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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

August 3, 2021

It Is Tough Being An Electricity Utility CEO Today

From battles over burying power lines to fighting takeovers of electricity utility companies and activist investors targeting above-average performing companies, this is the CEO's world today.

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It Is Tough Being An Electricity Utility CEO Today

Being an electric utility CEO in the 1950s was much less stressful than today, at least judging from news headlines of the past several weeks. In the good old days, a CEO had only two concerns – keeping regulators happy and shareholders satisfied. Stable economies meant plugging 5% growth into the company’s financial model to know what revenues would be. Making sure the company could meet demand growth required timely investments for new generation, transmission, and distribution assets, which dictated the management of cash flow, borrowings, and dividend payments. Happy regulators ensured stability in the utility’s allowed rate of return on assets. That stability required solid operating performance, especially when weather events occurred. Steadily rising dividends kept shareholders satisfied. In general, a 1950’s utility CEO’s life was boring – 9-to-5 working hours but plenty of time for golf.

Today, an electric utility company CEO’s life is challenged by controllable and uncontrollable events, any one of which could ruin a career overnight. The list of worries includes uncertain electricity demand; fuel choice and availability considerations; ESG (environmental, social and governance) pressures; turbulent financial markets; activist shareholders; regulators bending to societal demands; and governments instituting mandates and rules, often conflicting with rational operational policies. Every worry includes a range of challenges, each one of which could significantly impact the utility’s financial performance and reputation that would reverberate to the CEO.

From the West Coast to the East Coast, and from north to south, American utilities are battling these and other issues. In California, Pacific Gas & Electric (PGE), who has been under attack for years over the contribution of its power lines to wildfires burning millions of acres of land, destroying thousands of structures, and killing civilians and firefighters, continues to fight these problems. The record wildfire damage in 2018 and the determination that PGE’s transmission lines were responsible for starting fires that killed people forced the company into bankruptcy protection.

One tool in PGE’s management of wildfire risk is to shut off the power in areas at high risk. Customers are inconvenienced by the rolling blackouts. This tool has been aggressively employed given drought conditions that have increased wildfire risk. Although blackouts last for brief periods of time, the fact customers must endure them has not won PGE any friends.

California has always experienced wildfires. In recent years it has been criticized for poor management of its forests, which has contributed to the wildfires. By failing to clear underbrush, harvest dead and dying trees, and construct firebreaks, government forest management policies have contributed to the fires. A recent investigation by CapRadio and NPR’s California Newsroom found that California Governor Gavin Newsom misrepresented his accomplishments in managing the state’s forests. He even disinvested in wildfire prevention!

The investigation found Gov. Newsom overstated the number of acres treated with fire breaks and prescribed burns in the 35 “priority projects” involving 90,000 acres he had identified. Cal Fire, the California Department of Forestry and Fire Protection, data showed that only 11,399 acres were treated, 13% of Gov. Newsom’s claim. Moreover, last year, he slashed Cal Fire’s budget to \$203 million from the \$355 million spent in 2019, a 40% cut.

The state and federal government recently set an annual goal of treating 500,000 acres each by 2025, with Cal Fire developing and continuously updating a list of 500 projects to reach that goal. The Cal Fire fact sheet from 2019 claimed Gov. Newsom’s priority projects and 90,000 acres

would reach “about 20% of the goal.” Realistically, the actual number of acres treated represented less than 3%. Cal Fire Chief Thom Porter said the state was never going to be able to tackle all 90,000 acres in 2019. “We didn’t have all of the environmental clearances that we were going to need to do all of that work,” he said. “Nor did we have all of the agreements with landowners completely in place.”

The recent California wildfires have finally convinced PGE to move forward on a plan to bury miles of its power lines to reduce the risk. The final impetus came when one of its employees found two blown fuses and a tree touching a power line near the Dixie Fire, which is in the proximity of where the Paradise fire burned in 2018 that killed 84 people. Those deaths led to PGE pleading guilty to 84 counts of manslaughter for its role in sparking the fire that killed them, making it the first U.S. corporation ever to be convicted of homicide-related charges. That conviction and the financial settlement tied to the Paradise fire forced the PGE bankruptcy. When the company emerged from bankruptcy, it issued huge amounts of debt and equity as part of its \$59 billion reorganization plan. Victims of the company-caused wildfires are the beneficiaries of a \$13.5 billion trust financed half with cash and half with shares. Another wildfire liability claim could force the company back into bankruptcy.

