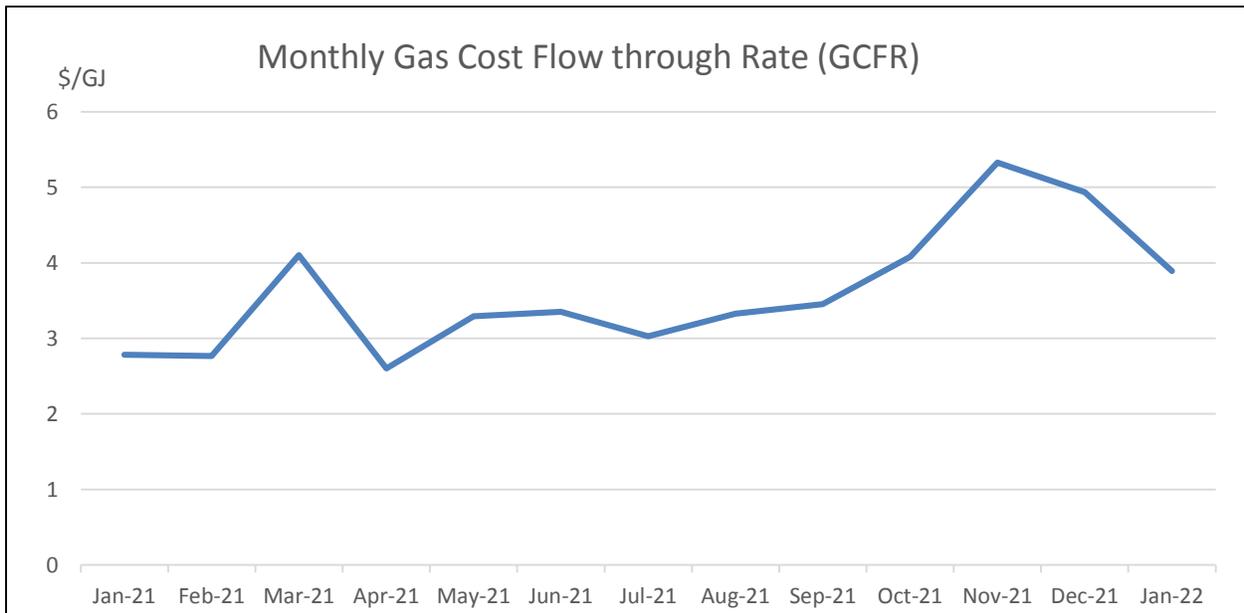


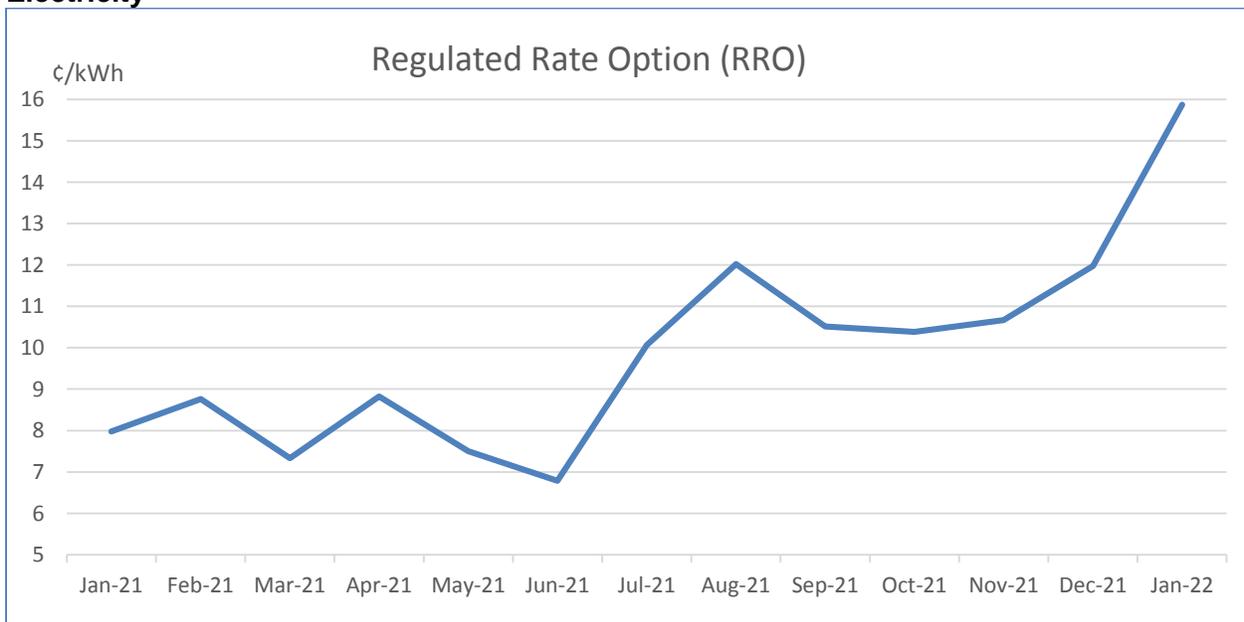
ENERGY PRICES AND MARKETS

Natural Gas

The 2022 January gas cost flow-through rate was \$3.89 per gigajoule. Natural gas prices in Alberta have dropped slightly as domestic natural gas production has returned to pre-pandemic levels (2019 December). Warmer-than-normal temperatures across much of the continent in 2021 December have also put downward pressure on natural gas prices. Year-over-year natural gas supply has risen as Canadian and US oil wells associated with natural gas production are returning following record low oil prices in 2020. The generally accepted natural gas industry price forecast has prices remaining around the \$3 per gigajoule range through the spring and summer of 2022.



Electricity



The ENMAX regulated rate option price for 2022 January was 15.88 cents per kilowatt-hour.

The ENMAX residential regulated rate option price is at its highest level since the regulated rate option was restructured by the provincial government in 2006. The exceptionally high regulated rate option price for 2022 January reflects, in part, abnormal strength and volatility in Alberta wholesale electricity prices.

Year-over-year, higher electricity prices in Alberta have been driven by increased demand, additional baseload generator outages (many overlapping as coal-fired units are being converted to using natural gas as its fuel source), extreme weather (a polar vortex at the start of 2021, a prolonged heat wave in the summer, and unseasonable cold in Alberta in December), a more aggressive price for carbon, higher generator offer prices, and firmer