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Energy Musings

Insights into the Energy Industry

Allen Brooks, Managing Director

Energy Musings *contains articles and analyses dealing with important issues and developments within the energy industry, including historical perspective, with potentially significant implications for executives planning their companies' future. While published every two weeks, events and travel may alter that schedule. I welcome your comments and observations.* Allen Brooks

September 6, 2022

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New England Power Market Is Heading Toward Blackouts

Europe is facing an existential crisis – having sufficient affordable heat and electricity this winter for its populations. People are not only suffering ahead of winter's arrival, but the likelihood of people dying because of this crisis is growing. A similar challenge is being faced in many U.S. power markets. Can the worst of the potential outcomes be avoided, or are we on a path that will only worsen for our residents?

In May of this year, Federal Energy Regulatory Commission (FERC) commissioner Mark Christie said the country was "headed for a reliability crisis." That claim was supported by a report from the North American Electric Reliability Corporation declaring that the central and upper Midwest (MIZO), Texas (ERCOT), and California (CASIO) power markets were staring down the barrel of blackouts. While they are yet to materialize broadly, the challenges facing regional power grids remain serious issues for the foreseeable future. Managing the clean energy transition while keeping the lights on requires the skills of a juggler. Balancing the many demands, often coming at the same time, when there is room to address only one is a talent that comes from years of practice with many mistakes. In this case, mistakes can be life-threatening.

Early in December 2021, Gordon van Welie, president and chief executive officer of Independent System Operator – New England (ISO-NE) warned of potential blackouts throughout New England if the upcoming winter was colder than forecast. He told reporters they were cautiously watching three "variables that could put the region in a more precarious position than past winters and force the ISO to take emergency actions, up to and including controlled power outages."

Van Welie cited the following variables he and his operations team were watching closely. First was "how much natural gas will be available for gas generators during cold weather." This was an acknowledgment that getting adequate natural gas supplies into New England was challenging because of pipeline constraints imposed by neighboring New York and New Jersey that have blocked proposed capacity expansions.

The second variable was low storage levels of heating oil and liquefied natural gas (LNG) supplies, while the final variable, "and the hardest to predict," was the weather. Even though a mild winter was predicted by the National Oceanic and Atmospheric Administration (NOAA), van Welie said, "even a mild winter forecast does not preclude extended cold snaps. Such prolonged cold snaps would heighten the probability that emergency measures would have to be taken to keep the system from collapsing." Fortunately, a crisis was avoided, but the issues surrounding these three variables have not been erased. They may be intensifying due to the Russia/Ukraine war and the Biden administration's policies toward the domestic oil and gas industry.

Recently, U.S. Secretary of Energy Jennifer Granholm wrote to Massachusetts Governor Charlie Baker. "I urge you to consider what additional steps you can take in the coming weeks to improve preparedness, including using any legislative or executive tools at your disposal, working with responsible state agencies to require increased storage levels, and encouraging industry to voluntarily prioritize increasing gasoline and distillate inventories at this pivotal period of heightened risk," she wrote. East Coast gasoline inventories are at their lowest point in nearly a decade, while diesel supply is roughly 64% below the five-year average storage level. Given an extended winter storm impacting the East Coast and New England regions, home heating oil supply chains could be disrupted. Oil is a key fuel source for ISO-NE in managing the region's power grid and for home heating during the winter.

While the issue of avoiding blackouts for ISO-NE is receiving greater attention, the paths the various states have elected to travel in decarbonizing their economies increase the risk of blackouts.

In late July, van Welie was the keynote speaker at the summer WIRES conference. His talk was titled "The Four Pillars Needed for a Successful Clean Energy Transition, and the Critical Role of Transmission Infrastructure," which was appropriate for the non-profit organization that sponsors transmission investments as the solution to power market issues.

Van Welie listed his four pillars.

1. Significant amounts of clean energy to power the economy with a greener grid
2. Balancing resources that keep electricity supply and demand in equilibrium
3. Energy adequacy—a dependable energy supply chain and/or a robust energy reserve to manage through extended periods of severe weather or energy supply constraints
4. Robust transmission to integrate renewable resources and move clean electricity to consumers across New England

We were surprised there was no mention of affordability. Securing van Welie's four pillars is easy if cost is not a concern. However, as we are seeing in Europe, the number of people involuntarily forced into "energy poverty" by skyrocketing electricity and natural gas (heating) prices is growing exponentially. According to the European Union, "'Energy poverty' is a widespread problem across Europe, as between 50 and 125 million people are unable to afford proper indoor thermal comfort." In the U.K., it is estimated that nearly one-third of British households will face poverty this winter after paying energy bills.

The End Fuel Poverty Coalition (EFPC) estimates that about 10.5 million U.K. households will be in energy poverty during the first three months of 2023. For these families, after paying for energy their incomes will fall below the poverty line defined as a household income of less than 60% of the U.K. median, which was £31,000 ($37,500) in 2021. The estimate is based on energy cost estimates from research firm Cornwall Insight. It sees average household energy bills hitting £3,582 ($4,335) a year by October, and rising to £4,266 ($5,163) from January, roughly equal to about £355 ($430) a month.

Although many readers may think the New England region is immune to an energy crisis because the summer heat is fading, they may need to adjust their thinking. Winter peak demand is the issue. It can cripple the region when and if temperatures drop very low. Add in a winter storm – a Nor'easter or a blizzard – and you have a recipe for a human disaster.

As van Welie began sounding the alarm about power adequacy in the New England region last winter, there had been periodic warnings ahead of prior winters, but without them sounding quite as dire. The warnings became more urgent last week with the release of a "Draft ISO/EDC/LDC Problem Statement and Call to Action on LNG and Energy Adequacy" ahead of the upcoming FERC New England Winter Gas-Electric Forum. More on that later.

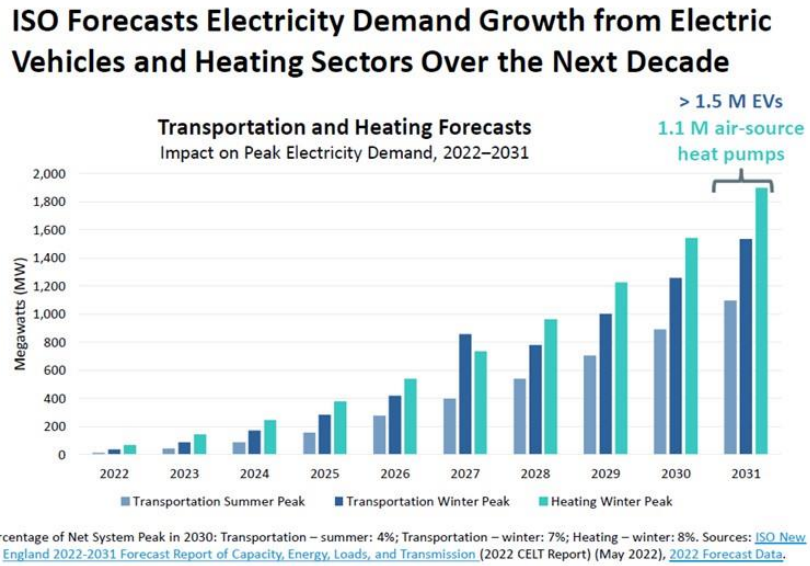
In his talk at WIRES, van Welie highlighted how the ISO-NE grid fuel mix had changed over time. Between 2000 and 2021, oil use fell from 22% to 0.2% of electrical energy production for the grid, while coal use went from 18% to 0.5%. Nuclear fell slightly from 31% to 22%, largely due to plant retirements, and renewables increased by 50% from 8% to 12% of the total. The biggest change was for natural gas which went from supplying 15% to 53%!

The problem for the region is that dispatchable generating capacity has shrunk. Since 2013, 7,000 megawatts (MW) of generation have retired or announced plans to retire. Most of that capacity has been coal, oil, and nuclear. Van Welie estimates that 5,000 MW of oil generation is at risk of retirement. He pointed out that retirements occur on schedule while new generating resources are often delayed, putting pressure on the grid. Additional grid pressure comes from its heavy dependence on imported LNG and oil that provides peaking energy supplies in the winter. These supply chains become uncertain during extreme weather conditions that create reliability risks for the grid.

It is important to understand how quickly generating capacity is changing on ISO-NE. In a slide for his talk, van Welie showed how the future fuel capacity mix is projected to change. In 2017, the grid's projected fuel mix called for natural gas to provide 48%, wind 44%, and solar 6% of the estimated 13,250 MW. This July, the future mix was dramatically different. Wind will provide 59% of the 28,704 MW of nameplate capacity to be added, while battery storage will supply 25% and solar 13%. Natural gas is projected to provide only 3% of the future generation capacity for the grid. Of the huge wind component, over half will come from new offshore wind projects, primarily off Massachusetts, with 8% coming from onshore wind projects. The future ISO-NE grid will have substantially less dispatchable energy raising questions about energy adequacy.

The future for the grid will be interesting given the following two slides about projected electricity demand and how peak demand switches from summer to winter. The first chart from van Welie's July presentation shows ISO-NE's forecast of energy demand from 2022 to 2031 based on the prediction of additional electric vehicles and electric heating in the New England region. At present, according to the U.S. Department of Energy's Alternative Fuels Data Center, there were 101,400 electric vehicles (battery electric and plug-in hybrid electric) in the six New England states in 2021. The ISO-NE forecast calls for over 1.5 million electric vehicles in the region that will need to be charged, thus the dramatic increase in transportation electricity demand. The chart shows a noticeable difference between the summer and winter transportation electricity demand, likely due to the diminished performance that comes with cold weather, as well as the increase in winter electricity from heat pumps.

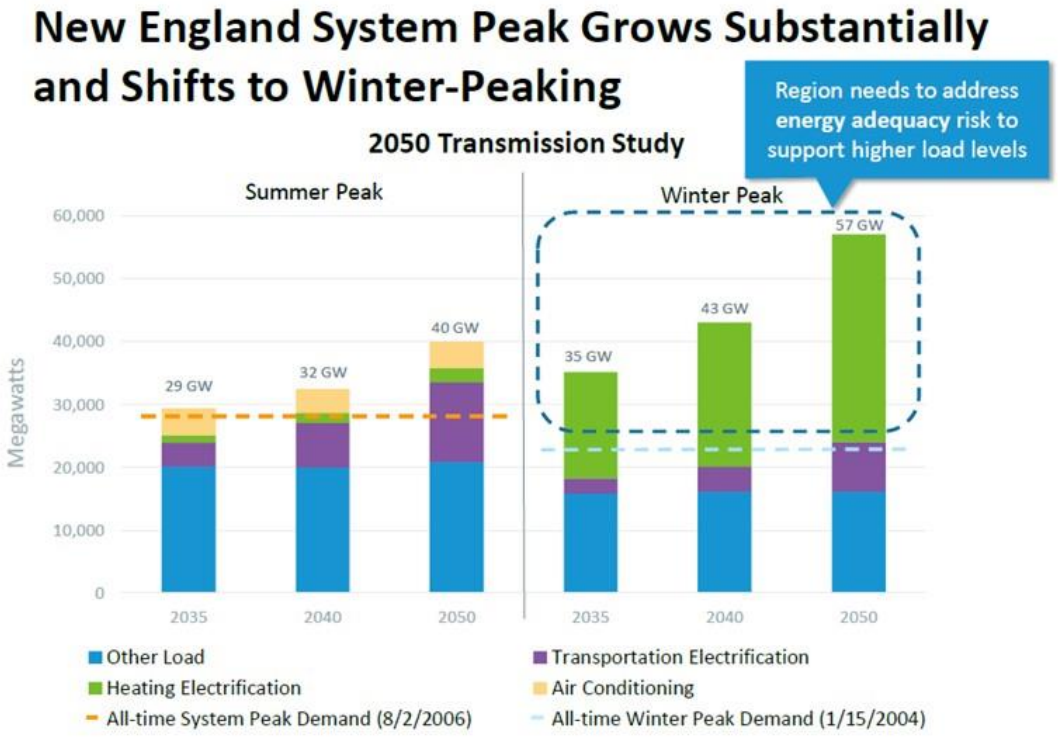
Exhibit 1. New England Is Projected To Need Substantial Electricity Supply



Source: ISO-NE

The implications of the green energy trends highlighted in the above chart, if carried through to 2050 are that the peak electricity demand in New England shifts from summer to winter as shown in the next chart. Moreover, the growth in the winter peak is dramatic, especially by 2050, compared to summer demand. The winter demand peak represents a doubling of the current gross generating capacity. That increase comes from heating electrification, which is a load that cannot be compromised because of its potential for creating a human disaster.