Addressing the wildfire risk has become the primary focus for CEO Patricia K. Poppe. The company’s power lines are within striking distance of eight million trees. PGE plans to spend \$1.4 billion this year to trim more than a million trees and remove more than 300,000 of them. That will become an ongoing expense and is likely to escalate. Therefore, investing to bury power lines at risk of causing a future wildfire is the appropriate move. The plan to bury 10,000 miles of power line carries an estimated \$16-\$20 billion price tag.

Exhibit 1. PGE Overhead Power Lines Targeted For Burial



Source: *WSJ.com*

PGE's system includes roughly 80,000 miles of lower-voltage distribution lines and 20,000 miles of higher-voltage transmission lines, many of which run through areas at high risk of wildfire. Thus, the 10,000 miles of line to be buried represents 10% of the company's current above-ground lines. According to media reports, PGE currently has 27,000 miles of underground lines, but those represent low-voltage distribution lines.

This year, PGE is putting 70 miles of high-voltage power lines underground. Increasing that number to 1,000 miles a year will be a "moonshot," according to Ms. Poppe on a call with reporters. Based on underground power line proposals PGE previously submitted to regulators, the project could cost about \$4 million per mile, or \$40 billion overall. We are sure PGE is hoping the cost will be the lower estimate, as it will help the company convince the California Public Utility Commission to include the investment in its rate base, making customers responsible for the expense. If the cost is the higher estimate, there will be a battle to make shareholders responsible for the cost, or at least a substantial portion. Another worry for PGE's CEO.

Across the country, the issue of burying power lines has become a flashpoint involving utilities and the public. This battle is more contentious, as National Grid, the power company, is accused of discrimination by refusing to bury power lines crossing India Point Park in Providence, Rhode Island. Complicating the issue is that National Grid is in the process of selling its operations in Rhode Island to Pennsylvania-based PPL Corporation, who needs approval from the state's regulators to sinch the deal.

The discrimination charge comes from Friends of India Point Park, and others, who have been fighting for the burial project for the past 19 years. They believe it would remove an eyesore, enhance property values in the area, and boost economic development in Providence. The groups are seeking to formally intervene in the hearing to approve the sale. They are hoping to secure a commitment from PPL to bury the high-voltage transmission lines and to "discontinue National Grid's disparate and unjust practices as they relate to Providence communities, because all communities regardless of ethnicity or income should be treated equally as a matter of law."

National Grid has buried power lines in at least three other cities in Rhode Island and is in the process of investing millions in replacing two major underground transmission lines just a stone's throw from India Point Park. The company further calls the charge of discrimination as "hard to comprehend." It contends it has never discriminated in its operations.

In some situations, private parties have paid to have their National Grid distribution lines buried. The cost estimate to bury the India Point Park lines is \$34 million, about half of which is already in place from various government sources, while the other half would have to come from electric ratepayers.

Exhibit 2. India Point Park Power Lines At Center Of Dispute

Source: *The Providence Journal*

In 2018, the Rhode Island Energy Facility Siting Board approved an agreement between National Grid and the City of East Providence to shift the power lines off parts of the waterfront, but not bury them because it was too risky and too expensive. An alternative proposal was considered that would have moved the lines away from the park and run them 950 feet across the Seekonk River but leaving them highly visible along parts of the waterfront. A lawsuit upheld the agreement, which caused Friends of India Point Park and the City of Providence to appeal. This spring the Rhode Island Attorney General filed a brief supporting them and raising concerns that the siting board did not follow proper procedures in reaching its decision. The Attorney General has also filed to intervene in the PPL deal to protect the interests of the public.

National Grid says it is prepared to move ahead with moving the power lines but is awaiting the court's decision. PPL said it is reserving any commitment about the lines until the sale is approved. There is no expectation that the matter is going to be resolved soon, as the Rhode Island Supreme Court has already had this case for three years.

But this is not the only issue involving National Grid. Rhode Island Governor Daniel McKee recently vetoed a bill that shifted some of the costs of solar and wind projects from developers to electricity ratepayers. Based on emails released by state regulators in response to a records request from *The Providence Journal*, a lawyer for the Public Utilities Commission estimated the cost of the transmission upgrades would be \$54.7 million for six renewable energy projects with agreements with National Grid to connect them to the regional power system.

