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August 29, 2023

Open Letter to Premier Danielle Smith on Renewables Moratorium

Dear Premier Smith,

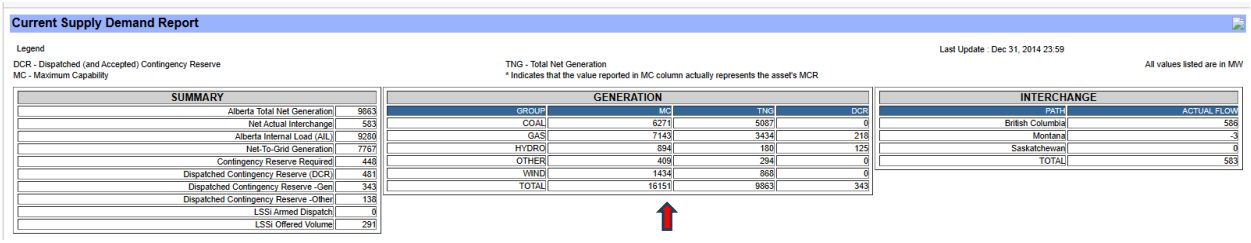
RE: Renewables Moratorium and Prevention of Blackout Risk

Citizens of Alberta should be grateful to you for imposing this pause on renewables. According to the Alberta Electric System Operator (AESO) report of 2022, issued March 2023,[1] a report barely covered in the media, Alberta faced seven grid level 3 emergency alerts last fall – meaning imminent blackout or load shedding - four of these alerts in December when temperatures were extremely cold all across the province.

In all cases, the collapse of renewables, particularly wind, was noted as a key factor.

Wind and solar are weather dependent and cannot be relied upon at critical times. Where once the Alberta power grid was almost equally powered with dispatchable (on demand) power from coal and natural gas, now natural gas is our principal provider of dispatchable power.

Until quite recently, the province was operating the grid with 1,000 MW shortage of dispatchable power over what we had had on Dec. 31, 2014. Though an additional ~1,000 MW of natural gas has since come online, this only sets us back into near balance of dispatchable power that we had in 2014. Please note the output of the "MC" (Maximum Capability) column.



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

Above: 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 is 14,308 MW.

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

Last Update : Dec 22, 2022 07:39

ntingency 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

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

Above: The second excerpt is from Dec. 22, 2022, 7:43AM. The dispatchable resource on that morning was gas (10894) + hydro (894) + energy storage (70) + dual fuel (466) + coal (820). That is 13,144 MW dispatchable power. At that point we had 1000 MW less dispatchable power than we did in 2014, even though the total 'Maximum Capability' deceptively reads 18,344 MW.

However, as opposed to the wind generation of 2014, which was only 1434 MW, Alberta, on Dec. 22, 2022, had 4756 MW of renewable power (wind and solar combined) on the grid, three times that of 2014. Renewables make the grid unstable.

Last Update : Aug 27, 2023 15:30

* 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

All values listed are in MW

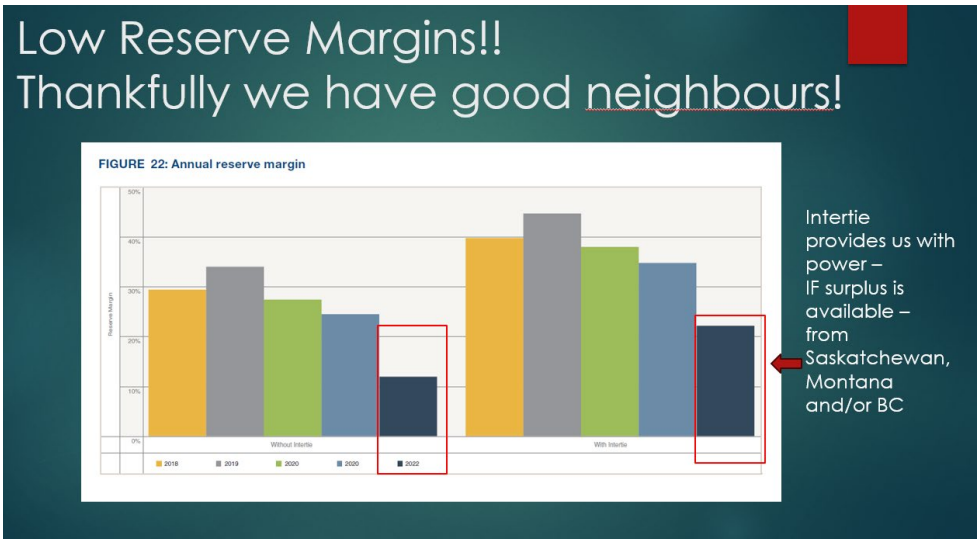
GENERATION			
GROUP	MC	TNG	DCR
GAS	11813	7123	78
HYDRO	894	338	290
ENERGY STORAGE	130	0	10
SOLAR	1291	1026	0
WIND	3853	171	0
OTHER	444	277	0
DUAL FUEL	466	465	0
COAL	820	794	0
TOTAL	19711	10194	378

INTERCHANGE	
PATH	ACTUAL FLOW
British Columbia	9
Montana	2
Saskatchewan	-88
TOTAL	-77

As of today, we now have 1291 MW of solar and 3853 MW of wind 5144 MW of wind and solar combined on the grid. If we add the maximum capability of natural gas (11,813) plus hydro (894) plus coal 820 plus dual fuel 446, we arrive at 13,993 MW dispatchable power, still 387 MW less dispatchable power than we had in 2014.