Exhibit 2. New England's Power Demand Peak To Shift And Grow Substantially



Source: ISO-NE

Van Welie concluded his WIRES presentation with the following key points. ISO-NE needs to plan to ensure energy adequacy to fully support the region's transition to clean energy resources and the electrification of transportation and heating sectors. New England has vast renewable energy potential, primarily wind energy, that the states want to tap for their decarbonization efforts. He also cited the potential of tapping additional hydropower from Quebec, but that adds to the grid's risk from both greater imports of power and the need to transport it from Canada to New England power markets.

His key conclusion was that ISO-NE will ultimately be required to make massive transmission investments to facilitate the clean energy transition. Estimates are that the grid must invest billions annually in new transmission capacity. Not only will it be costly, but there are issues with siting and cost allocation that needs to be overcome for the clean energy transition to be successful in New England. This clean energy transition is at risk because the projects necessary to add the required generating capacity and transmission lines to move the power around the region are complicated, costly, and have extended construction times. These are risks not receiving sufficient consideration in the rush to make the clean energy transition.

As mentioned earlier, the ISO-NE has issued a draft problem statement about LNG and energy adequacy in advance of a major regional and federal energy planning meeting. The two issues highlight the risk of early closure of the Everett LNG terminal, as currently planned. The following statement from the ISO-NE paper describes the issue.

In the meantime, the region needs to secure and stabilize the imported LNG supply chain to supply customers of natural gas. Most immediately, the region must ensure the continued operation of the Everett LNG Facility to maintain reliable electric and natural gas service for New England consumers. The need for the Everett LNG Facility will extend for a finite period beyond June 2024, when ISO New England's retention of the related Mystic Generating Station expires, and until the required infrastructure investments are made to reliably enable the envisioned clean energy future. (emphasis in the original)

We have no idea how long ISO-NE anticipates keeping the Everett LNG Facility operating, but we suspect it will be many years. ISO-NE continues working on finding solutions to manage energy adequacy while facilitating the region's clean energy transition. Its efforts have been done through the Future Grid Reliability Study, which involved collaboration between ISO-NE, the energy offices of the various New England states, and NEPOOL. Since 2005, NEPOOL has served as New England's independent, FERC-approved stakeholder advisory group on all matters relating to the competitive wholesale market rules and transmission tariff design. Involving NEPOOL is a recognition of the challenge of managing state environmental and power offices and plans with ISO-NE's needs and responsibilities along with FERC rules in developing energy solutions. As part of the planning, the study showed that approximately 73-90 gigawatts (GW) of wind, solar, and battery storage will be needed by 2040 to ensure the reliability of the energy systems depending on the amount of available dispatchable resources.

In summarizing its draft position paper to help focus the discussion at the FERC session in early September, ISO-NE wrote the following.

> In sum, we believe that, for the clean energy transition to be successful, the region must continue to have reliable supplies of gas for home heating and electricity. **Without adequate gas, the region may not be able to meet the demand for home heating and electricity – and, when reliability suffers, the clean energy transition suffers**. We have seen that story play out in Europe, Australia and, closer to home, in California and Texas. In sum, it is critical to the region's decarbonization goals that the lights and heat stay on in New England – and, for the foreseeable future, that requires gas. (emphasis added)

New Englanders are largely unaware that the light at the end of the clean energy transition tunnel is not a train, it's a blackout. Those who are reading the newspapers and financial press about sharply higher electricity and natural gas prices in Europe, increased energy poverty, and the potential for social unrest should be alarmed. Those risks lie in the background of U.S. energy policy if we continue to follow in lockstep Europe's policy moves.

Britain Scrambles To Reverse Gas Storage Crisis

In 2017, the British government decided the cost to upgrade and maintain the Rough gas storage field, located in the North Sea, was too expensive, so without a contract the facility was closed by its owner Centrica. Late in July, Centrica's storage license was renewed, and the UK energy regulator, the Office of Gas and Electrical Markets (Ofgem), granted Rough an exemption from the Third Party Access Regime, allowing Centrica to operate the facility at a capacity of 28 billion

cubic feet (bcf) (0.8 million cubic meters (mcm)) for the winter of 2022/23 and 59 bcf (1.6 mcm) for the winter of 2023/24. Without the exemption, Centrica said it would not be willing to go ahead with the investment necessary to bring the facility back into use.

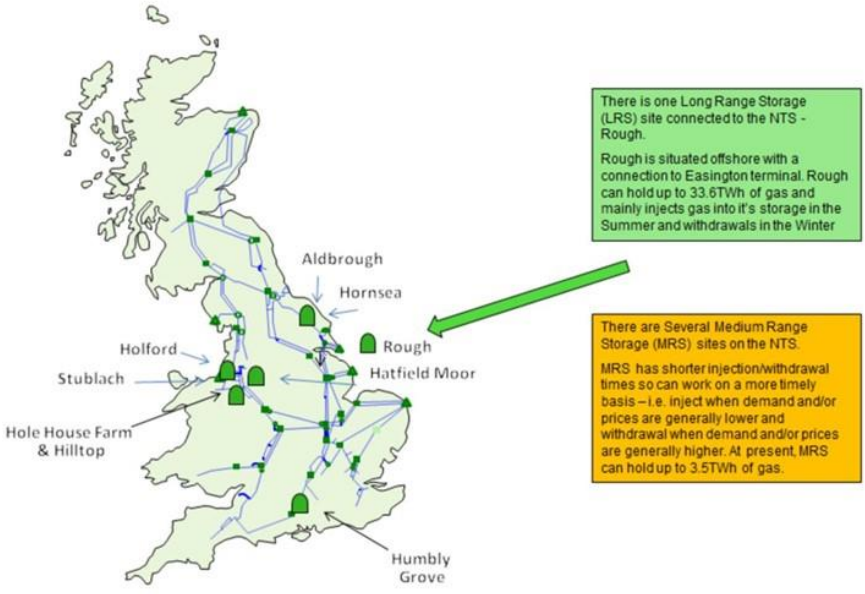
In its heyday, the 120-bcf (3.3 mcm) capacity represented 70% of the U.K.'s gas storage capacity, and it had a withdrawal rate of 1.6 billion cubic feet per day (bcf/d) (44 million cubic meters per day – mcm/d). Reports are that Centrica is preparing to begin injecting gas into storage in the next several weeks. It will not be able to supply what it formerly did, but any increase in the country's gas storage capacity will be welcomed.

Rough's history is an example of short-term thinking by a government lulled into complacency by low energy commodity prices. In 2013, the then energy minister Michael Fallon said closing Rough would save the government £750 ($877) million over the next 10 years. He said a diverse population of energy sources would ensure the public received "reliable supplies of electricity and gas at minimum cost."

As a result, today, U.K.'s storage facilities hold enough natural gas to meet the demand of four to five typical winter days, or about 1% of Europe's total available gas storage. The Netherlands has more than nine times the storage capacity of the U.K., while Germany's capacity is 16 times the size. Adding more storage is a good thing for the overall European gas market, and especially for the struggling British people, but it will take years before the U.K. has as much storage capacity as it had before 2017.

The irony of Fallon's decision was that in a matter of months following Rough's closure, National Grid, the U.K.'s energy operator, issued a formal warning that the country did not have sufficient gas to meet demand during the freezing "beast from the east" storm that battered the U.K. in March 2018. Within a day, the U.K. gas price surged by almost 75%. The U.K. did not run out of gas, but the cost of gas climbed eightfold from usual levels on that day.

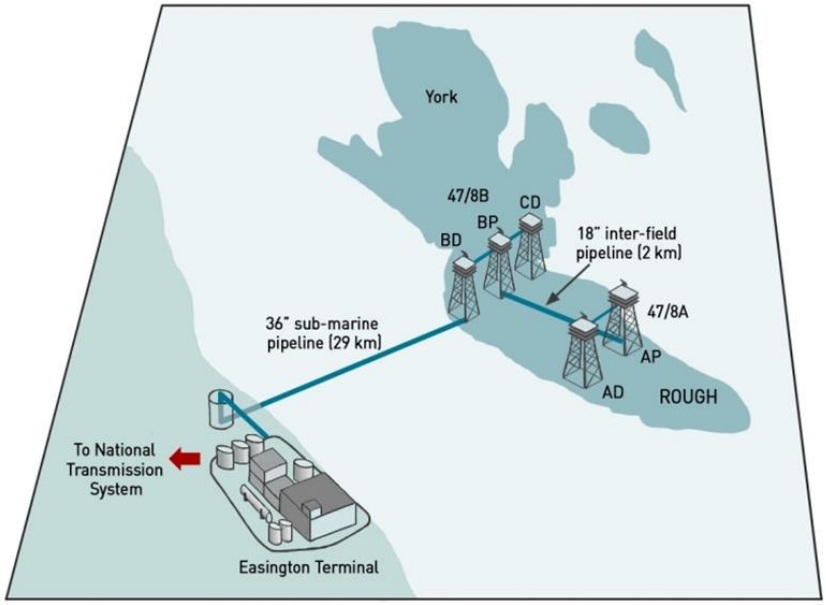
Exhibit 3. Rough Gas Storage Facility Is In The North Sea



Source: ***Watt-Logic***

The chart above shows Rough's location, while the chart below shows the plan of the facility. The Rough reservoir is a depleted gas field located approximately 18 miles off the east coast of Yorkshire. It is approximately 6 miles long by 1.8 miles wide and lies about 1.8 miles beneath the seabed. The porous rock that forms the Rough reservoir, Rotliegendes sandstone, is a rare geological formation with uniform porosity that enables gas to flow easily through it. The reservoir is surrounded by non-porous rock, enabling natural gas to be pumped into it and held in place under pressure.

Exhibit 4. Schematic Of Rough Gas Storage Facility



Source: Centrica Storage Limited

Source: *Watt-Logic*

The Rough facility is comprised of two offshore installations (47/3 Bravo and 47/8 Alpha), and a terminal at Easington, which was used for the injection and withdrawal of gas to and from the reservoir. The Bravo platform has 24 operating wells across three linked platforms. The Alpha platform, with its six wells, was used to maintain deliverability of gas from the field during peak demand days.

When British Gas bought the Rough field in 1980, roughly a third of its reserves had been produced, leaving 255 bcf (7.2 bcm) of recoverable reserves. The reservoir pressure had declined from 4,535 pounds per square inch absolute (psia) to 2,800 psia. Given the declining reservoir pressure, if normal production had continued, compressors would have been necessary for the production platform. Since it was impractical to use the same compressors for gas injection and production, the storage facility was designed so compressors would be used only for injection.