The bill aimed to put an end to this longstanding source of contention that has only grown more heated recently between developers primarily of solar farms and National Grid, which owns the

electric wires and poles in Rhode Island. The developers install facilities from about 500 kilowatts in capacity to 50 megawatts, smaller than utility-scale solar projects. These projects mainly use the local distribution lines to supply power generated to nearby homes and businesses. National Grid is charging these developers for upgrades to the transmission system, or high-voltage power lines. The developers claim these charges are unfair as their systems do not impact those power lines. However, as National Grid points out, increasingly these solar projects are in the state's rural areas that have less energy infrastructure, requiring investments to deliver the influx of new power safely and reliably. This dispute is at the core of the issue of who pays for the increasing fragility of the electricity grid due to more renewable power generation coming online.

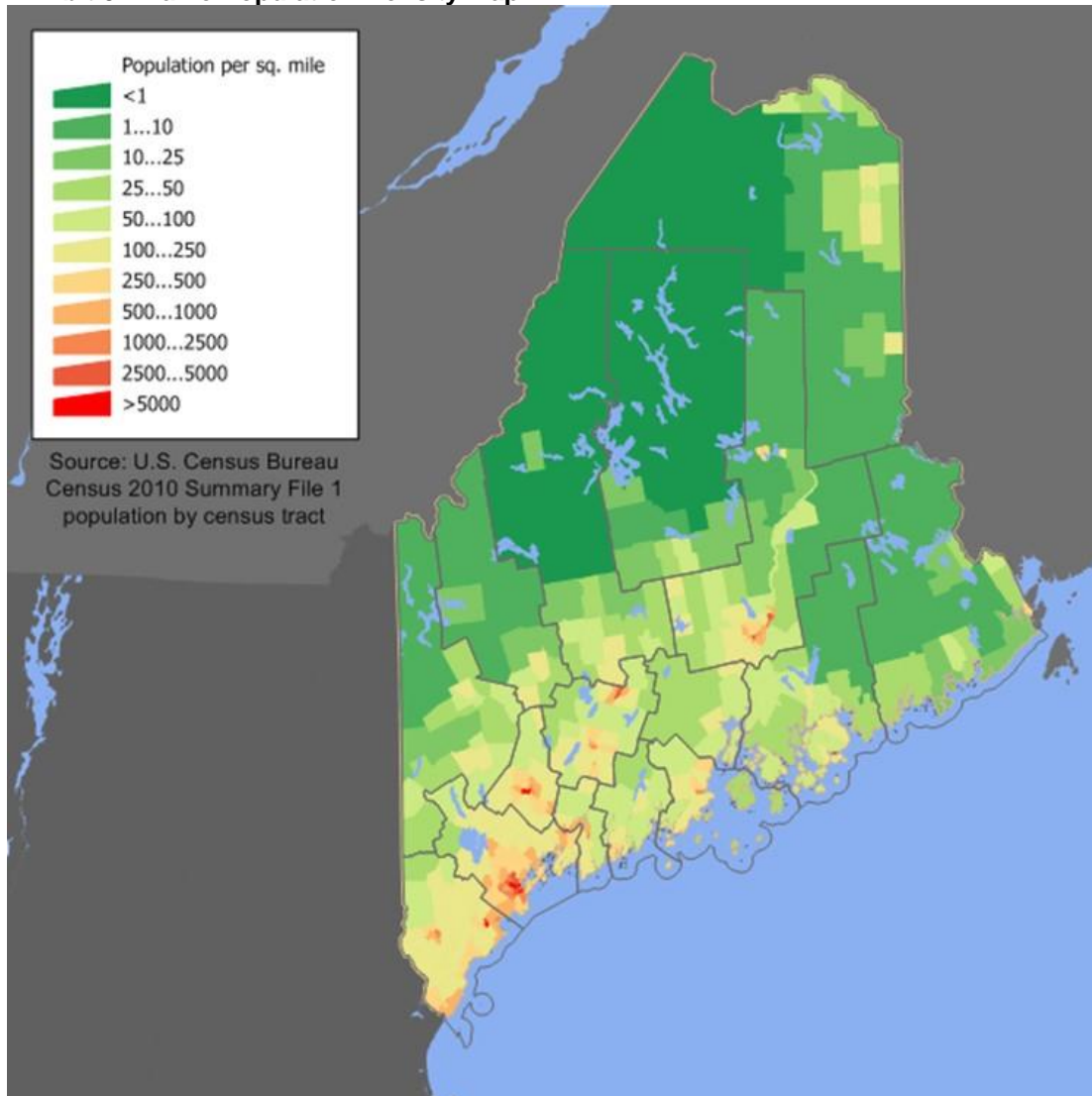
According to the media, one solar farm is being charged \$18 million for transmission upgrades to an electrical substation, while another solar farm is being assessed \$14 million for transmission improvements. National Grid says it estimates upgrade investments will average conservatively \$30 million a year for the next several years.