natural gas prices. With an average annual wholesale price of \$101.93 per megawatt-hour, 2021 prices were more than double the annual average in 2020 (\$46.72 per megawatt-hour) and is the second highest annual average price on record (after \$133.22 per megawatt-hour in 2000) since the establishment of the Alberta power pool in 1996.

As the retirement of coal-fired generators is expected by the end of 2023 and natural gas-fired units are gaining prominence in the production of electricity to meet baseload demand in Alberta, natural gas prices are becoming an even more important cost driver in determining Alberta electricity prices. 2021 regulated rate option Alberta electricity prices averaged 9.40 cents per kilowatt-hour, up from 6.36 cents per kilowatt-hour in 2020. The generally accepted power industry price forecast has prices declining slightly in 2022 Q2 and averaging 8.9 cents per kilowatt-hour for the 2022 calendar year.

UTILITIES AND INDUSTRY DEVELOPMENTS

Alberta sets new electricity demand record on 2022 January 3

On 2022 January 3, hour ending 18:00, the Alberta Electric System Operator reported that the province recorded a new all-time record for Alberta internal load demand at 11,939 megawatts. This occurred as the province endured a lengthy stretch of brutally cold weather in late 2021 December and early 2022 January. Alberta has only ever recorded 14 hours in which internal load demand has exceeded 11,700 megawatts, and 12 of these hours have occurred during the recent 2022 January 3 to 9 cold snap. From 2017 to 2021 (inclusive) Alberta internal load demand in January has averaged 10,294 megawatts across all hours.