The storage facility was designed to use wells, the cushion gas, and pipelines so that no production compression was required, but the reservoir pressure needed to be roughly 1,000 psia higher than the existing pressure and sustained at that higher pressure. Under normal storage operations, the maximum operating pressure would be 3,500 psia.

When the Competition & Market Authority published its preliminary decision in 2013 allowing suspension of Rough's operating requirements as a storage facility, it was allowed to produce all the remaining recoverable gas, estimated at 175 bcf (5.0 bcm). Centrica began producing the cushion gas and anticipated it would take 4-5 years to accomplish. According to Centrica's reports, cushion gas production was as follows:

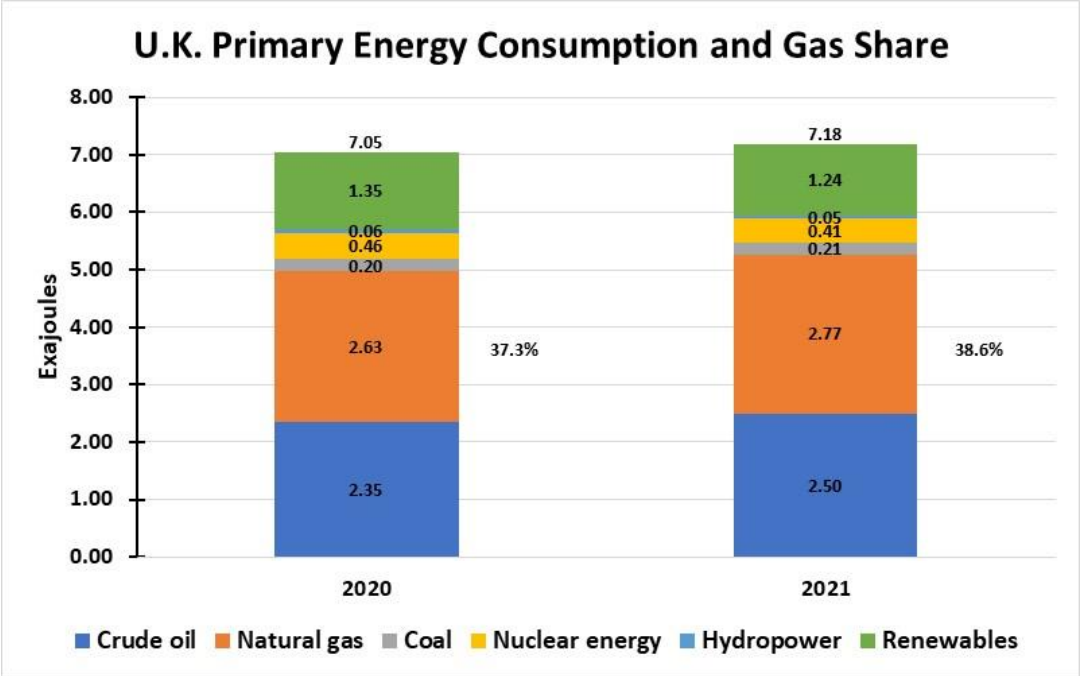
- 2016: 9 bcf (0.26 bcm)
- 2017: 56 bcf (1.59 bcm)
- 2018: 67 bcf (1.90 bcm)
- 2019: 40 bcf (1.13 bcm)
- 2020: 23 bcf (0.65 bcm)
- 2021: 16 bcf (0.45 bcm)
- 2022: the interim results indicate a 71% increase in production versus 2021 which would be a further 28 bcf (0.78 bcm)

This record indicates that 239 bcf (6.8 bcm) of cushion gas has been extracted since Rough began the process, which is more than the amount estimated to be held in the reservoir at the time of the storage facility's closure. Therefore, some of the previously un-recovered gas reserves have also been produced.

It will be interesting to see how much gas can be injected into Rough once it reopens and begins the process of rebuilding storage for this winter and next. According to Reuters, the amount of gas that will be available to the U.K. energy is equivalent to 10 LNG cargos. The typical LNG cargo contains 70,000 tons, or 3.4 bcf (0.1 bcm). Thus, 10 cargos imply a total of 34 bcf (1.0 bcm). Natural gas is a key primary energy source for the U.K. because it heats about 70% of homes and powers electricity generation.

The following chart is derived from primary energy consumption data reported by the U.K.'s Department for Business, Energy & Industrial Strategy (BEIS). Total primary energy consumption increased between 2020 and 2021, which is not surprising given that 2020's economic activity was depressed by the Covid-19 pandemic. It should be noted that the consumption of natural gas rose in 2021 and accounted for nearly 39% of total U.K. primary energy use, demonstrating how critical this fuel is to the country's economy.

Exhibit 5. Natural Gas Is A Major Component In U.K. Primary Energy Consumption



Source: BEIS, PPHB

To appreciate the role Rough may play in the U.K.'s energy future, the following chart shows all the other storage facilities in the country, their capacity, and days of supply at maximum withdrawal rates. Of the seven storage facilities, two are quite small. However, of the five facilities with substantial capacity, only three have any notable duration of supply at maximum withdrawal rates. If Rough can be returned to its former role as the nation's primary gas storage facility, U.K. energy customers will be in better shape as they head into this winter. The problem, as noted previously, is that Rough's capacity will be limited for this winter and next, as Centrica completes upgrades and maintenance work.

Exhibit 6. U.K. Gas Storage Facilities

GB gas storage facilities
(as at January 2021)

Facility	Operator	Estimated working gas volume (mcm)	Approximate maximum production rate (mcm /d)	Approximate maximum injection rate (mcm /d)	Withdrawal duration at maximum rate (days)
Hornsea (Atwick)	SSE Hornsea Ltd	285	12	3	20
Hatfield Moor	Scottish Power	70	2	2	60
Humbly Grove	Humbly Grove Energy	243	7	8	34
Aldbrough	SSE Hornsea Ltd /Equinor	205	31	29	6
Holford	Uniper	237	22	26	19
Hill Top Farm	EDF Energy	59	13	3	5
Stublach	Storengy	400	30	30	13

Source: Ofgem

Source: *Watt-Logic*

Another potential source of natural gas supply for the U.K. is its three liquefied natural gas (LNG) terminals, listed below. While LNG remains an important supply source, it is expensive and

subject to disruptions from weather and market forces. For instance, the U.K. just received an LNG cargo from Australia, which picked up additional volumes via a ship-to-ship transfer off Malaysia from a carrier hauling LNG from Oman. Australian LNG cargos to the U.K. and Europe are rare because of the distance that elevates the cost.

Exhibit 7. U.K. Has Only Three LNG Terminals

GB LNG terminals

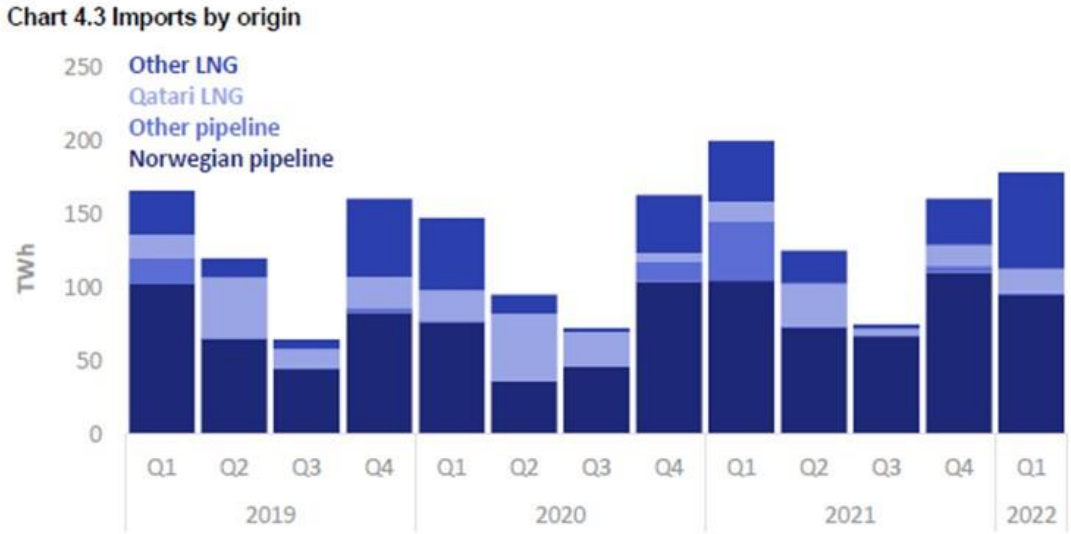
LNG Terminal	Annual process capacity (bcm /year)	Technical capacity (GWh /day)	Technical capacity (mcm /d)
South Hook	20.3	650	59.7
Isle of Grain	19.5	652	59.8
Dragon	7.6	252	0.7

Source: Company data, REMIT information

Source: *Watt-Logic*

The chart below shows the source of natural gas supply imported into the U.K. quarterly for 2019 through the first quarter of 2022. Note the importance of Norwegian pipelined gas supply. It dwarfs the LNG shipments. But Norway has slowed its gas exploration and development activity.

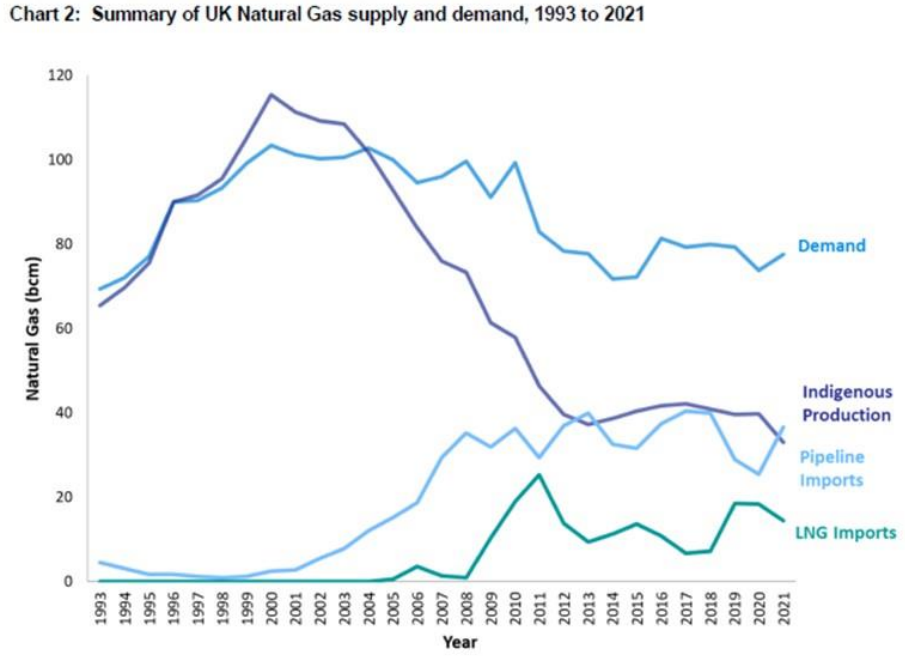
Exhibit 8. How U.K. Natural Gas Imports From Suppliers Have Varied Over Time



Source: BEIS

The following chart highlights the long-term trends in natural gas supply sources for 1993 to 2021. With the decline in domestic gas supply as the North Sea gas fields depleted and exploration lagged, imported supply sources grew in importance. That growth came despite a decline in natural gas consumption as renewable energy grew in importance in the power generation market. The interesting but unanswerable question is whether the uptick in gas consumption in 2021 marks the start of a new trend or merely a reaction to market forces.