The volatile nature of wind (especially) and solar mean we should have equivalent dispatchable resources to back them up for when they fail. Alberta's economy and population are booming. Electrical generation demand will only grow – but the growth must first be in dispatchable power, or we risk facing blackouts again.

Likewise, as weather patterns are regional, and we are highly reliant on our neighbours for power via the interchange, when it is extremely cold or hot, all of our neighbours generally need as much of their own power as they can get – often they had little or none to spare to help us out.



Pembina Institute, Environmental Defence, National Observer and many other organizations funded by the federal government, and some of them funded by foreign sources, are kicking up a ruckus about the fact that you are protecting Albertans from the crisis of a blackout. While some people view blackouts as a temporary and minor inconvenience, there is no telling the length of time a blackout may go on or what damage it may cause. Depending on the causes and weather conditions at the time, extremely deadly consequences may result. We have seen this over and over again in the eastern provinces of Ontario and Quebec where winter ice storms have often left people stranded for more than a week without power. People frequently die from desperate and improper efforts to heat their homes with barbeques or propane devices that end up poisoning them with deadly carbon monoxide.

The financial consequences of blackouts are enormous. This is a case study from Allianz from 2006.

BLACKOUT 2006, GERMANY INCL. WESTERN EUROPE [20/21/22/23]

What happened?

- On November 4, 2006 the German TSO E.ON Netz had to switch off a high voltage line to let a ship pass underneath.
- Simultaneously there was a high amount of wind electricity which fed into the grid 10,000 MW from wind turbines to Western and Southern Europe grids.
- Insufficient communication about this switch-off led to instabilities of the frequency in the grid and to overloading of lines.
- Devices had to switch customers off in the countries affected to cope with this lack of power in the Western zone automatic.
- The blackout lasted up to two hours.

Causes:

- After manual disconnection of the high-voltage line the n-1 criterion of process security was not fulfilled. N-1 criterion means that any component may fail and all other components are still below their limit. As a result, even a relatively small power flow deviation could trigger the cascade of line tripping.
- Insufficient co-ordination between transmission system operators.
- No access to real-time data from the power units connected to the distribution grids.
- Lack of joint simulation training with neighbouring transmission system operators.
- Lack of coordination between operators' internal procedures regarding grid-related, market-related and other adjustments.

Impacts:

- In France 5 million customers were cut-off.
- In Germany millions of customers were affected and in Belgium, Netherlands, Italy and Spain some hundreds of thousands of customers were without electricity.
- Long delays in rail transport, affecting about 100 trains mainly in Germany.
- Subway had to be evacuated.
- Costs to restaurants and bars in spoiled products and lost sales totalled up to USD 139m.

We are alarmed to learn that there are over 21,840 MW of active projects plus a few thousand megawatts of projects in other states of development. Adding additional wind and solar without confirmation that under the Clean electricity/NetZero Standards upcoming natural gas plants will be allowed to be built and operate on existing terms of operation and finance is a 'road to unreliability hell.'

We are deeply concerned that groups like the Pembina Institute have been foreign and domestic funded to promote renewables and denigrate other forms of power generation as well as denigrating the Alberta Oil Sands, and part of that funding has been applied to silencing opposing voices like ours. Pembina Institute has consistently misinformed the public and policymakers about the need for

baseload power from conventional, dispatchable sources, as explained in our report "What you really need to know about renewable power (that the Pembina Institute won't tell you)."[2]

It seems that the informal group, the Strathmere Alliance, has made coordinated efforts with the media to fix messaging on climate change and renewables – as suggested by this statement from Boothroyd Communications about their client "Strathmere.

> *"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*

Parker Gallant has a detailed series about the Strathmere Group/Alliance, set up in 2009 by Marlo Raynolds of the Pembina Institute.

> *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. (*Now includes CAN-RAC and umbrella group of over 100 ENGOs and Unions)*
>
> *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/*

This is a powerful lobby group of poorly informed activists and citizen supporters who do not understand how the power grid works and who are driven by climate catastrophe ideology.

