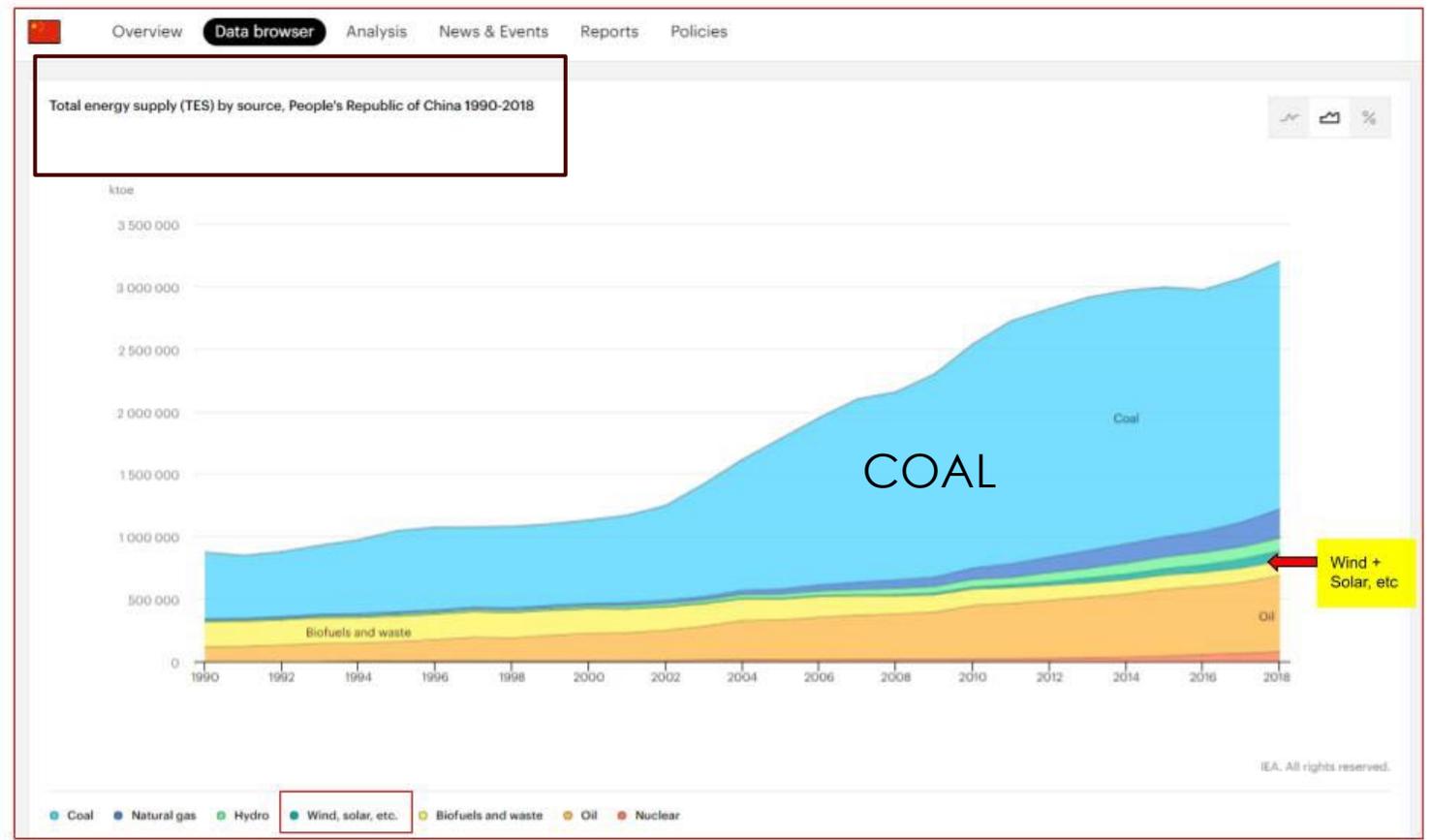


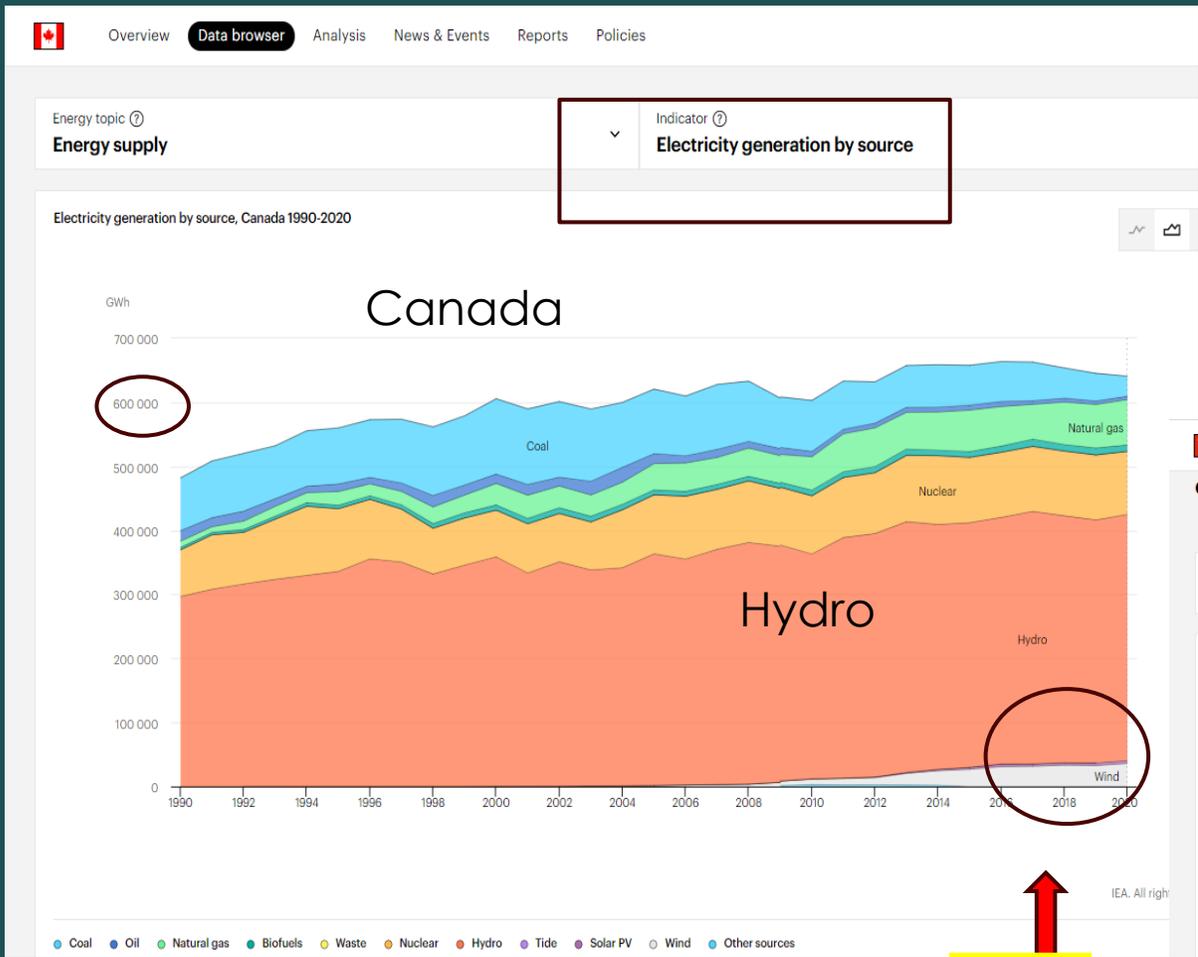
Graph source: IEA <https://www.iea.org/countries/canada>

IEA. All rights reserved.