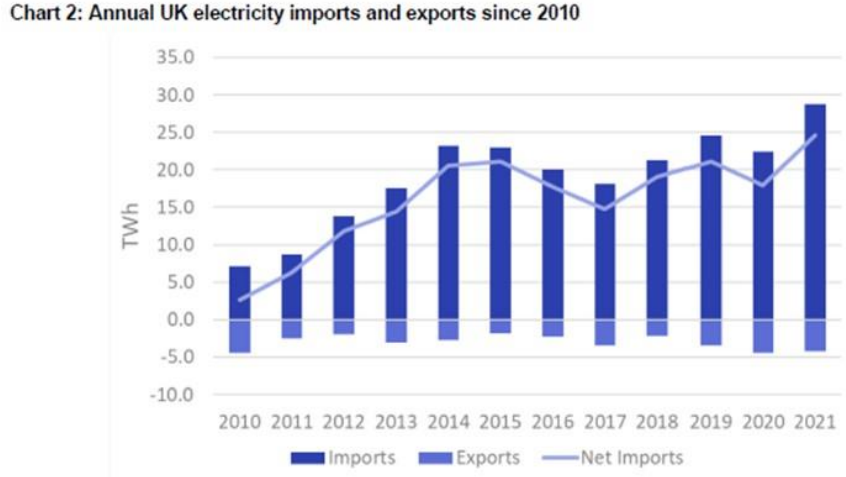
Exhibit 9. How U.K. Natural Gas Supply Sources Have Changed Over Time



Source: BEIS

Attempting to answer the question about the U.K.'s natural gas consumption, there is little the country can do in the near-term other than ask people to use less. Turn down the thermostat in winter. Wear more clothes. Shower in cooler or cold water. Burn wood or coal in home fireplaces. These are temporary adjustments. They are not sustainable, long-term. The following chart shows electricity imports to the U.K. since 2010. It shows a steady rise from 2010 to 2014. While imports declined during the next three years, the 2017 low was still higher than the electricity imports in the earlier years. Since 2017, electricity imports have climbed, spiking in 2021.

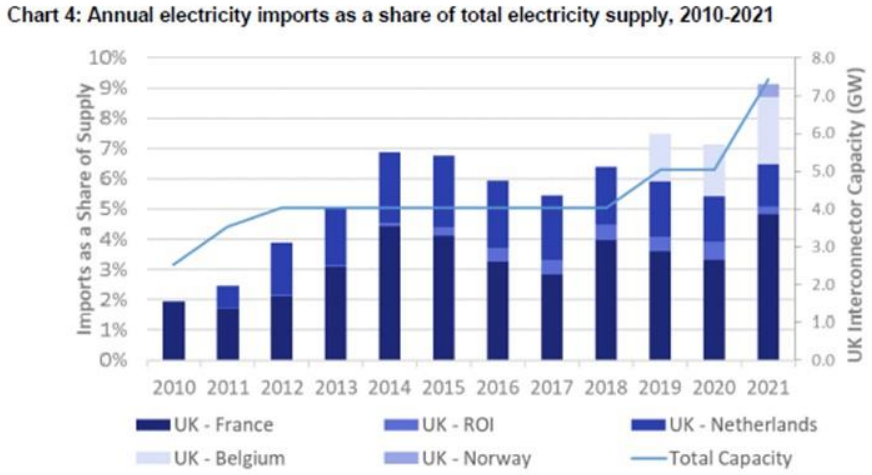
Exhibit 10. U.K. Increasingly Depended On Electricity Imports – A Growing Risk



Source: BEIS

The next chart shows the percentage of total electricity supply that was represented by imports. From a low of 2% in 2010, imported electricity was slightly above 9% in 2021.

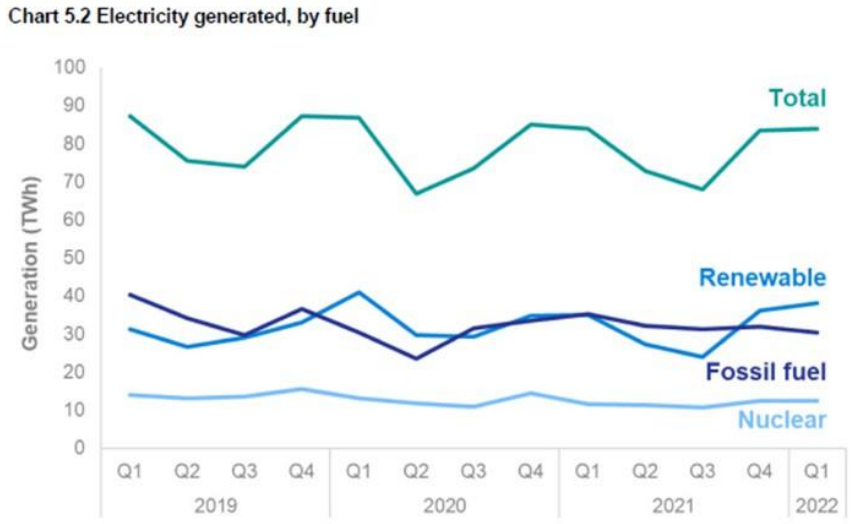
Exhibit 11. Electricity Import Share Of Power Supply Has Been Growing Recently



Source: BEIS

Over the last three years, U.K. electricity generation was essentially unchanged as shown in the chart below. The chart shows quarterly data, so winter demand compared to summer demand becomes evident. BEIS commented in its latest quarterly update (1Q2022) on how that quarter compared with 1Q2021. Total electricity generated was essentially flat, however, renewable output was higher while fossil fuel production was lower. BEIS stated that environmental conditions were better in the most recent quarter – better wind speeds and more solar hours – that helped renewable energy. Of course, none of that happened in 2Q2021 and 3Q2021 when wind stillness arrived and days were cloudy, which was what kicked off the U.K. and European energy crisis.

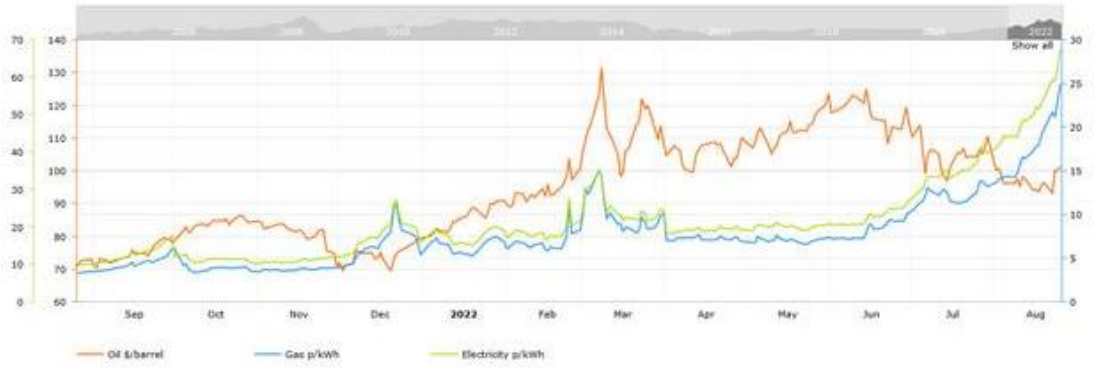
Exhibit 12. Renewable Fuel Share Growing But Creating Energy Insecurity



Source: BEIS

The importance of natural gas to the U.K. electricity market is demonstrated by the price action of U.K. gas and electricity prices in recent days. The chart below shows U.K. prices for oil, gas, and electricity for the past 12 months, as fears of physical shortages of fuels began driving markets. Two things stand out. First, natural gas and electricity prices began rising almost at the exact time crude oil prices started falling this summer. Second, electricity and natural gas prices track each other closely over the virtually the entire period, except starting in late June when they diverged. By mid-August the prices were returning to their long-standing close relationship.

Exhibit 13. U.K. Oil, Gas, And Electricity Prices Over Last 12 Months



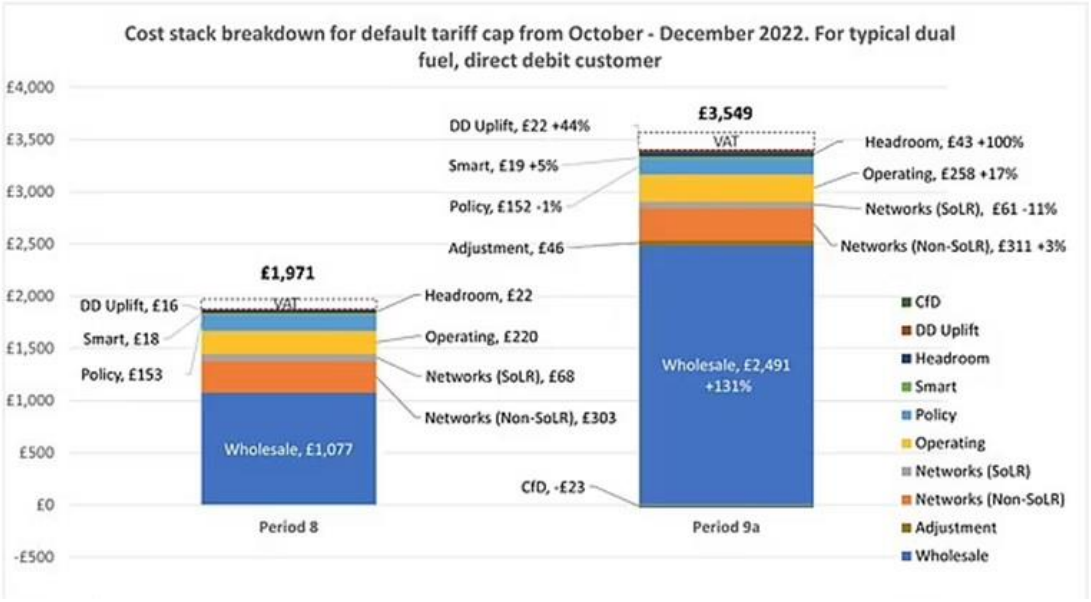
Source: cliffordtalbott.co.uk

What does all this mean for the average British family? Simply, their cost of living is going up and there is little they can do about it except keep a stiff upper lip. Household annual energy costs went up in April by over 50%, rising from an estimated £1,277 ($1,730) to £1,971 ($2,670). That estimate covered the April to September 30 period. Cost calculations normally covered six-month spans, however, under revised guidelines the review and price-cap setting has been shortened to every three months once the October period ends in March 2023.

In April, Ofgem indicated it expected the cost for the October period would be higher, but on August 19 it announced that the projected energy cost increase for the typical household would jump by 80%. Each increase means not only greater financial pain for families, but it pushes an increasing number of families into “energy poverty” in which they must choose between paying for energy, food, or rent. The government will need to step up relief measures, in effect socializing the higher energy costs, or risk civil unrest. There is already a financial grant mechanism in place, but the amount of money granted to families has been eclipsed by the rise in energy and food prices, leaving families struggling to determine how they will pay for necessities in the upcoming winter.

Ofgem determines what energy suppliers can charge households via a complex formula that includes establishing the price per unit of natural gas and electricity that can be charged as well as various other charges like subsidies for clean energy, networking, and operating costs. The chart below shows the breakdowns of the prior energy cost and the newly announced one into their various component parts.

Exhibit 14. Composition Of Annual Energy Projections



Source: Ofgem

Ofgem said the recent increased cost estimate was almost entirely due to higher wholesale energy costs as they represent 70% of the total electricity cost estimate. Natural gas is the primary driver of that cost increase, as more than 80% of English households rely on natural gas rather than electricity to heat their homes. That mix will change as the British government has ordered homes to convert their gas-burning furnaces with electric-powered heat pumps.

Another fee included in the total energy cost estimate is the Policy fee. It will amount to £152 ($205) of the energy cost and is for green energy subsidies.