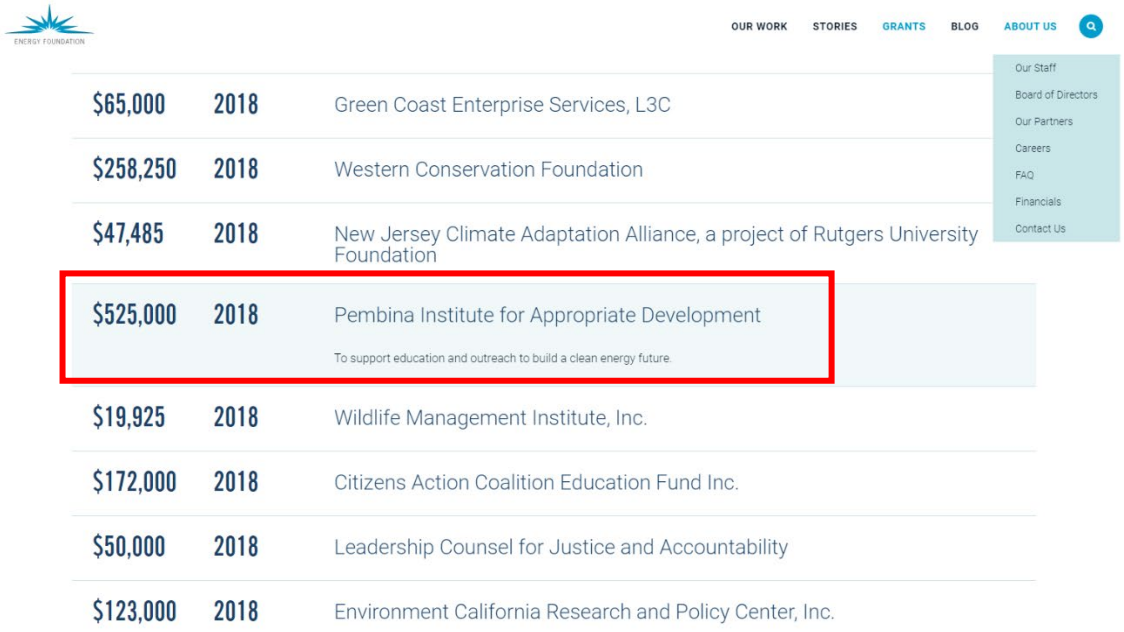
Whether one hates, loves or ignores the Freedom Convoy, one must recognize that on mere suspicion of foreign-funding to change Canadian policies, those who supported the Freedom Convoy had their bank accounts frozen and many physical assets were towed away, some assets and reputations were irrevocably damaged by actions taken by the banking sector, yet no such sanctions appear to be in force for Environmental Nongovernmental Organizations who actually are receiving or have received substantial sums of money with specific targeted actions in mind to dampen the conventional energy markets in Canada and blacken our name worldwide. Many of them charities, also living off tax-subsidies and government grants while blocking the economy.

One such example is the Pembina Institute. (Excerpt of Oak Foundation funding)

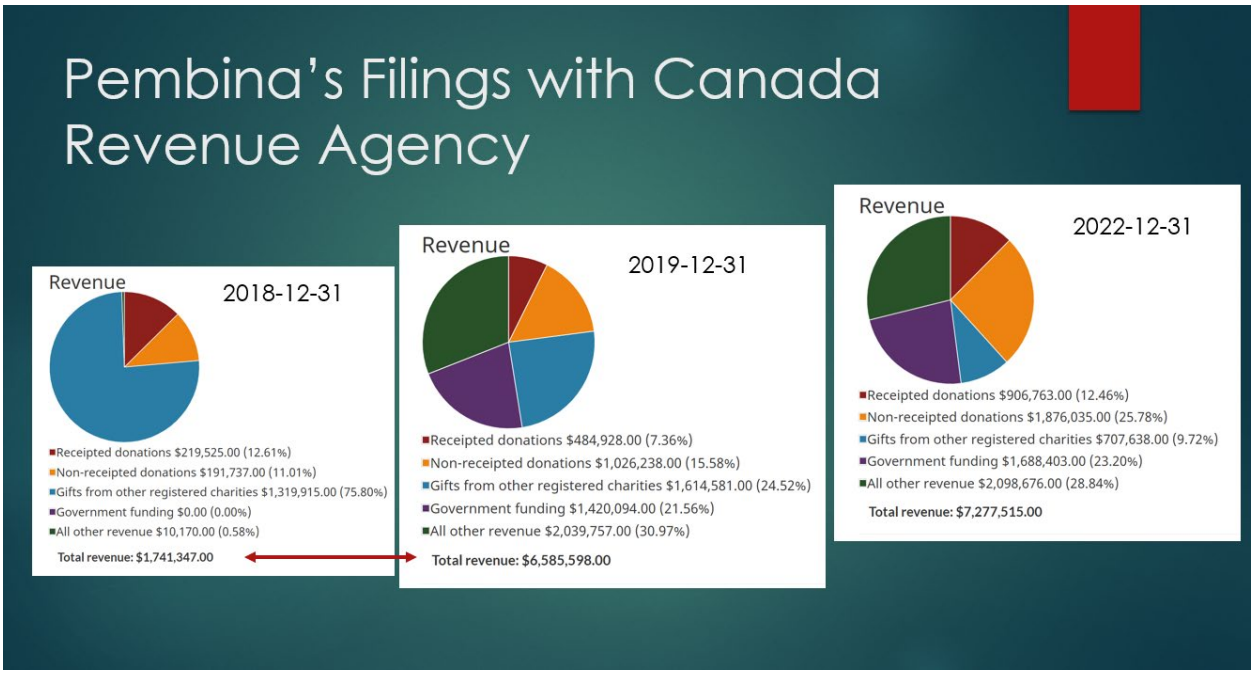
[2] https://blog.friendsofscience.org/2021/10/20/what-you-really-need-to-know-about-renewable-energy-that-the-pembina-institute-wont-tell-you-parts-a-and-b/

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

And Pembina received this from the Energy Foundation of the US.