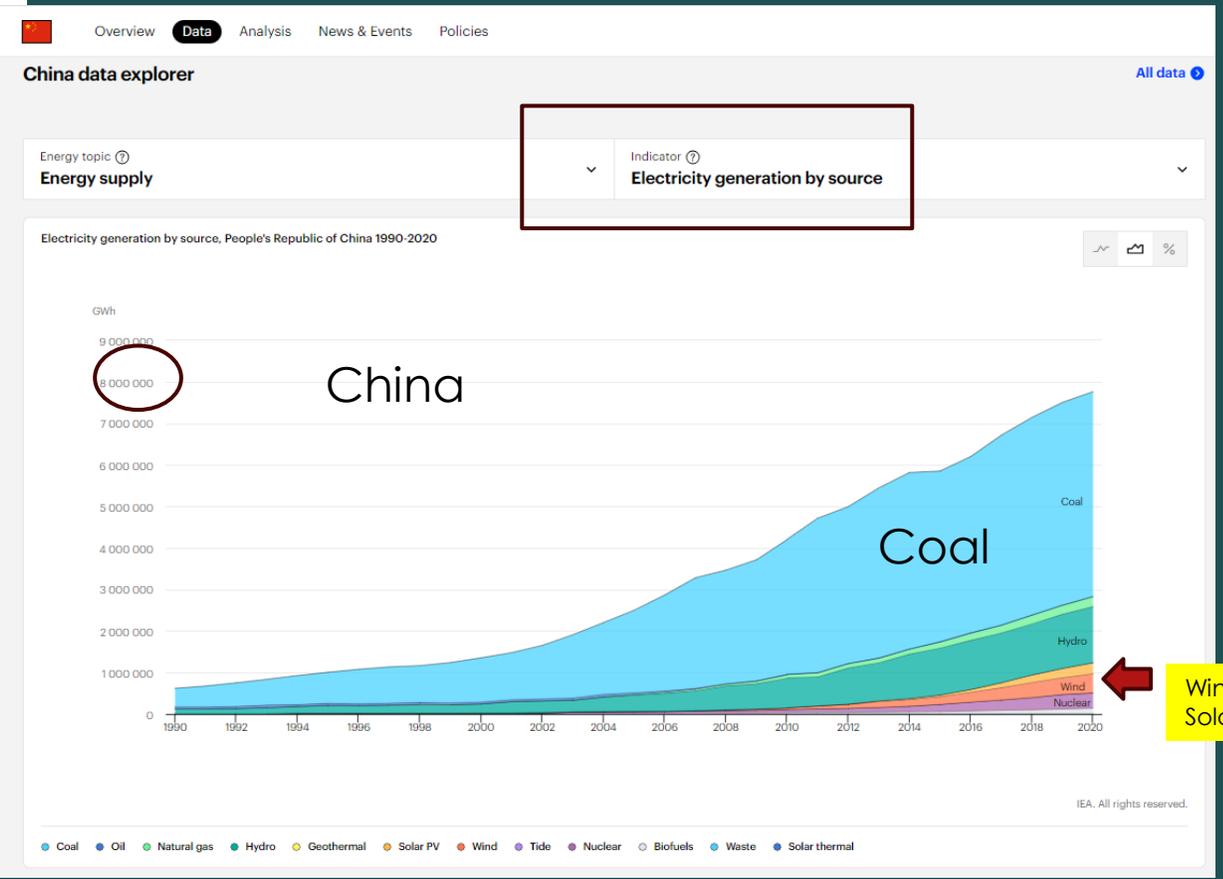
Coal Consumption by Country

Product	Rank	Country	Consumption (Thousand Short Tons)
Crude Oil			
Natural Gas			
Liquids			
Motor Gasoline	1	China	4,361,427.00
Jet Fuel	2	United States	924,442.00
Kerosene	3	India	886,052.00
Distillate Fuel Oil	4	Germany	270,404.00
Residual Fuel Oil	5	Russian Federation	229,820.00
Oil	6	Japan	222,304.00
Liquefied Petroleum	7	South Africa	190,085.00
Gases	8	Poland	160,817.00
Other Petroleum Products	9	Korea, Republic Of	142,464.00
Dry Natural Gas	10	Australia	132,565.00
Coal	11	Turkey	92,855.00
Ethanol Fuel	12	Kazakhstan	87,485.00
Biodiesel	13	Ukraine	78,619.00
Total Primary Energy	14	Taiwan, Province Of China	74,740.00
Electricity	15	United Kingdom	66,585.00
Hydroelectric Power	16	Indonesia	61,765.00
Nuclear Electric Power	17	Greece	60,284.00
Other Electric Power	18	Czech Republic	50,140.00
	19	Serbia	44,558.00
	20	Thailand	41,484.00
	21	Canada	37,659.00
	22	Bulgaria	33,596.00
	23	Viet Nam	30,811.00
	24	Romania	28,540.00
	25	Malaysia	28,160.00
	26	Mexico	27,419.00
	27	Brazil	26,919.00
	28	Italy	23,232.00
	29	Spain	22,164.00