Ofgem allows energy suppliers to earn a profit of 1.9%, which it calls "modest." The regulator is looking into whether this profit margin allowance is too high. Ofgem did note that "most domestic suppliers are currently not making a profit." According to *Forbes Advisor*, since the start of the U.K. energy crisis in 2021 through February 2022, over 31 British energy companies closed their doors leaving over two million customers dependent on Ofgem's safety net while they searched for new suppliers. Helping British families deal with exploding energy costs will be a prime mission for the new British government that will succeed Prime Minister Boris Johnson.

Following the April energy cost hike, the Energy Saving Trust provided a list of energy saving steps a typical household could take to reduce their annual energy and water costs. The estimated cost savings are based on a typical three-bedroom, gas-heated home in Great Britain, using April 2022 price-cap prices. If every step was taken for a year, a family would save £375 ($506, a little more than 10% of their estimated energy cost as of the October 2022 figure.

1. Switch appliances off standby: £55
2. Draught-proof gaps: £45
3. Turn off the lights: £20
4. Wash at 30 degrees and reduce use by one run a week: £28
5. Avoid using the tumble dryer: £60

6. Limit showers to four minutes: £70
7. Swap one bath a week for a shower: £12
8. Don't overfill the kettle and fit a tap aerator: £36
9. Reduce your dishwasher use by one run a week: £14
10. Insulate your hot water cylinder: £35

The editorial board of the *Financial Times* offered its opinion on what Britain faces and problems with the choices. The opening paragraph of their editorial stated:

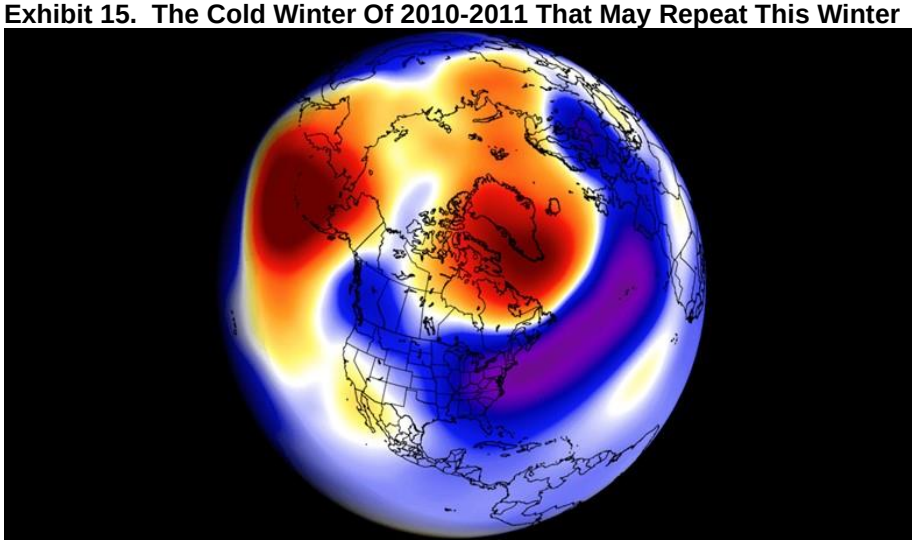
> Not for decades have Britons faced the kind of agonizing choices they will confront this winter. The grim confirmation of an 80 per cent increase in the cap on household energy bills from October will force many to choose between heating and eating this Christmas. For businesses, many of whom could face a fourfold rise in bills, the decision may be between cutting jobs and shutting up shop. A surge in unemployment would compound the misery for families across the country. Whatever their other ambitions, finding ways to tackle what is a national emergency will be the defining challenge for Britain's next prime minister.

The typical suggestion for easing the financial pain include capping energy prices but given that power is purchased in global markets means someone – the government – must pay the difference between the capped price and the market price. There are other fallouts from such a strategy that the editorial board wrote.

> Holding down energy prices across the board for long periods, as some are advocating, could prove inordinately expensive, and dull incentives to economize. Indeed, while cutting value added tax on energy may help at the margin, VAT revenues are also useful to fund support packages and the energy transition.

High energy costs will hurt Britons and the nation's economy. The scary scenario is a bitterly cold winter. The chart below shows the global weather during the winter of 2010-2011 a particularly cold year. As seen, the dark blue on the globe represents extremely cold temperatures as they extended from Western Canada across the Midwest and eastern portions of the U.S. and across the Atlantic Ocean to Northern Europe, including the U.K. While such a scenario hasn't been forecast for the upcoming winter yet, early forecasts are calling for a more normal winter, which for the U.K. would be relatively mild – a thankful outcome if it happens. Climate modelers, however, are acknowledging that the world is about to experience its third consecutive La Niña year. This weather pattern is the opposite of El Niño, and for the U.K. it is known to cause temperatures to drop. The last time we experienced a "triple-dip" La Niña was 2010-2011. That winter saw the coldest December on record for the U.K, with "copious" amounts of snow. January experienced more normal winter weather, and February was very mild, but extremely cloudy, which is not particularly good for renewable energy generation.

Exhibit 15. The Cold Winter Of 2010-2011 That May Repeat This Winter



Source: NOAA

The British people are about to experience a winter that will be challenging to say the least. We can only hope for the British people that the winter is not a repeat of 2010-2011 and that energy costs ease. Britons must prepare for and adjust their lives in anticipation that they will get little relief. An issue is whether those managing the U.K.'s energy system are prepared. A recent *Bloomberg* article by Javier Blas raises questions about the degree of readiness.

For several months, Blas has been listening in on the weekly call officially known as the "ESO Operational Transparency Forum" that allows market participants to question the managers of the Electricity National Control Centre, the organization that moves power around the U.K. from electricity generators to traders to consumers. Usually, the questions deal with obscure power-trading issues. Now they have shifted to issues dealing with crisis management. Apropos given how the forward energy market is pricing U.K. power for December 2022 close to £1,000 ($1,170) per megawatt-hour (MWh), up 50% from current prices.

Recent questions have included: "Are you war-gaming possible options for if/when cross-border trading collapses under security of supply pressures this winter?" "Can we have a session where we talk through the emergency arrangements?" A questioner asked, "What level of demand reduction, demand destruction, are you forecasting for the winter ahead from commercial industrial consumers as a price response?" And another questioned, "What demand destruction, if any, is included in your demand forecast for this winter for residential and industry?" The questions received no answers.

Another call participant said the government's forecast for the demand-and-supply electricity balance showed "how bad the winter could be for anyone who can do the maths." The questioner went on to say, "I don't think you believe what you've written [about supply predictions], and nobody else does." As the questions become more pointed over what the energy system managers truly believe about the nature of the potential winter fuel crisis, the lack of answers is troubling. The concerns raised from unanswered questions contrast with the British government's statement that there's nothing to worry about. "Households, businesses and industry can be confident they will get the electricity and gas that they need over the winter," the British government opined. "That's because we have one of the most reliable and diverse energy systems in the world."

After listening to numerous weekly calls over several months, Blas had three takeaways. "First, the looming power emergency is worse than many industry executives publicly acknowledge, and a lot more dangerous than the government admits. Second, high prices are a big problem, but security of supply is at risk, too. Third, time is running out to prepare before temperatures start to drop." Getting the Rough gas storage facility up and working as soon as possible is an important step in helping Britons cope with the upcoming winter, but it will likely be insufficient if the winter is colder than anticipated.

Global Energy Markets At Risk Of Hurricane Disruptions?

The current Atlantic Basin hurricane season is off to the slowest start in 40 years according to Colorado State University (CSU) meteorologist Philip Klotzbach, who heads their hurricane forecasting. After a tropical depression brought street-flooding to parts of South Florida in early May and became Tropical Storm Alex over the open waters of the western North Atlantic, people were convinced that the predictions of CSU, the National Oceanic and Atmospheric Administration (NOAA), and others, calling for an "above-average" storm year would come true.

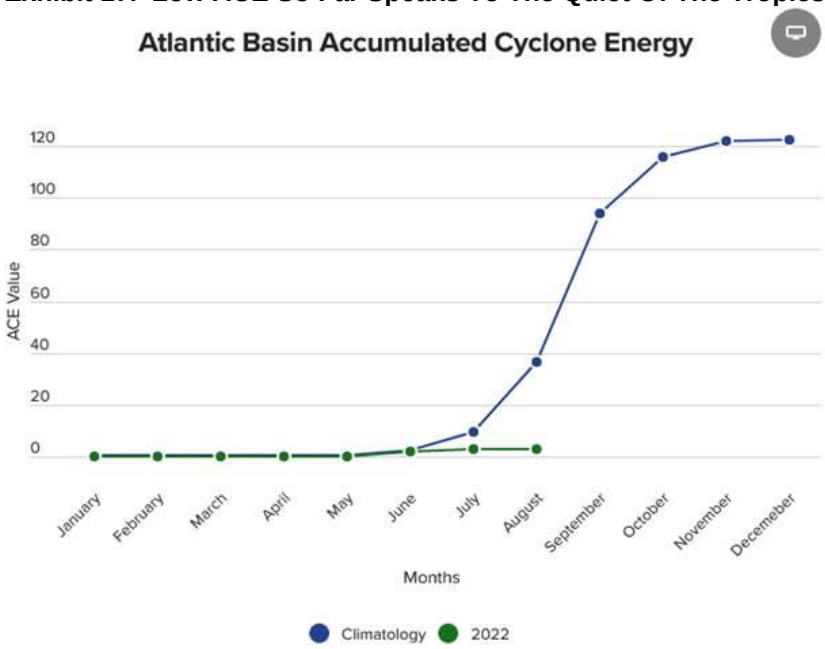
TS Alex was followed by Tropical Storm Bonnie which developed in the western Caribbean Sea in early July and landed in Nicaragua and Costa Rica and then by Tropical Storm Colin which developed over South Carolina in early July but with minimal impact. Those three storms constitute the total tropical storm activity so far this season. Following TS Colin, the tropics became quiet. Klotzbach tweeted about how quiet the Atlantic basin had become.

Exhibit 16. July and August Proving To Be Extremely Quiet

Source: ***Twitter***

To appreciate how quiet the season has become, the following chart shows the Accumulated Cyclone Energy (ACE), a measure of the energy released by tropical storms over their lifetimes, for 2022 compared to the normally expected ACE. Through most of August, the Atlantic Basin ACE is 83% behind the normal pattern.

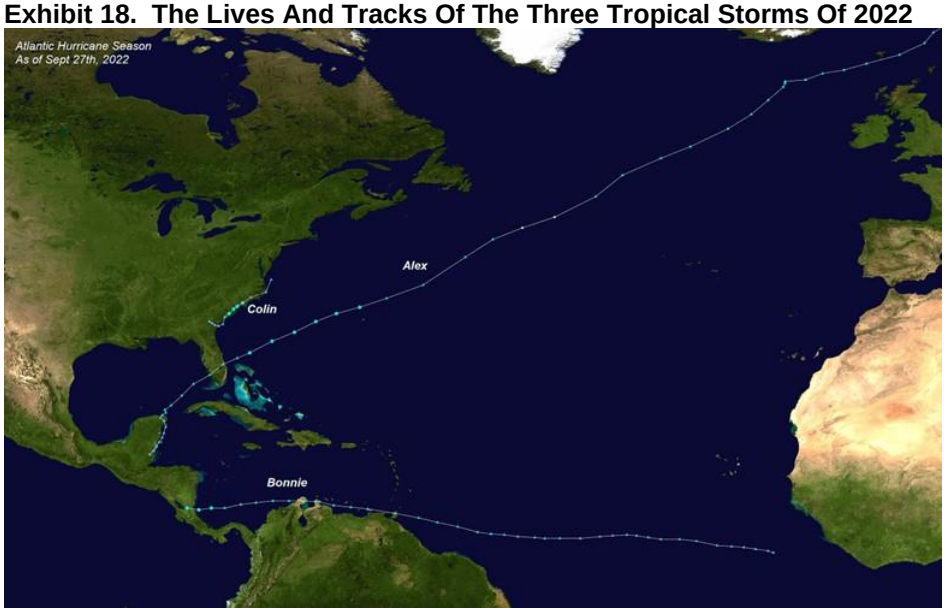
Exhibit 17. Low ACE So Far Speaks To The Quiet Of The Tropics In 2022



Source: CSU

While initial 2022 hurricane season forecasts called for an active year, forecasters recently have been marginally reducing their outlooks, given how much of the season has been quiet. Forecasters remain convinced we will still experience an above-average hurricane season. The challenge to their forecasts is the record so far of the three tropical storms. Note in the chart below how short the life of TS Colin was. (The date on this chart has the wrong month – August rather than September.)