It is interesting to note that in a time when many businesses were suffering burdensome energy bills and collapse due to climate policies, from 2018 to 2022, Pembina Institute was thriving, exceptionally, so.



It is unclear if this increase comes from the revenue sharing arrangement that Pembina Institute announced with Bullfrog Power back in 2007[3] or if there is some arrangement via the Business Renewables Centre. Possibly neither is true. However, it is true that even the Bank of Canada buys offsets from Bullfrog Power.[4] And it is true that many ENGOs like Pembina are funded by tax dollars and have participated for decades in destroying the reputation of the Alberta oil sands, in hindsight now, after the Alberta Inquiry/Allen Inquiry as a means of demarketing conventional power in order to prop up the myth of "clean" energy. If readers are unaware of the impact, please review Robert Lyman's summary "Has No One Read the Deloitte Report?"[5]

The Business Renewables Centre states:

In May 2022, BRC-Canada passed the original goal of achieving two gigawatts of renewable energy almost three years earlier than expected. Our new goal is for corporations and institutions across Canada to purchase 10 GW of renewable energy by 2030.

3 "As part of the partnership, the Pembina Institute will transition its commercial and residential "Wind Power by Pembina" customers to Bullfrog Power, but will continue its national Wind Power Computers campaign. Residential customers who sign up for Bullfrog Power through the Pembina Institute will receive a discount and help support the work of the Institute. Bullfrog will work collaboratively with the Pembina Institute to accelerate demand for green power and support the growth of the renewable power industry in Alberta and across Canada."

4 https://www.bankofcanada.ca/2023/04/bank-of-canada-disclosure-of-climate-related-risks-2022/ *The Bank purchased renewable energy certificates from Bullfrog Power in 2022 for 100% of the electricity used at its four Bank-owned buildings located in Ontario and Quebec (equivalent to 455 tCO_2e). Using location-based emissions, the Bank calculates the total Scope 2 indirect emissions for 2022 to be 1,136 tCO_2e.

5 https://blog.friendsofscience.org/2021/11/02/has-no-one-read-the-deloitte-report/

By working with organizations to assist them in purchasing renewable energy, BRC-Canada has and will continue to play an important role in decarbonizing Canada's energy grid and making it emissions-free by 2035.

That may have been the goal of the Business Renewables Centre, but was it the goal of Albertans or the AUC/AESO? Was it/is it manageable?

A standard unit for measuring electricity is the kilowatt (kW), which is equal to 1,000 Watts.[6] A Watt is a measure of energy named after the Scottish engineer James Watt. One kW of electricity generated or used for one hour is a kilowatthour (kWh). Other units for measuring electricity capacity and electricity generation and consumption are:

Megawatt (MW) = 1,000 kW; megawatthour (MWh) = 1,000 kWh

Gigawatt (GW) = 1,000 MW; gigawatthour (GWH) = 1,000 MWh[7]

Thus, the BRC's goal of 10 GW is astronomical and insupportable.

How many Albertans know what they are getting in for in this kind of arrangement – because the taxpayer will be subsidizing the Leviathan operations, and as you have pointed out, there is no clear arrangement for recycling old solar panels or wind turbines and the physical amounts of trash will be astronomical if these arrangements continue.

And we will still have to build more conventional dispatchable power plants to back up such

WHAT'S A WATT?

1) Watt -The smallest unit of energy measurement is the watt. The definition is one ampere of electric current flowing across a voltage drop of one volt equals one watt of energy. This unit while small, is the base building block for what follows and most readers will be familiar with, for example, a 60-watt light bulb, or a 100-watt light bulb.

2) Megawatt - In power generation, especially in the sizes used for commercial production of electricity, the base unit of capacity is the megawatt. This unit is the simple watt, multiplied by one million. Envisage ten thousand people, 10,000, turning on one 100-watt light bulb each, all at the same time, because they would be consuming one million watts, 1,000,000 watts, or one megawatt, 1 MW of energy.

3) Gigawatt - When speaking of national generation capacities, the author uses the typical capacity unit of capacity which is the gigawatt. Using a similar example, if the reader can imagine ten million people, 10,000,000, all turning on that same 100-watt light bulb, then the reader is imagining an output of one gigawatt, 1 GW. For the mathematically inclined, 1GW=1,000 MW.

4) Capacity - Capacity is not the same as accomplishment. The reader may have the capacity to learn Sanskrit, but may not have accomplished the mastery of that language. Similarly, energy generation capacity is exactly not the same as the accomplishment of energy delivery or usage. Extending the above examples, if the electrical system has the capacity to deliver 100 watts of light bulb to each of 10,000 people, in other words the one-megawatt capacity described above, and if it can do so for a time duration of one hour, that electrical system will have accomplished the delivery of one megawatthour, 1 MWH of energy. So, the accomplishment is the product of a rate, 1 MW, multiplied by a duration, 1 hour in the example, for a quantity of energy equaling 1MWH.