Previous Rhode Island Governor Gina Raimondo, currently U.S. Secretary of Commerce, signed an executive order last year directing the state to get all its electricity from renewable sources by 2030. An official with Green Development said that the state is nowhere close to being on track to meet this goal. However, renewable energy development is taking place at a rapid pace, fueled by the state's incentive programs that pay above-market prices for solar and wind power. [We are a beneficiary of one of these plans.] About 374 megawatts of solar power have been installed in Rhode Island with another 775 megawatts in the pipeline. The premium incentive payments are financed by National Grid ratepayers, which explains why the state had the second most expensive residential power costs in the lower 48 states in April 2021 (23.54-cents-per-kilowatt-hour based on the latest data available from the Energy Information Administration). Rhode Island is barely behind number one Connecticut and is followed by Massachusetts and California. Texas residential power cost was 11.97 cents per kilowatt-hour, 49% cheaper than Rhode Island. Based on the average of all sector power costs, Rhode Island (18.51-cents/kWh) was in third place behind Connecticut and California and nearly twice the cost in Texas. At what point will Rhode Island ratepayers question why they are paying such high electricity rates?

Up north, Maine Governor Janet Mills announced her veto of a bill that would have created a consumer-owned electric utility known as Pine Tree Power Company. The state's investor-owned electric utilities would have been forced to sell their assets to Pine Tree Power. To finance the purchases, Pine Tree Power will issue bonds. The company would be governed by a publicly elected board, which would use a competitive bidding process to award contracts to run its acquired utilities. The governor's veto was based on flaws in the legislation due to its rushed enactment. The stage is now set for a public vote on the issue in November.

Why is Maine taking this step? To answer that question, it requires understanding Maine and the two utilities. At the heart of the issue is public dissatisfaction with their performance.

Maine has a population of 1.34 million people, which translates into a population density of 41.3 people per square mile, making it the least densely populated state east of the Mississippi River. The state contains 30,862 square miles of land mass, and it ranked first among states in percentage of forest coverage at 89.46%, according to the U.S. Forest Service in 2016. This translates into miles of power lines traversing dense forests to service the state's sparse population. That is a recipe for unhappy customers.

Exhibit 3. Maine Population Density Map

Source: U.S. Census Bureau

Maine has two electric utilities, both owned by foreign corporations that may contribute to customer belief that the owners care little about working hard to keep customers satisfied. Central Maine Power Company (CMP), a subsidiary of Avangrid, Inc., which, in turn, is a subsidiary of Spanish power company Iberdrola, S.A., is Maine's largest electricity transmission and distribution utility. The company operates approximately 23,500 miles of distribution lines and 2,900 miles of transmission lines and serves approximately 646,000 customers in central and southern Maine. Versant Power, formerly known as Emera, is owned by ENMAX Corp., a Canadian power company. It serves approximately 159,000 customers in northern and eastern Maine and operates 1,265 miles of transmission lines and 6,090 miles of distribution lines.

According to federal data, Maine records longer and more frequent power outages than any other state, which contributes to customer dissatisfaction with the utilities' performance. The utilities point a finger at the state's rugged topography, but the critics say it is due to underinvestment in

the grid infrastructure. The critics also suggest that more infrastructure investment would not only improve reliability but would allow more renewable power. These differences in opinion over power outages frames the “advantages” a customer-owned utility would bring.

The bill’s supporters say Mainers would not only save money, but the company would create thousands of green jobs while vastly improving the nation’s most unreliable grids. With local control over the grids, it would be easier to decarbonize the state’s power and meet its climate goals, which call for reducing Maine’s 1990 carbon emission levels by 80% by 2050. Sponsors of the utility takeover bill argue that a consumer-owned utility could cut that timetable potentially in half. They assume a consumer-owned utility would embrace renewables, which CMP and Versant Power have fought, including successfully lobbying against solar energy rebates, funding for energy efficiency programs, while also pushing for Maine to scrap net metering.

A spokesperson for Versant Power, responding to a reporter’s questions, stated, “A recent study done by London Economics International shows that a proposed transition to government-operated power across the State of Maine would be costly, bearing significant risks and uncertainties, and could lead to higher rates for customers for an extended period of time, offering no guarantees of increased reliability or service improvements.”