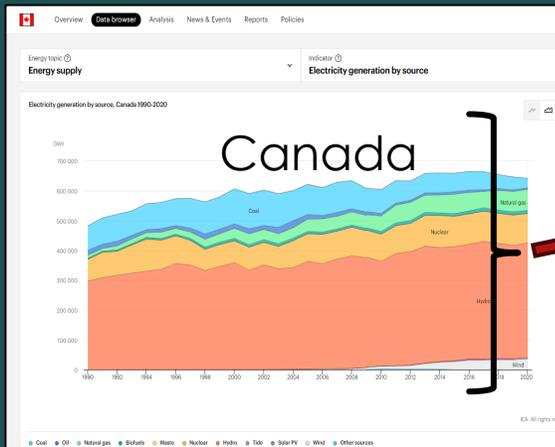
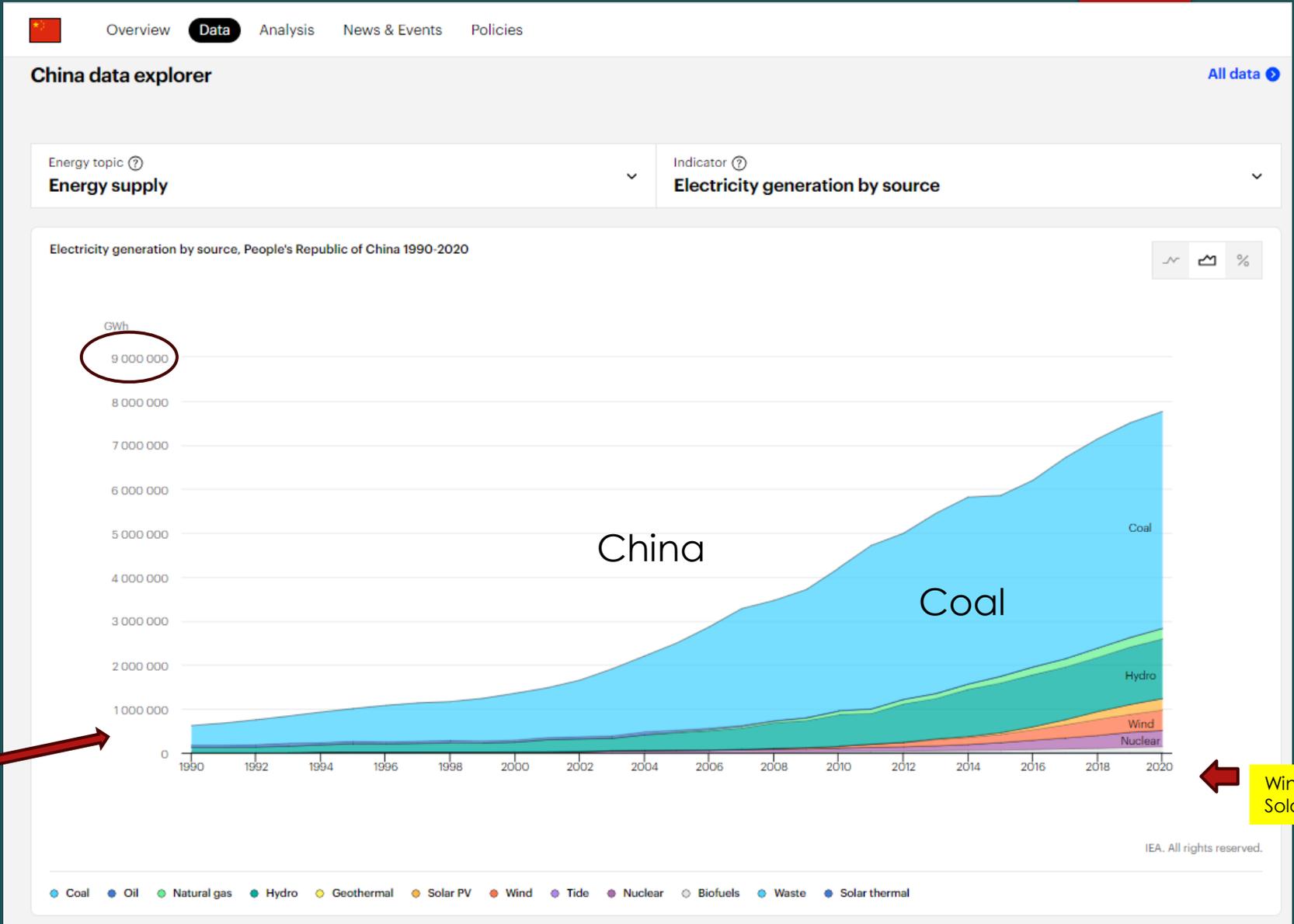




Wind +
Solar



Wind +
Solar



Wind + Solar



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.