5) Again, extending the example, energy delivered from a system capacity of a gigawatt, GW would be a gigawatthour, GWH.
https://blog.friendsofscience.org/wp-content/uploads/2020/06/WHY-RENEWABLE-ENERGY-CANNOT-REPLACE-FOSSIL-FUELS-BY-2050-FINAL-2.pdf

[6] https://www.eia.gov/energyexplained/electricity/electricity-in-the-us-generation-capacity-and-sales.php#:~:text=One%20kW%20of%20electricity%20generated,gigawatthour%20(GWH)%20%3D%201%2C000%20MWh

[7] *For context:* The average home in Alberta uses 600 kWh of electricity and 10 GJ of natural gas every month. But what does that mean? Electricity is measured by kilowatt-hour or **kWh**. One kWh is the amount of energy 1,000 watts consumes in an hour. So, a 100-watt light bulb uses 1 kWh every 10 hours. Natural gas is measured in gigajoules or **GJ**. One GJ of natural gas could heat enough water for 150 bathtubs! https://gas.atco.com/en-ca/products-services-rates/rates-billing-energy-savings-tips/energy-101.html

renewables…IF the federal government will let Alberta do that. Or will the feds condemn us to blackouts and despair?

While many activists seem to think connecting the power grids of provinces will provide a free and simple exchange of excess power between regions, the more likely outcome would be national blackouts,[8] astronomical costs and insurmountable territorial negotiations.[9]

In fact, Alberta used to export excess coal-fired power at night to British Columbia, so that it could replenish its hydro dams. Now that is over. This means in times of El Nino drought, a recurring, cyclical phenomenon, British Columbia could find itself unable to export hydro power to Alberta. Then what?

The fact is that there is not one 100% renewable grid in operation anywhere in the world, not even a small pilot project.

Premier Smith, Friends of Science Society has been in operation since 2002; we are now entering our 21st year of operation. Over the years, particularly during coal phase-out activism in Alberta, we issued reports, videos, press releases, letters to the editor – and our work was rarely reported on by the press. It appears that arrangements had been made to keep our information from the public, because no one would ever have agreed to the present situation if they had been properly informed.

In 2013, we brought Dr. Benny Peiser here from the UK to speak about "To Heat or Eat: Europe's Failed Climate Policies."[10] We wanted to warn Albertans about where such net zero climate policies would lead. At the time he told us how pensioners were spending Christmas Day in bed – not enough money for a festive meal; not enough money to heat their homes. He told us of thousands of premature deaths of pensioners who were suffering from 'heat or eat poverty;' children going hungry and growing up in homes where the family lived in one room, shutting off the rest of the flat or house to cut heating bills. He described the absurd cycle of subsidies that are created from such policies in testimony to the US Senate in 2014:

> The EU's unilateral climate policy is absurd: first consumers are forced to pay ever increasing subsidies for costly wind and solar energy; secondly they are asked to subsidize nuclear energy too; then, thirdly, they are forced to pay increasingly uneconomic coal and gas plants to back up power needed by intermittent wind and solar energy; fourthly, consumers are additionally hit by multi-billion subsidies that become necessary to upgrade the national grids; fifthly, the cost of power is made even more expensive by adding a unilateral Emissions Trading Scheme. Finally, because Europe has created such a foolish scheme that is crippling its heavy industries, consumers are forced to pay even more billions in subsidizing almost the entire manufacturing sector. -- Benny Peiser, Testimony to the US Senate Committee on Environment & Public Works, 2 December 2014

Dr. Peiser's full testimony can be read/seen here.

[8] 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/
[9] https://blog.friendsofscience.org/wp-content/uploads/2020/11/Design-Considerations-of-a-Real-World-Interprovincial-Energy-Corridor-Power-Transmission-Line.pdf
[10] https://friendsofscience.org/library/events/friends-of-science-tenth-annual-luncheon-with-dr-benny-peiser.html

https://www.netzerowatch.com/content/uploads/2014/12/Peiser-Senate-Testimony-2.pdf

https://youtu.be/uQ0O-Lq8TQs

The point is, that ten years on from his presentation and testimony, the situation with renewables has not improved anywhere in the world in terms of reliability and the claims of 'free' energy or lower cost ignores the fact that renewables are parasitic to the existing grid and freeloaders in terms of not paying their share of the transmission and delivery/integration costs for their presence being integrated into operations.

Citizens, who are also Professional Engineers, have alerted us to anomalies in Alberta's electricity market which is ending up causing high prices for consumers and a windfall for renewables operators. One message reads:

I draw your attention to the AESO daily market report for Aug 22 (see Appendix II). For 14 hours the pool price exceed $400/ MW and within that 14 hours there were 7 hours when the pool price exceeded $700 / MW. Then, if we look at August 24, pool prices are running from $22.05/ MW to $55.02/ MW. So, on Aug 22, despite the fact that solar generators would have offered power at less than $30/MW they were paid between $400 and $700/MW. That is SERIOUS overpayment and price gouging of the consumers of electricity.

We invite you and your team to explore our library of works by our Professional Engineers which we have prepared over the years, and which were blocked by mainstream media; thus the public has only heard the "One Note Samba" of climate change and renewable activists, and not the reasoned, experienced voices of power generation engineers, who actually have had to make this complex network of power plants and transmission networks deliver reliable, formerly affordable, high quality electricity to residential customers, industry, farmers and ranchers and the retail sector 24/7 – often in the worst weather conditions. To date, the reliability score for the Alberta power grid has been one of the highest in the world. Let us keep it that way.