Exhibit 18. The Lives And Tracks Of The Three Tropical Storms Of 2022



Source: severe-weather.eu

The chart below shows the record of the CSU forecasts from April through early August. What we see is that the storm numbers increased slightly from the initial April forecast but have recently been trimmed. CSU now expects two fewer named storms and 10 fewer associated storm days. Both the number of hurricanes and major hurricanes have been reduced slightly, as well as the number of associated storm days.

Exhibit 19. Quiet Hurricane Season Start Needs Revised Forecast

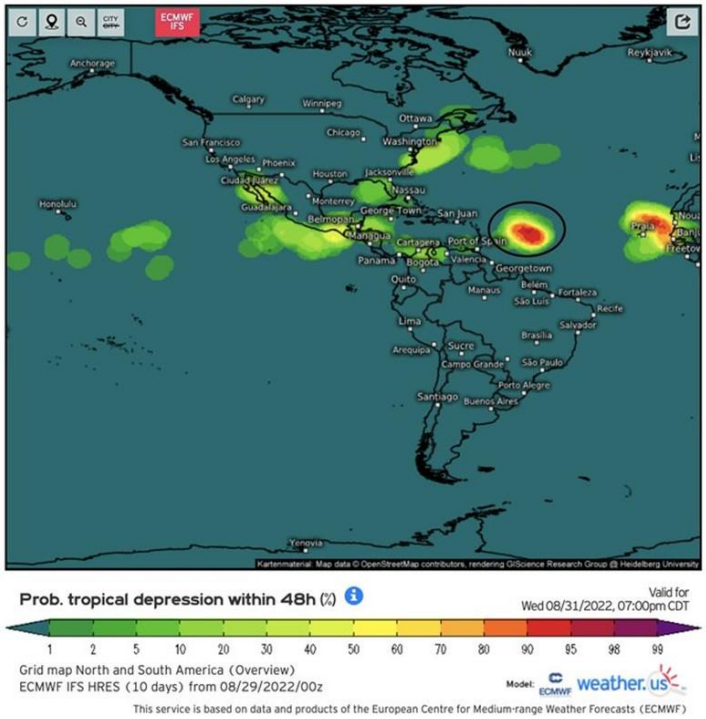
Forecast Parameter and 1991-2020 Average (in parentheses)	7-Apr-22	2-Jun-22	7-Jul-22	4-Aug-22	Observed Thru 6 July 2022
Named Storms (14.4)	19	20	20	18	3
Named Storm Days (69.4	90	95	95	85	3.25
Hurricanes (7.2)	9	10	10	8	0
Hurricane Days (27.0)	35	40	40	30	0
Major Hurricanes (3.2)	4	5	5	4	0
Major Hurricane Days (7.4)	9	11	11	8	0
Accumulated Cyclone Energy (123)	160	180	180	150	3

Source: CSU, PPHB

NOAA has lowered its estimated probability for an above-average storm season from 65% to 60%, with its normal season probability rising from 25% to 30%. It has retained its 10% probability for a below-average storm season. NOAA did reduce the upper end of its range for named storms by one to 20, and for major hurricanes, also by one, down to five.

Forecasters are now warning about the likelihood that tropical storm activity is about to accelerate. Numerous comments cited the following graphic of the world's weather disturbances (green, red, and yellow areas) and the probability they may turn into tropical depressions, which is the first step in evolving into tropical or stronger storms.

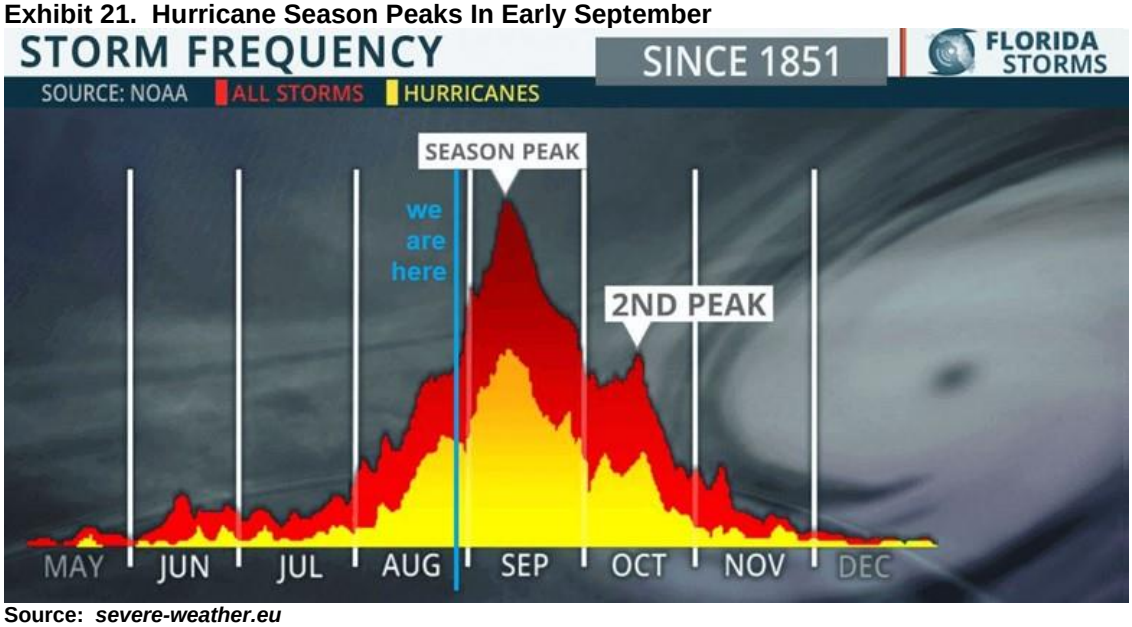
Exhibit 20. End To Quiet Hurricane Season?



Source: Weather.us

The odds are that we will experience more tropical storms and even hurricanes and major hurricanes before the season is over. The following chart shows the normal pattern for tropical storm frequency during the season. As it demonstrates, while August is traditionally an active month, the peak of the storm season usually occurs in the first half of September. But since the hurricane season does not end until November 30, we currently remain exposed to the possibility of another 90 days when tropical storms might arrive. Occasionally, we have experienced tropical storms even in early December, although that has been a rare occurrence, just as storms forming before the season starts on June 1.

Exhibit 21. Hurricane Season Peaks In Early September

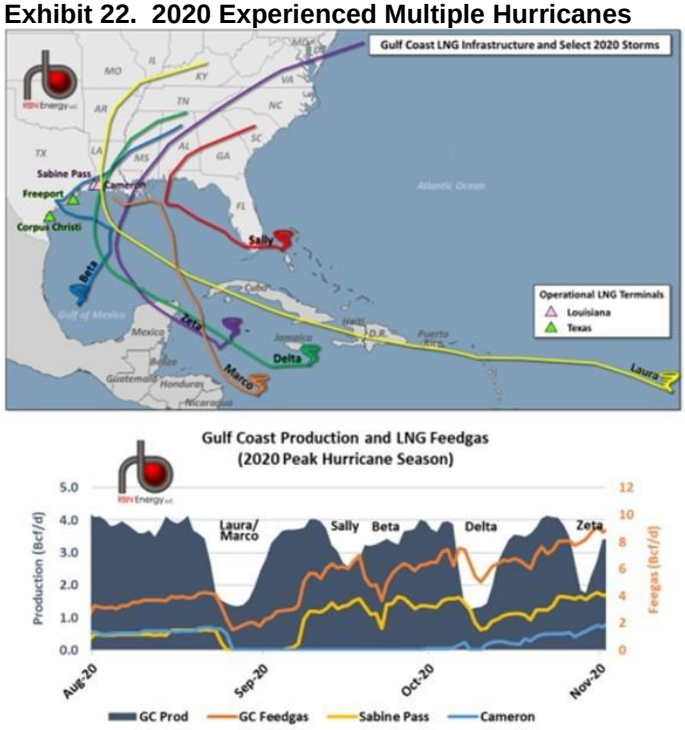


Source: ***severe-weather.eu***

For energy markets, the quiet Atlantic Basin tropical storm season so far has been a godsend. Liquefied natural gas shipments have remained strong, other than for those postponed by the fire that damaged loading facilities at Freeport LNG. Almost every Gulf of Mexico LNG shipment has gone to Europe where countries are scrambling to fill storage facilities ahead of the upcoming winter with the possibility of a complete loss of Russian natural gas supplies.

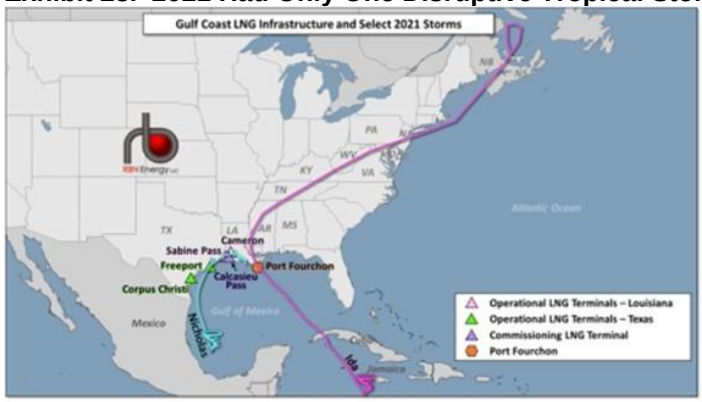
To gain an appreciation of the impact hurricanes can have on Gulf of Mexico gas markets, energy consultant RBN Energy published an article discussing the potential disruptions that might occur if and when Atlantic Basin tropical storm activity increases. The two charts below show the hurricanes and their paths in 2020 and 2021. Importantly, the second portion of each chart shows the daily feedgas flows supporting LNG exports. Each terminal's feedgas is charted during the time period. Feedgas flows can fall when tankers cannot reach the terminal, storage tanks are full but loading is precluded due to the weather conditions, or wells supplying the natural gas are shutdown. In most cases, the declines in feedgas are the result of the first two conditions. The time for recovery depends on the nature of the disruption and its impacts on infrastructure.