Image licensed from Shutterstock.



Futile Folly

Canada's Climate Policy Goals in the Global Context

"...extraordinarily expensive and dangerous political grandstanding ... Canadians deserve better."

Robert Lyman 5/4/19 Friends of Science Society

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

Village of Carmangay

- ▶ **The Carmangay solar project's electricity is seven times more expensive than the gas-fired electricity it is displacing.** The fact that wind and solar generation must be 100% backed up by conventional generation means that Carmangay's solar project does not eliminate any of the fixed costs of conventional generation. Moreover, as we retire existing coal plants and add more intermittent and highly variable renewable generation to the grid, the need for flexible and efficient gas-fired generation will only grow.

- ▶ <https://blog.friendsofscience.org/2021/01/13/carmangay-solar-project-good-for-carmangay-terrible-for-the-rest-of-us/>

The screenshot shows two web pages. The top page is from 'FRIENDS OF SCIENCE' and features a blog post titled 'Carmangay Solar Project – Good for Carmangay...Terrible for the Rest of Us' dated January 13, 2021, with 7 comments. It is attributed to Jim Hunter and Ken Gregory, P. Eng. © 2021. An update note mentions a response to a comment regarding a 2.5% municipal borrowing rate. A 'PDF Here' link is provided, leading to a download button for the file 'Carmangay-Solar-Project-Final-2-rev-w-Addendum'. The bottom page is from 'Global NEWS' and features an article titled 'Village of Carmangay the latest in southern Alberta to harness solar power' by Danica Ferris, dated December 10, 2020.

FRIENDS OF SCIENCE LATEST BLOG | SEARCH BLOG | ABOUT

Carmangay Solar Project – Good for Carmangay...Terrible for the Rest of Us

JANUARY 13, 2021 / / 7 COMMENTS

Contributed by Jim Hunter and Ken Gregory, P. Eng. © 2021

Updated Mar. 31, 2021 to respond to an on-line comment regarding the use of the municipal borrowing rate of 2.5%. See Addendum.

[PDF Here](#)

Carmangay-Solar-Project-Final-2-rev-w-Addendum [Download](#)

Global NEWS World Canada Local Politics Money Health Entertainment

ENVIRONMENT

Village of Carmangay the latest in southern Alberta to harness solar power

By Danica Ferris • Global News
Posted December 10, 2020 7:03 pm • Updated December 10, 2020 8:03 pm

▶ If we assume, just to keep things simple, that the consumer uses a constant 855 kWh per month, then the rooftop solar panels produce 464 kWh too much energy in July and 473 kWh too little in December. From October to February, solar output is 2565 kWh, 1710 kWh short of the 4275 kWh consumed.[5] If we put a dozen of these homes together, the winter shortfall is 20,520 kWh or just over 20 MWh.

▶ 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>



FRIENDS OF SCIENCE LATEST BLOG | SEARCH BLOG | ABOUT

ELECTRICITY FROM THE SUN: REALITY VERSUS FANTASY

MAY 4, 2021 / / 4 COMMENTS

Posted by Friends of Science Society © 2021

PDF version with [linked footnotes](#)

[Electricity-from-the-Sun-Reality-Versus-Fantasy-3](#) [Download](#)

In a recent article in the [Calgary Herald](#) [1], journalist Licia Corbella was effusive in her praise of both solar energy and Alberta's competitive electricity market. In several places, her article quoted Robert Hornung, president and CEO of the Canadian Renewable Energy Association, who also extolled the virtues of solar generation and the competitive market. There are two very serious problems with their assessments. The first is that several of Mr. Hornung's statements are based on commonly held myths that are easily refuted using real-world data. The second is that one of the reasons why Alberta is favoured by renewables investors is that they receive hidden subsidies from the province's consumers. Those subsidies will grow rapidly as renewable generation is added unless some changes are made to the market rules.[2]