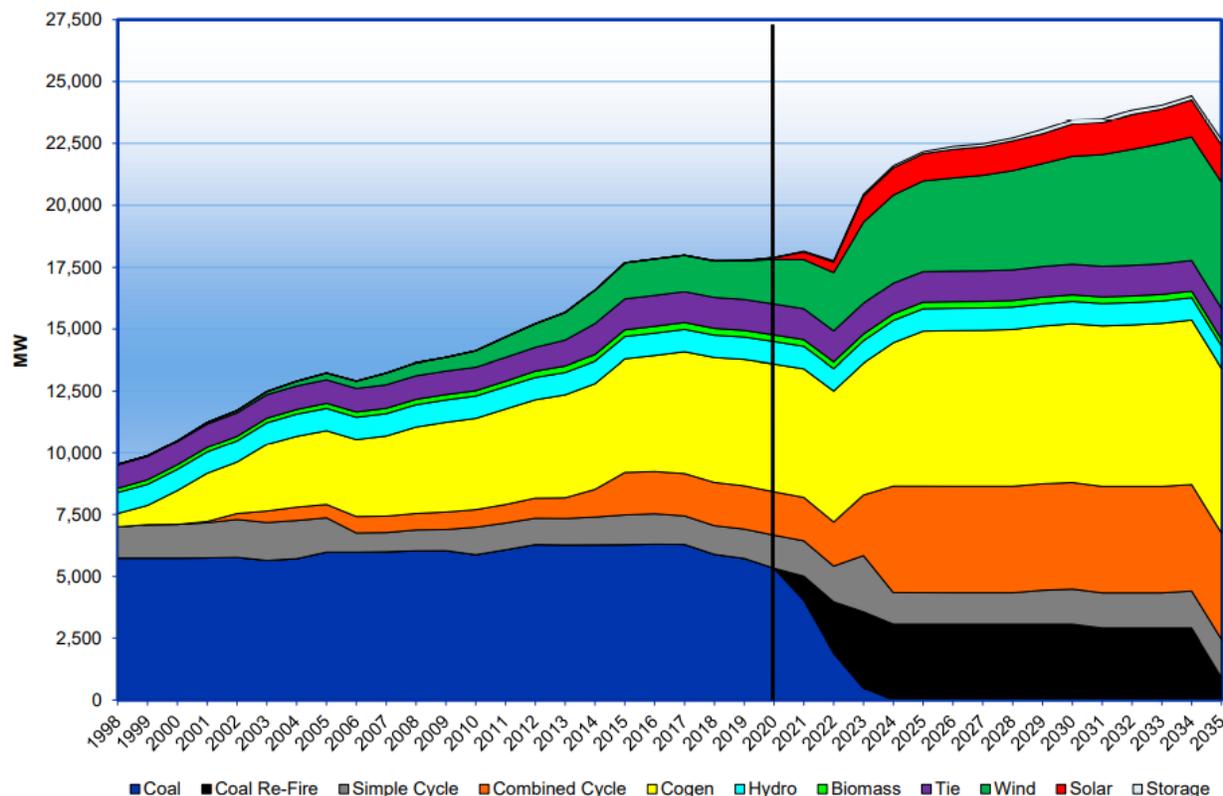
Besides the 2022 January 3 to 9 cold snap, the 10 highest Alberta internal load demand hours (as of 2022 January 16) are as follows:

	Hour (HE = Hour Ending)	Alberta internal load demand (megawatts)
1	2021 February 9, HE 19	11,729
2	2021 June 29, HE 14	11,721
3	2020 January 14, HE 18	11,698
4	2018 January 11, HE 18	11,697
5	2021 February 8, HE 18	11,696
6	2021 December 16, HE 16	11,696
7	2021 December 29, HE 18	11,696
8	2020 January 13, HE 18	11,693
9	2021 December 30, HE 18	11,683
10	2021 June 29, HE 17	11,674

Despite the record high demand observed during the 2022 January 3 to 9 cold snap, the Alberta Electric System Operator did not declare an energy emergency alert during this time. This suggests that there was sufficient generation/supply to meet this historic demand.