We have recently informed the Office of the Superintendent of Financial Institutions[11] of serious conflicts of interest in the climate science/climate finance world that render the notion of a climate emergency moot. We invite you to review that open letter. This may also set important perspective on whether or not there is any crisis and whether or not renewables are the answer.

According to Prof. William van Wijngaarden's calculations, this is Alberta's contribution to global warming over the past century. It does not seem that the federal government's draconian Clean Electricity Standards are in keeping with this nominal risk.

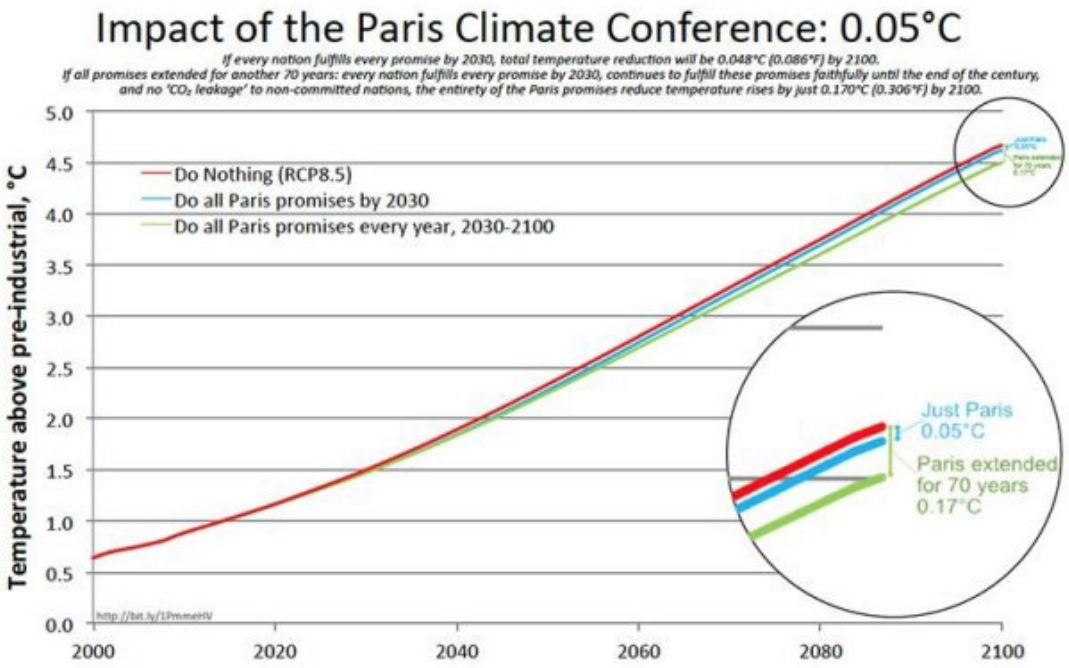
[11] https://blog.friendsofscience.org/2023/07/12/open-letter-to-the-bank-of-canada-on-climate-risk/

Gas	World Warming	Canadian Contribution	Alberta Contribution
	C/Century	C/Century	C/Century
CO_2	0.85	0.016	0.0052
CH_4	0.085	0.0016	0.00052
N_2O	0.064	0.0012	0.0037
Total	**1.0**	**0.019**	**0.006**

six thousandths

-The world warming column is from: C. de Lange, J. Ferguson, W. Happer & W. A. van Wijngaarden, **2022**, "Nitrous Oxide & Climate", *Atmos. & Oceanic Phys.* arXiv: 2211.15780.
-Canada produced 1.9% of CO_2 according to https://www.worldometers.info/co2-emissions/
-According to Environment and Natural Resources Dept. of Government of Canada in 2019 Alberta generated about 37% of Canada's carbon dioxide equivalent output.
-For simplicity, we assume same emission fraction for CH_4 and N_2O as for CO_2

How do Wijngaarden's numbers translate to the future? With full 2015 Paris Accord compliance, temperature reductions in 2100 (using the implausible RCP8.5 high emission scenario), would only be 0.17 °C (Alberta's share – 0.0012 °C), at what cost, for what benefit?



Bjorn Lomborg shows that even if all countries met their Paris Agreement pledges, warming reductions would be miniscule and immeasurable.[12]

[12] https://lomborg.com/paris-climate-promises-will-reduce-temperatures-just-005degc-2100-press-release

The issue of Alberta maintaining a reliable, affordable and high-quality power grid (i.e., no dips/surges) takes precedence over any other discussion, in our opinion, followed by the serious questions related to decommissioning/recycling and impacts of possible cadmium or other toxic contamination of quality farmland.

Lights on!