[Solar Energy Myths](#)



Foreign funding to change policy

Climate Change as Social Drama

Grant from the Swiss-based Oak Foundation to:

Environmental Defence Canada

USD \$426'857

Date: 2010

36 months (1 Aug 2010-30 Jul 2013)

*To call for the passage of legislation **mandating a reduction of tar sands emissions and introducing additional regulatory requirements for the industry.***

The project aims to secure agreement to implement and fund incentives for investment in renewable energies and energy efficiency. EDC seeks to ensure that Canada's cap and trade system is as strong as possible and to close off loopholes for the tar sands industry (such as intensity targets and weak compliance options). It also seeks a federal permit system for tailings ponds and at least USD 5 billion in new incentives for renewable energies and energy efficiency from federal and state governments in 2010.

Source: Oak Foundation online grant database [bold emphasis added]



LATEST BLOG | SEARCH BLOG | ABOUT

Call to Retract University of Alberta Report on Renewables

SEPTEMBER 12, 2020 / / 5 COMMENTS

An Open Letter

University of Alberta

ATTN: Prof. Bill Flanagan, President

Dear Sir,

RE: An Open Letter – Call for retraction due to false statements about Friends of Science Society and inaccurate information on wind farms published in “Assessing Barriers to Renewable Energy Development in Alberta: Evidence from a Survey on Wind Energy with Rural Landowners” Authors: Sonak Patel, Monique Holowach, Sven Anders, John R. Parkins

It-to-president-of-U-of-A-FINAL

Download

<https://blog.friendsofscience.org/2020/09/12/call-to-retract-university-of-alberta-report-on-renewables/>

All this foreign-funded Climate Activism and Coordinated Push for Renewables has put Albertans and Alberta's Power Grid at Risk

December 20, 2022

The AESO is declaring an EEA-3 as of 16:47

**4:45 PM
DECEMBER 20
2022**

SUMMARY	
Alberta Total Net Generation	11396
Net Actual Interchange	-681
→ Alberta Internal Load (AIL)	12077
Net-To-Grid Generation	8566
Contingency Reserve Required	552
Dispatched Contingency Reserve (DCR)	555
Dispatched Contingency Reserve -Gen	453
Dispatched Contingency Reserve -Other	102
LSSi Armed Dispatch	95
LSSi Offered Volume	95

INTERCHANGE	
PATH	ACTUAL FLOW
British Columbia	-446
Montana	-173
Saskatchewan	-62
TOTAL	→ -681

Public Weather Alerts for Alberta

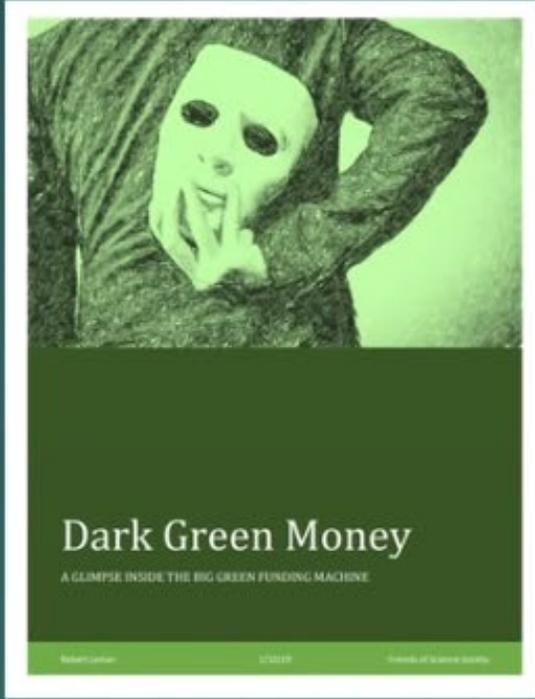
Click on a coloured region for the latest alert

GENERATION			
GROUP	MC	TNG	DCR
GAS	10894	9357	82
HYDRO	894	387	291
ENERGY STORAGE	70	0	68
SOLAR	1138	0	0
WIND	3618	47	0
OTHER	444	328	12
DUAL FUEL	466	466	0
COAL	820	811	0
TOTAL	18344	11396	453