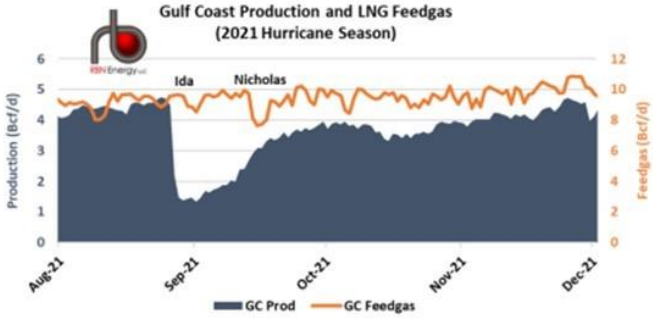
Exhibit 22. 2020 Experienced Multiple Hurricanes



Source: RBN Energy

Exhibit 23. 2021 Had Only One Disruptive Tropical Storm





Source: RBN Energy

The absence of weather disruptions in the Gulf of Mexico has also allowed oil and gas production to continue virtually uninterrupted, other than for some isolated outages for maintenance and repair, helping gas markets and refiners operate at high rates. It is the growing concern that the Gulf Coast may be hit by another massive hurricane like last year's Hurricane Ida which shuts down refineries for days and crimps refined output and feedgas volumes for LNG terminals and domestic storage. These supply concerns are beginning to help lift commodity prices. The recent refinery fire in the Midwest has caused a fuel emergency to be declared. Additionally, warnings are being sounded about refined product inventories in New England being at half their normal level, which points to the vulnerability of the region to potential storm disruptions. Keep an eye on the weather in the tropics and prepare to live in an energy-constrained environment until the hurricane season is largely over in late November.

Random Energy Topics And Our Thoughts

Dominion Challenges Virginia Wind Performance Standard

As we predicted in our article in the last issue of *Energy Musings* discussing the approval of Dominion Energy's Virginia Electric & Power subsidiary's Coastal Virginia Offshore Wind (CVOW) project by Virginia's State Corporation Commission (SCC), the inclusion of a "performance standard" was challenged by the company. Dominion petitioned the SCC for reconsideration of the approval citing that "the Commission lacks authority to impose a performance guarantee on this Project of the nature directed and it is unreasonably broad in scope and unreasonable and improper in application." We were not surprised given Dominion's Chairman, President, and Chief Executive Officer Robert Blue told analysts on the company's second-quarter earnings call days after the approval was announced that the performance standard was "untenable."

The SCC ordered Dominion Energy Virginia's customers to be held harmless for any shortfall in the wind farm's projected 42% annual net capacity factor, measured on a three-year rolling average. Blue stated, "Effectively, such a guarantee would require [Dominion Energy Virginia] to financially guarantee the weather, among other factors beyond its control, for the life of the project." He further said, "There are obviously factors that can affect the output of any generation facility, notwithstanding the reasonable and prudent actions of the operator, including natural disasters, acts of war or terrorism, changes in law or policy, regional transmission constraints or a host of other uncontrollable circumstances." This performance standard guarantee creates a financial one-way risk for the utility and is "inconsistent with the utility risk profile" expected by investors according to Blue. These points were presented in the filing with the SCC asking for a reconsideration of the approval.

In the order approving CVOW, the SCC stated the following about its authority to create such a performance standard as a customer protection mechanism.

> The parties requesting these protections assert that the Commission possesses the statutory authority to require such. Dominion, in turn, argues that the Commission's authority has been limited in this regard. In actuality, **the plain language of the statute simply does not speak directly to this legal question**. Absent a specific directive from the General Assembly limiting the Commission's authority to require reasonable consumer protections within the confines of the statutory structure for a Project of this magnitude… (emphasis added)

Dominion, in its reconsideration filing, argued that the 42% annual net capacity factor was based on the lifetime (30 years) of the project. Since it envisions periods when the performance is

below as well as times when it is above, there is no mechanism to reward Dominion in the latter scenario. This makes it a one-way financial risk for Dominion. Of course, if they overproduce, they are getting paid for the power.

That is a persuasive argument until one realizes that the performance of wind turbines declines during their lifetimes. So, should the CVOW fail to reach the 42% output in its early years, it will likely underperform in its later years. Should Virginia electricity customers be responsible for the power shortfalls for the first 29 years with Dominion having to repay those costs in year 30?

At the heart of the issue is that the net capacity factor plays a crucial role in determining the levelized cost of energy (LCOE), which is the measure that determines whether the project meets the Virginia threshold to be an acceptable project under its Clean Energy Act. The SCC approval noted the following:

> In choosing to construct the Project and seek recovery of the costs requested herein, the Company based its cost-benefit analysis and LCOE proposal on an average net capacity factor of 42%, and Dominion continued to affirm its high level of confidence in relying upon a 42% capacity factor to undertake this Project.

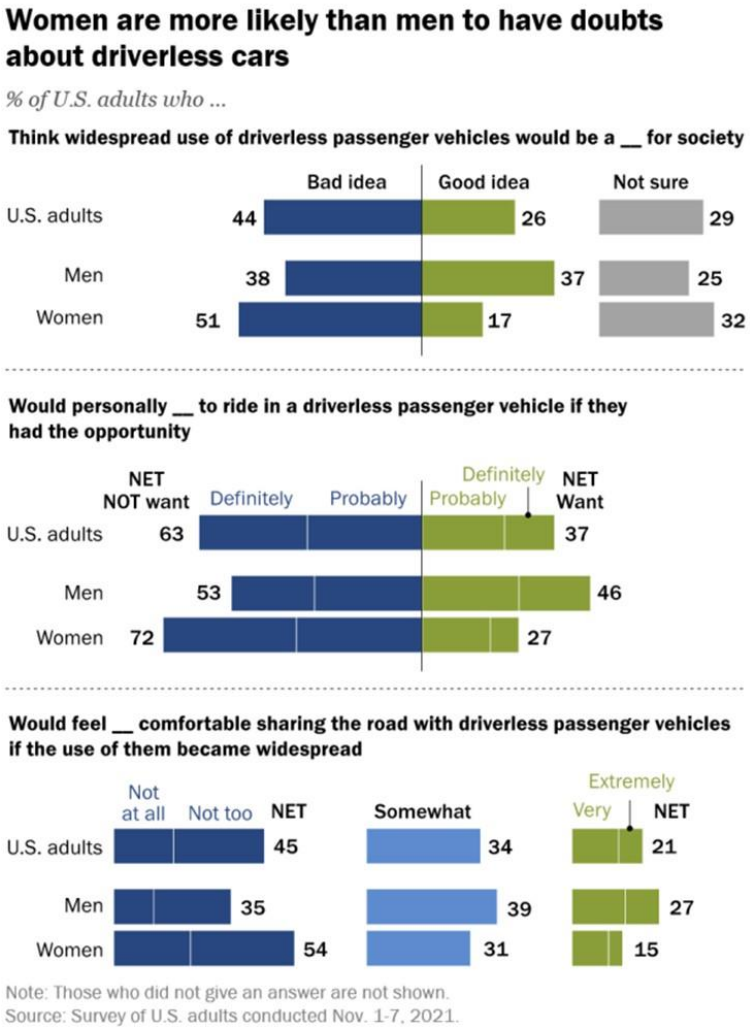
We said in our prior article that the SCC performance standard was the first effort by a regulatory agency to level the electricity playing field between intermittent renewable and dispatchable power.
Since renewable energy requires the grid operator to maintain backup power supplies for when the wind doesn't blow and the sun doesn't shine, someone must pay that cost. So far, that cost is borne by ratepayers. As we have seen, electricity rates have climbed in states with high renewable energy shares, as the grid operator must protect against power shortfalls from renewable projects by securing backup power. Given the magnitude of the 176-turbine, $9.8 billion offshore wind farm development, and the four years needed to build it, Virginia ratepayers are at risk for construction and operational risks, at a time when alternative projects would be precluded from being considered.

Will be actively watching this application. We anticipate another hearing, but we are expecting the SCC to remain firm, despite Dominion's threat of canceling the project. We also expect the Virginia legislature will wade in to clarify the uncertainty. What will they do – favor protecting Virginia ratepayers or leaving them potentially at significant risk from CVOW's non-performance? The legislature is different from the one that passed the Virginia Clean Energy Act, so it may lean more toward protecting customers than the earlier legislature might have been. Time will tell.

Are Women Really Better Drivers?

Who is the better driver – a woman or a man? A *Washington Examiner* columnist claims she knows the answer. "A new study settles the debate: Women are better drivers than men – simply because they would rather drive a car than let it drive them," she wrote, citing research from a recent Pew Research Center study to back up her conclusion.

Exhibit 24. Women Vs. Men On Self-Driving Vehicles



Source: Pew Research Center

The topic of driverless vehicles was augmented with an earlier Pew study. The specific conclusions from that much larger and broader study of issues related to artificial intelligence and human enhancement issues are listed below and show interesting beliefs among men and women toward self-driving vehicles.

- Only about 3 in 10 women say they believe self-driving cars will decrease the number of people killed or injured in accidents. Meanwhile, almost half of men (49%) say automated driving will reduce accidents.
- Just 17% of women say driverless cars are a good idea for society, while 37% of men say the same.
- Only 27% of women surveyed say they would definitely or probably personally want to ride in a driverless passenger vehicle if given the chance, compared with almost half of men (46%).

- A majority of women (54%) say they would not feel comfortable sharing the road with a driverless passenger vehicle if their use becomes widespread. Only 35% of men say the same.
- While self-driving long-haul trucks may be among the first autonomous vehicles to show up on U.S. roadways, both women and men oppose this use of the technology in high numbers. Two-thirds of women (66%) oppose self-driving trucks compared to 53% of men.
- Just over half of women, 51%, say they are against the use of self-driving buses for public transportation. Just over a third of men, or 35%, say the same.
- Women are far more accepting of self-driving vehicles used as taxis, shared-ride vehicles, and delivery trucks, however. Only 39% of women surveyed opposed these applications, while 29% of men opposed them.

One conclusion from the above data is that women fear large self-driving vehicles such as trucks and buses used for public transportation. Is it just the fear of size, or is it a highway versus city driving issue? The fact that women accept self-driving vehicles for taxis, shared-ride vehicles, and delivery trucks suggests they are ok with these vehicles on city streets but fear large vehicles speeding along highways.

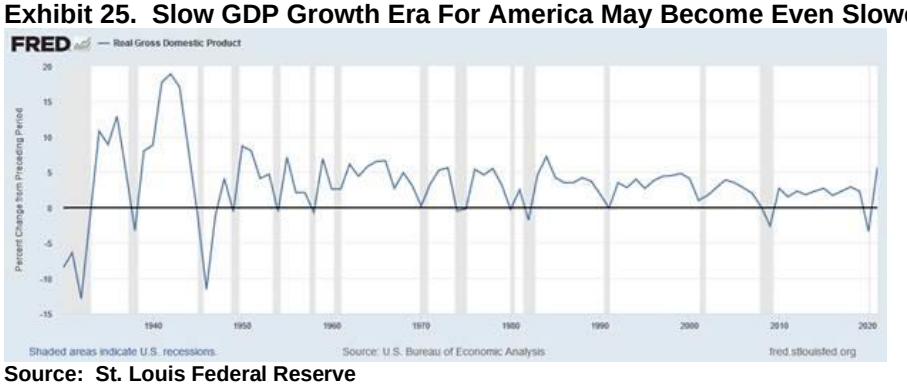
The issue of the impact of self-driving vehicles on accidents is mixed. The National Highway Traffic Safety Administration (NHSTA) estimated that nearly 43,000 people died in motor vehicle accidents in 2021, a 10.5% increase over 2020's total. The distribution of the cause of 2020 vehicle deaths (most recent detailed data available) provides ammunition for self-driving vehicles. Drunk drivers accounted for 30% of auto fatalities, while speeding represented 29%. Distracted drivers caused 8% of auto deaths and drowsy drivers were responsible for nearly 2%. The NHSTA said in a 2021 report that self-driving cars could "greatly support drivers and reduce human errors and the resulting crashes." However, other research has shown that self-driving can't eliminate all auto crashes, with one report predicting that automated-driving features would cause people to spend more time in their cars, increasing the likelihood of an accident. Will female drivers spend more time in these self-driving vehicles?