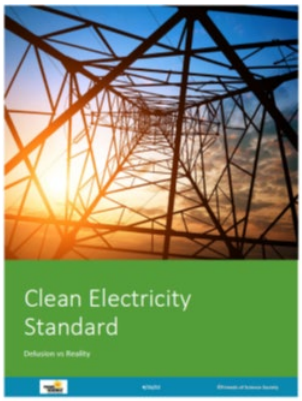
Sincerely,

Ron Davison, P. Eng.
President
Friends of Science Society

Appendix I

Clean Electricity Standard Net Zero 2030: Reality vs Delusion

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

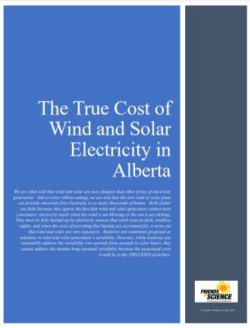


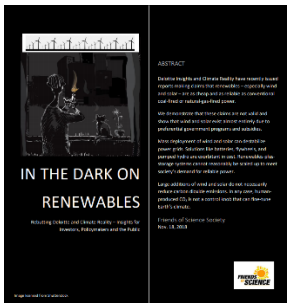
What You Really Need to Know about Renewable Energy (That the Pembina Institute Won't Tell You)

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/

The True Cost of Wind and Solar Electricity in Alberta

https://blog.friendsofscience.org/2021/04/25/the-true-cost-of-wind-and-solar-electricity-in-alberta/



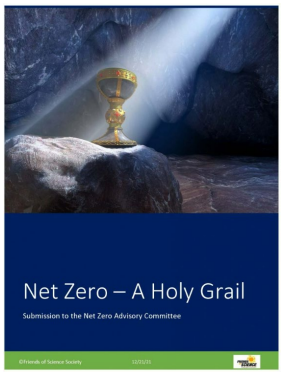


In the Dark on Renewables: Rebutting Deloitte Insights and Climate Reality

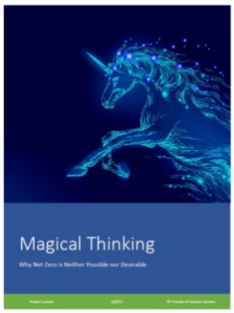
https://blog.friendsofscience.org/2018/11/18/in-the-dark-on-renewables-rebutting-deloitte-insights-and-climate-reality/

NET ZERO – A Holy Grail

https://blog.friendsofscience.org/2021/12/22/net-zero-a-holy-grail/



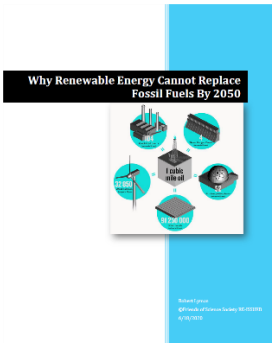
https://blog.friendsofscience.org/2022/06/09/royal-banks-netzero-decarbonization-estimate-is-severely-underestimated/?highlight=RBC



Magical Thinking – Why "Net Zero" Is Neither Possible nor Desirable
https://blog.friendsofscience.org/2021/06/09/magical-thinking-why-net-zero-is-neither-possible-nor-desirable/

Why Renewable Energy Cannot Replace Fossil Fuels By 2050

https://blog.friendsofscience.org/wp-content/uploads/2020/06/WHY-RENEWABLE-ENERGY-CANNOT-REPLACE-FOSSIL-FUELS-BY-2050-FINAL-2.pdf



DIRE CONSEQUENCES: DESTROYING ALBERTA'S AFFORDABLE POWER ADVANTAGE

https://blog.friendsofscience.org/2016/09/29/dire-consequences-destroying-albertas-affordable-power-advantage/

https://friendsofscience.org/assets/documents/Dire-consequences-blackout.pdf

Burning Questions: An Evidence-based Review of the Alberta "Phase-out Coal" Campaign

https://friendsofscience.org/assets/documents/FoS_BurningQuestions_Health_Coal_Wildfires_Jan2015.pdf

ELECTRICITY FROM THE SUN: REALITY VERSUS FANTASY

"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

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

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. Therefore, the "full story" economic comparison is between the total costs (fixed plus variable) of the solar electricity and the variable costs (only) of the gas-fired electricity that we could be using instead.

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

Appendix II

Daily Market Report
Tuesday, August 22, 2023

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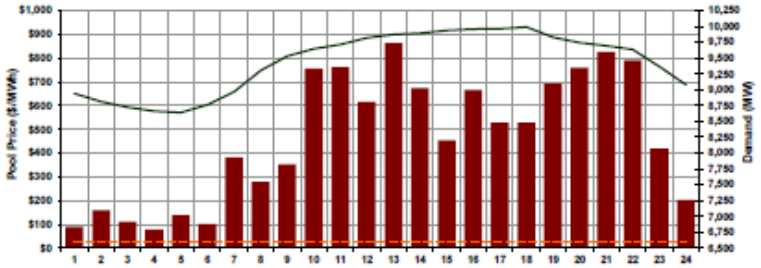
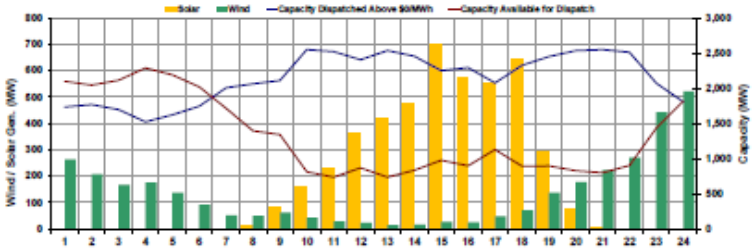
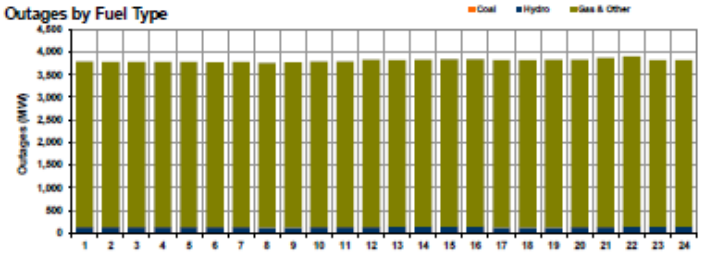
Pool Price and Demand