The Changing Face of Alberta’s Electricity Generation – Past, Present and Future

The graph below shows how Alberta’s installed electricity generation capacity (by fuel source) has evolved from 1998 to the present, along with a forecast out to 2035. Multiple trends are noticeable. Baseload generation (i.e. generation that is considered more predictable as it typically runs around the clock) has evolved from coal (dark blue area) to combined cycle (orange), largely as a result of increasing environmental legislation making coal fired power more expensive and decreasing natural gas prices since the mid 2000s as a result of shale gas plays. Coal fired generation, once the dominant fuel source for electricity generation in Alberta, is expected to be fully retired and/or converted to natural gas sources by the end of 2023. Many baseload generation outages have occurred over the past year as multiple coal-fired units go offline for reconfiguration into a natural gas-fired electric generating unit – these units are labeled “Coal Re-Fire” in the graph below. The environmental legislation coupled with technological improvements have also led to strong forecasts for further proliferation of renewable energy sources (wind and solar) in Alberta.



Source: EDC Associates, Q4-2021 Forecast Update

Alberta generating unit offer behaviour following the expiration of power purchase arrangements on 2020 December 31

On 2020 December 31, the final power purchase arrangements (PPAs) for electricity generating units in Alberta expired. With the expiration of these PPAs, offer control for many units changed hands from the PPA holder back to the owner of the generating unit. The largest cumulative change was the effective transfer of offer control from the Balancing Pool (a former PPA holder) back to utilities including TransAlta, Capital Power, and Heartland Generation – the owners of these former PPA units.

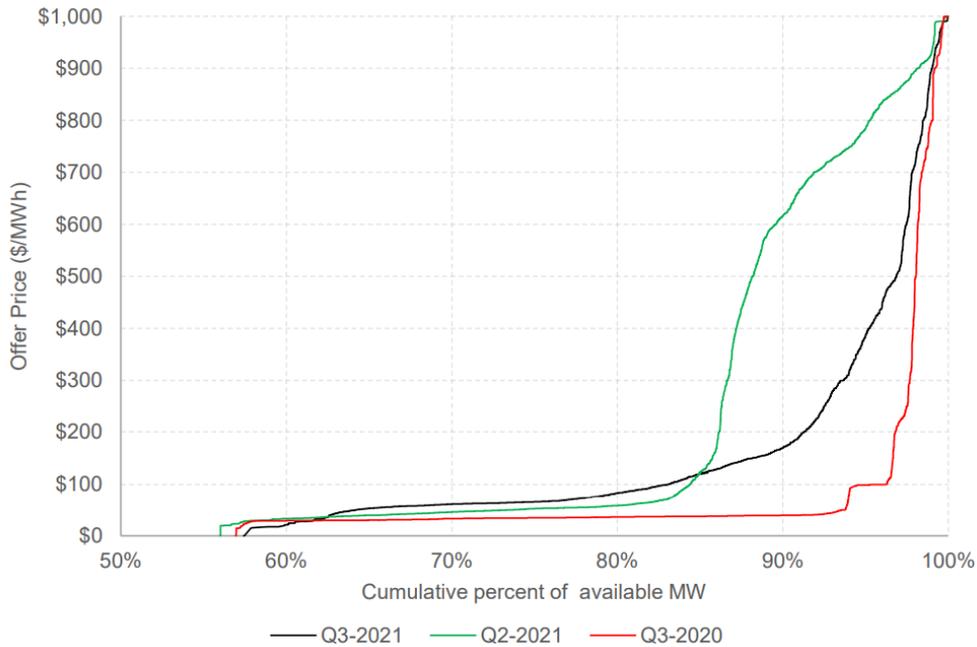
In its management of the PPAs prior to expiry, some market participants had alleged that the Balancing Pool did not operate the generating units for which it had offer control through the PPA in a “commercial manner.”¹

In its 2021 quarterly reports, the Market Surveillance Administrator has analyzed the offer behaviour of electricity generating units in Alberta, comparing the distribution of offer prices from generators both before and after the 2020 December 31 PPA expiries.