Biden Economists Revise Faulty 2022 Economic Forecast

Two weeks ago, the White House Office of Management and Budget issued a mid-year update to its economic predictions for 2022, which impacts the proposed Fiscal Year 2023 Budget. The economists now expect significantly slower economic growth and substantially higher inflation than they had predicted when they presented President Joseph Biden's budget in March. At that time, the economists were smugly predicting gross domestic product (GDP) would grow by 3.8%, but now they have cut that growth to only 1.4%. They also have reduced the GDP estimate for 2023 to 1.8% from the earlier 2.5%. Moreover, the White House forecasting team was also telling Americans that inflation, measured by changes in the Consumer Price Index (CPI), would be a lowly 2.9%. They are now predicting the CPI will increase by 6.6% in 2022.

The chart below shows the history of the annual change in real GDP. This year, we have already had two consecutive quarters (1Q and 2Q) posting negative GDP, so achieving growth for all of 2022 necessitates positive 3Q and 4Q GDP growth. The most telling point about the revised government forecast is that if the 1.4% growth estimate is met, it would represent the lowest annual rate, excluding recession and pandemic years, going back to 2001 (1.0%). The new growth projection would almost match 2011's 1.5%, the second lowest yearly growth rate in the past 20 years.

Exhibit 25. Slow GDP Growth Era For America May Become Even Slower Under Biden

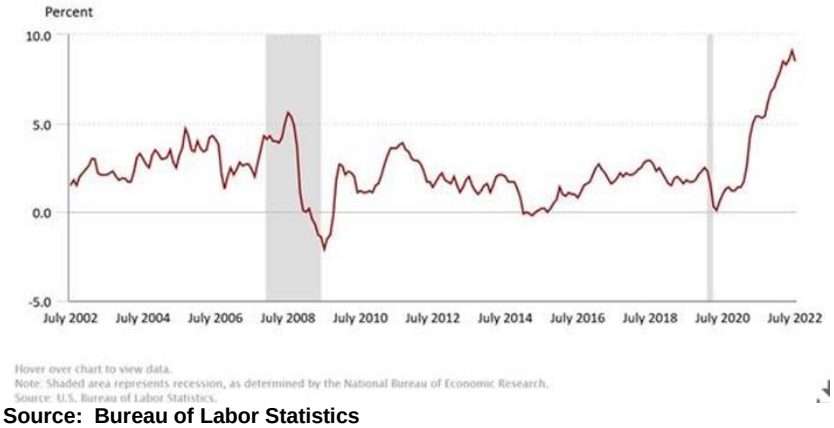


Source: St. Louis Federal Reserve

Inflation is the greatest concern for Americans because it erodes family incomes and their purchasing power. We remember when inflation would be only "temporary" or "transient", but it has quickly been embedded in the economy, necessitating drastic monetary actions to quell it.

The following chart shows how inflation has exploded since it bottomed in the early months of 2020 when Covid shut down the economy. Since then, inflation has been straight up, peaking in June at 9.1% before falling back slightly in July to 8.5%.

Exhibit 26. 12-month Percentage Change Consumer Price Index



Source: Bureau of Labor Statistics

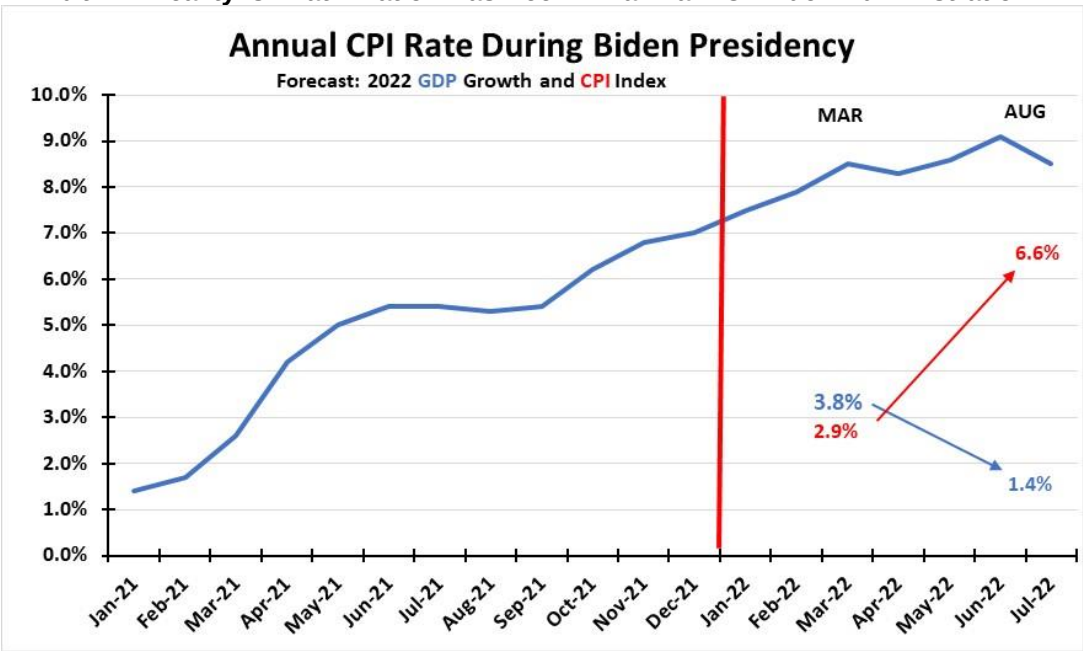
In December 2021, Biden claimed that November's 6.8% inflation rate was likely the "peak." This was after calling high inflation in July 2021 "temporary" when it was merely 5.4%. In February 2022, Biden called NBC anchor Lester Holt a "wise guy" for pointing out that Biden had erroneously said high inflation would be temporary but instead it surged higher. At the time of Holt's interview, Biden blamed the inflation on Covid supply chain bottlenecks as well as the shortage of semiconductors for automobiles. The problem was the CPI was rising in response to higher prices for a wide range of goods and services.

This time, the White House economists are pointing to the recent wave of Omicron Covid-19 infections and Russia's invasion of Ukraine. They claim that neither of these developments was captured in their earlier forecast. We might ask why.

The chart below shows the CPI rate during Biden's presidency. Only during the summer months of 2021 did the CPI not rise. But inflation was evident in the fall of 2021 when presumably the economists began preparing their initial report. The causes of the inflation were evident then, and

the invasion of Ukraine was mere speculation. Inflationary pressures from the surge in government spending, financed by the Federal Reserve's printing of money, were behind the rise in prices.

Exhibit 27. Reality Is That Inflation Has Been A Hallmark Of Biden Administration



Source: BLS, PPHB

All of this was evident before the Fiscal Year 2023 Budget was unveiled in March. We would point to the record of Federal Reserve Chairman Jerome Powell from last summer to this June as substantiation of the acceptance of the reality that inflation was not going away anytime soon.

In August 2021, Powell pushed back against growing beliefs that swiftly rising consumer prices could become embedded in the future economy. However, by December 2021, Powell was ditching the word "transitory" to describe the 31-year high in inflation. And then this past June, when testifying before the Senate Banking Committee, he admitted that inflation in the U.S. was high before Russia invaded Ukraine, making sure to cement the view that our current inflation was not "Putin's inflation," as postulated by President Biden and his officials.

The inflation chart above also contains, as points, the March and August White House economists' forecasts for 2022 GDP growth and the rise in the CPI. The March forecast was dictated by the administration's dedication to their narrative that inflation was transitory. The reality is that their forecast was divorced from reality at the time of the March forecast, and there were months of data to support a weaker and more inflationary outlook. This is what happens when you build an economic plan on a narrative resting on flimsy facts.

Energy Finished Disastrous August In First Place

In August, the Energy sector of the Standard & Poor's 500 Index experienced both good times and bad times. Energy ended the month on a sour note, but its monthly performance still put it atop all industry sectors. Its outperformance relative to the overall market was outstanding –

nearly seven percentage points ahead. Energy's performance came despite August being the third consecutive month of falling oil prices. Over that period, the WTI oil price has fallen from $120 a barrel to under $90, a 25% decline. In these three months, the Energy sector was the worst, then third best, and now the best performing sector. Based on that record, we surmise the stock market was surprised by the drop in oil prices in June, so it punished Energy shares, sending them down nearly 17%, some 8.5 percentage points below the performance of the S&P 500 Index.

Exhibit 28. Energy Was The Best Performing Sector In August As Oil Prices Retreated

Jan - 22	ENRS 19.1%	FINL 0.1%	CONS -1.4%	UTIL -3.3%	INDU -4.7%	S&P 500 -5.2%	TELS -6.2%	HLTH -6.8%	MATR -6.8%	INFT -6.9%	REAL -8.5%	COND -9.7%
Feb - 22	ENRS 7.1%	INDU -0.9%	HLTH -1.0%	MATR -1.2%	FINL -1.4%	CONS -1.4%	UTIL -1.9%	S&P 500 -3.0%	COND -4.0%	INFT -4.9%	REAL -4.9%	TELS -7.0%
Mar - 22	UTIL 10.4%	ENRS 9.0%	REAL 7.8%	MATR 6.1%	HLTH 5.6%	COND 4.9%	S&P 500 3.7%	INFT 3.5%	INDU 3.4%	CONS 1.8%	TELS 1.0%	FINL -0.2%
Apr - 22	CONS 2.6%	ENRS -1.5	MATR -3.5%	REAL -3.6%	UTIL -4.3%	HLTH -4.7%	INDU -7.5%	S&P 500 -8.7%	FINL -9.9%	INFT -11.3%	COND -13.0%	TELS -15.6%
May - 22	ENRS 15.8%	UTIL 4.3%	FINL 2.7%	TELS 1.8%	HLTH 1.4%	MATR 1.1%	S&P 500 0.2%	INDU -0.5%	INFT -0.9%	CONS -4.6%	COND -4.8%	REAL -5.0%
Jun - 22	CONS -2.5%	HLTH -2.7%	UTIL -5.0%	REAL -6.9%	INDU -7.4%	TELS -7.7%	S&P 500 -8.3%	INFT -9.3%	COND -10.8%	FINL -10.9%	MATR -13.8%	ENRS -16.8%
Jul-22	COND 18.9%	INFT 13.7%	ENRS 9.7%	INDU 9.5%	S&P 500 9.2%	REAL 8.5%	FINL 7.2%	MATR 6.1%	UTIL 5.5%	TELS 3.7%	HLTH 3.3%	CONS 3.3%
Aug - 22	ENRS 2.8%	UTIL 0.5%	CONS -1.8%	FINL -2.0%	INDU -2.8%	MATR -3.5%	S&P 500 -4.1%	TELS -4.2%	COND -4.6%	REAL -5.6%	HLTH -5.8%	INFT -6.1%

Source: S&P, PPHB

For July, although oil prices remained in a downtrend, Energy's performance was half a percentage point better than that of the overall market, landing it in third place among all sectors. Today, oil prices are in the high $80s, about where they were in February, but roughly $10 a barrel above January's levels, yet Energy just produced the best sector performance last month. Does this say more about problems with the overall market, or is Energy that much better prepared for the world we live in?

Year-to-date, oil prices are up by mid-teens percentages, and the Energy sector has generated a 48.75% gain at the same time the overall stock market is down over 16%. The fundamentals for energy companies are better than they have been in many years: company earnings are higher, cash flows are larger, balance sheets are stronger, dividends are up, and managements are repurchasing shares. The long-term outlook for the energy industry remains positive due to an extended period of underinvestment and the world suddenly recognizing that fossil fuels will be critical for sustaining global economies for decades, despite the ongoing energy transition and environmentalists pushing to ban the use of oil and gas. In our opinion, Energy is likely to be the top performing sector at the end of 2022.

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