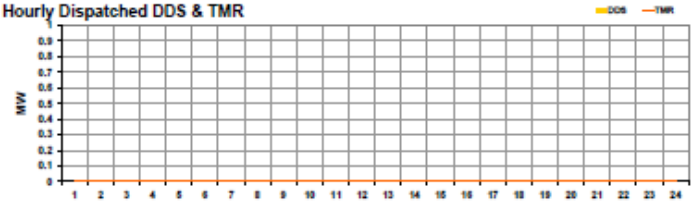
Wind and Solar & Capacity Available for Dispatch in the Energy Market Merit Order



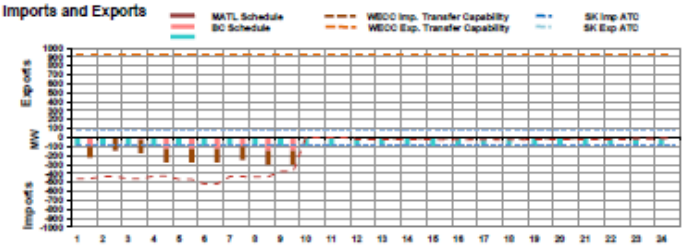
Outages by Fuel Type



Hourly Dispatched DDS & TMR



Imports and Exports



Pool price averaged $467.97/MWh, Up 164.5% from the previous day's average of $176.94/MWh. During the day the pool price ranged from $78.33/MWh to $863.33/MWh. The peak load was 9,992 MW, observed in HE 18. Pool price during peak demand was $527.89/MWh.

Pool Price ($/MWh)	Today	Same Day Last Week	30 Day Roll	YTD
Average	$467.97	$292.91	$162.81	$153.34
On Peak	$622.96	$388.42	$196.72	$180.14
Off Peak	$157.99	$105.90	$94.98	$99.71
Maximum	$863.33	$737.28	$908.61	$999.99
Minimum	$78.33	$44.11	$19.83	$0.00
SMP ($/MWh)				
Maximum	$903.25	$918.48	$970.37	$999.99
Minimum	$77.97	$37.89	$18.68	$0.00
Demand (AIL, MW)				
Average	9,437	10,217	9,748	9,819
On Peak	9,744	10,669	10,109	10,123
Off Peak	8,823	9,314	9,025	9,209
Maximum	9,992	11,314	11,522	11,572
Minimum	8,640	9,069	8,527	7,873
Load Factor (%)	94%	90%	85%	85%
Coal Availability Factor (AC/MC, %)				
Average	97.6%	97.1%	86.5%	90.8%
Maximum	97.6%	97.6%		
Minimum	97.6%	96.3%		
Gas & Other Availability Factor (AC/MC, %)				
Average	68.3%	69.2%	73.7%	73.0%
Maximum	68.7%	71.0%		
Minimum	67.5%	68.2%		
Hydro Availability Factor (AC/MC, %)				
Average	87.6%	86.7%	89.6%	79.2%
Maximum	89.0%	87.7%		
Minimum	86.5%	85.7%		
Solar Capacity Factor (Gen./MCR, %)				
Average	14.9%	0.0%	30.2%	9.2%
Maximum	54.5%	0.0%		
Minimum	0.0%	0.0%		
Wind Capacity Factor (Gen./MCR, %)				
Average	3.5%	36.1%	35.8%	4.8%
Maximum	13.5%	81.5%		
Minimum	0.4%	9.1%		
Transmission Must Run (Average Hourly MW)				
Average	0	0	1	7
Maximum	0	0		
Minimum	0	0		
Dispatch Down Service (Average Hourly MW)				
Average	0	0	0	0
Maximum	0	0		
Minimum	0	0		
BC Intertie (Average Hourly MW)				
On Peak	-19	-93	-49	12
Off Peak	-75	134	86	166
SK Intertie (Average Hourly MW)				
On Peak	-90	0	1	-87
Off Peak	-90	0	-16	-91
MATL Intertie (Average Hourly MW)				
On Peak	-33	-83	-70	-86
Off Peak	-129	-43	-81	-89

Notes & Disclaimers

On peak hours for the purposes of this report are defined as HE 8 through 23, Monday through Sunday. Off peak hours are all other periods. Outages are defined as the Maximum Capability (MC) minus the Available Capability (AC). The information, including prices, posted on this page is subject to the AESO's legal notice on our website.