**DYING WITH
RENEWABLES**

Importing at a pool price of \$999/MW because there is not enough gas and coal capacity



<https://blog.friendsofscience.org/2019/05/07/environmental-charities-a-Compilation-of-reports-on-their-finances-power-and-implications-for-canada/>



Clean Electricity Standard

Delusion vs Reality



© Friends of Science Society



What You Really Need to Know About Renewable Energy

(That the Pembina Institute Won't Tell You)

Second Release, October 2012



© Friends of Science Society

The True Cost of Wind and Solar Electricity in Alberta

As you often read, wind and solar are now cheaper than other forms of electricity generation. And at every ribbon-cutting, we are told that the use of wind or solar plants can provide emissions-free electricity in a way thousands of times. Both claims are false because they ignore the fact that wind and solar generators cannot meet customers' electricity needs when the wind is not blowing or the sun is not shining. They must be backed up by electricity sources that work even in dark, weather nights, and when the cost of providing that backup are accounted for, it turns out that wind and solar are very expensive. Deloitte are unwitting projected as inhibitors to wind and solar generation's viability. However, while Deloitte can conveniently address the electricity cost periods, they cannot do so in the future, they cannot address the months-long seasonal variability because the associated cost would be in the 100,000,000 of dollars.



© Friends of Science Society, 2012



IN THE DARK ON RENEWABLES

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

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.

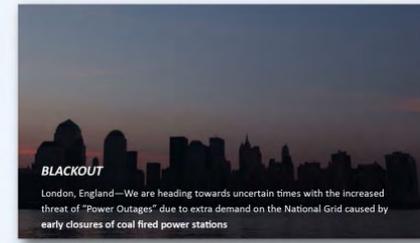
Large additions of wind and solar do not necessarily reduce carbon dioxide emissions. In any case, human-produced CO₂ is not a control knob that can fine-tune Earth's climate.

Friends of Science Society
Nov. 18, 2018



DIRE CONSEQUENCES

Destroying Alberta's Affordable Power Advantage
Critical Review of the Claims of Accelerated Coal Phase-out Activists
September 2016



BLACKOUT
London, England—We are heading towards uncertain times with the increased threat of "Power Outages" due to extra demand on the National Grid caused by early closures of coal fired power stations



Broken Promises:

Why Renewables Offer no Resilient Recovery.

Robert Lyman

5/5/20

© Friends of Science Society



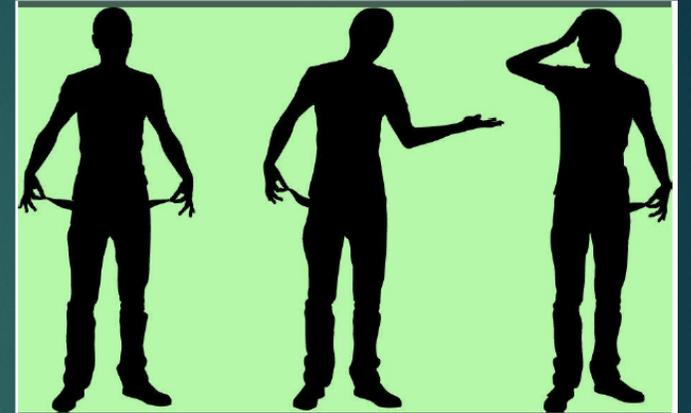
Empty Wallets

Why Renewables Offer no Resilient Recovery – Part 2

Robert Lyman

5/23/20

© Friends of Science Society



Empty Pockets

Why Renewables Offer No Resilient Recovery

Robert Lyman

6/1/20

© Friends of Science

Friends of Science Society 20th Annual Climate Science Event

October 17th, 2023 • 6:00pm - 9:00pm • Red & White Club • McMahon Stadium, Calgary

Break Free from Climate Tyranny: Evidence over Ideology



Robert Lyman
Energy Economist

**When Will Climate
Policy Hit the Wall?**



Dr. Ian Clark
Emeritus Professor

**A Reality Check on
Climate and Net Zero**

- Buffet Dinner Included
- Free Parking after 6pm
- Easy LRT Accessible



www.friendsofscience.org

Order tickets by October 6, 2023

Early Bird Pricing ends July 31, 2023

Note: This event is not affiliated with or endorsed by the University of Calgary

www.friendsofscience.org