The three duration curves in the chart below show how the distribution of offers from Alberta’s electricity generation have differed from the third quarter of 2020 (red line) versus the second and third quarters of 2021 (green and black lines). The Market Surveillance Administrator has described the shift in offer behaviour between 2020 and 2021 as a result of the expiry of the

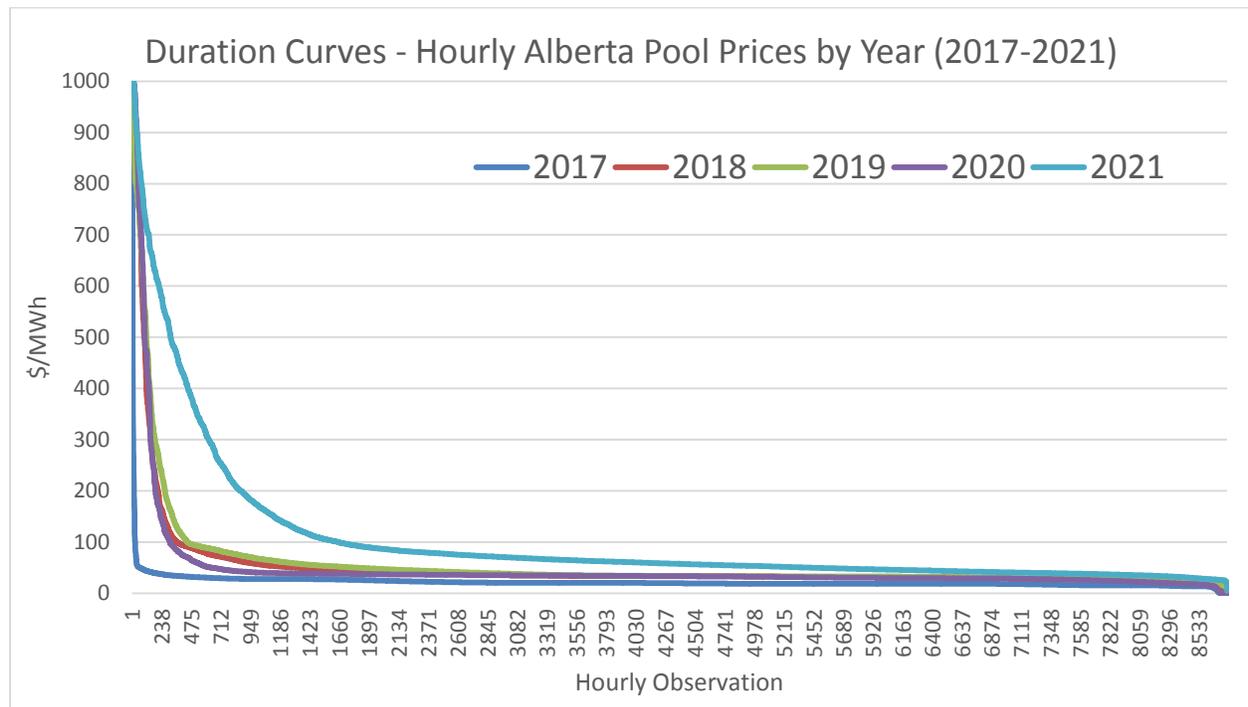
¹ For instance, please see Alberta Utilities Commission Decision 23828-D02-2020.

PPAs as a “material change” and is a contributor to the year-over-year increase in observed Alberta 2021 electricity prices.



Source: Market Surveillance Administrator, Q3 2021 Quarterly Report

These higher generator unit offer prices are believed to be a major contributing factor to the elevated Alberta wholesale electricity prices reported by the Alberta Electric System Operator in 2021. The annual duration curves (every hourly electricity price from that calendar year sorted from high to low) for 2017 to 2021 (inclusive) are as follows:



2018-2020 had similar duration curve profiles, while 2017 had significantly fewer wholesale pool price hours exceeding \$100 per megawatt hour, and 2021 had significantly more wholesale pool price hours exceeding \$100 per megawatt hour. The table below shows the average annual Alberta power pool price for 2017 to 2021 (inclusive):

Year	Average Annual Alberta Power Pool Price (\$ per megawatt hour)
2017	22.19
2018	50.35
2019	54.88
2020	46.72
2021	101.93