This statement contrasts with the bill’s sponsor estimate that the \$10-\$15 billion to fully modernize the grid could be financed at a 3% cost rather than the 8% it would cost the current utilities. The lower bond coupon would support not only modernizing the grid, but also financing the cost of purchasing the utilities’ assets. The irony in all this is that the legislation would require Pine Tree Power to hire a system manager through a competitive bidding process, but the winner needs to be familiar with the assets. In effect, Pine Tree Power would buy the assets and then contract with one or both utilities to operate them. Does this meet Albert Einstein’s definition of insanity?

A thousand miles south, Duke Energy has become the target of activist investor Elliott Management. The hedge fund purchased shares earlier this year and in May sent a letter to the board of directors of the utility urging it to consider breaking the company into three, separating its three geographic utility operations into separate companies. Elliott claimed such a move would unlock \$15 billion in near-term value for shareholders. In the fund’s recent letter, it ignored the company splitting suggestion, but pointed to long-term underperformance of Duke Energy shares. Elliott said Duke had underperformed regulated-utility peers by 63% since Lynn Good became CEO in July 2013. The latest letter called on the company’s directors to enhance board independence and to seat directors with more public-policy experience in Florida and Indiana, with the intent of improving performance. Duke responded by pointing out that its stock’s three-year total shareholder return of 47% tops both the PHLX Utilities Index and the S&P 500 Electric Utilities Industry Index. Duke also noted that nine of its 13 board members were added within the last five years, generating an average board tenure of 4.7 years. While a high board refreshment effort, it does not speak to the backgrounds and experiences of the newly appointed board members. Regardless, Elliott’s efforts look more like an attempt to make a short-term profit rather than effect an improvement in a structurally underperforming company.

We could go on for the rest of this newsletter with stories about the challenges facing electricity utility CEOs. The world of electricity is vastly different today from what it was only a few years ago. Given the critical role the grid is expected to play in achieving a decarbonized world, these battles will continue and with the list of issues increasing. Re-examining and strengthening business plans will be critical for CEOs as they address the growing list of challenges. Considering how to improve operations and prepare for the electricity world of the future is

imperative. If you ever thought electricity was critical to our economy, yet little understood by its critics and attackers, the above should be the start of your education.

Hello. Offshore Wind Power Is Expensive

If offshore wind power is so cheap, why do developers shut down turbines once their subsidies end? After 20 years of subsidies, shouldn't the turbines be fully paid off and their cost of producing power be very low? Isn't that what their proponents keep telling us? Then why shut them down? Or is it possible that none of this is correct, so without a subsidy they aren't economic? That seems to be the conclusion drawn from a recent report in the U.K.

Recently a BBC video showcased one of its environmental reporters observing the installation of the 1,000th wind turbine by Danish energy company Ørsted off the U.K. coast. In the video, BBC reporter Justin Rowlett claimed that offshore wind is "virtually subsidy-free." This was a gross misstatement, as it only applies to offshore wind leases won at auctions last year, but which will not be developed for three years or more, if at all. If the economics of offshore wind – the price realized versus the generating cost – are not profitable at that point, there is little cost to the developer by walking away from the lease.

To substantiate his subsidy-free claim, Mr. Rowlett commented that companies are tumbling over each other to secure new offshore wind leases. He was referring to the rush by European oil companies to secure leases to demonstrate their "green" credentials. In fact, companies such as BP and Royal Dutch Shell bid so high for leases, not a single lease went to an existing offshore wind developer. Do those developers know something about the economics of offshore wind Big Oil doesn't?

The U.K. government offers two subsidies – Renewables Obligation Certificates (ROC) and Contracts for Difference (CfD) – that help push investment into the sector. ROCs are the green certificates issued to electricity generators and bought by suppliers to show that they have fulfilled their obligation to use a certain prescribed percentage of renewable power. CfDs are the main scheme for the U.K. government to support low-carbon electricity generation. It provides for a guaranteed price for renewable electricity. If electricity's wholesale price falls below the guaranteed price, the developer is paid the difference.

Exhibit 4. U.K. Hornsea Project 2 Offshore Wind Farm

Source: Pexels

Mr. Rowlett's report on the 1,000th wind turbine installed, dealt with the Hornsea Project 2. The first phase of that project, now completed, totaled 1.2 gigawatts (GW) of power capacity and currently earns an index-linked, guaranteed price of £164.98 (\$229.04) per megawatt-hour (MWh) of power generated. Wholesale electricity prices currently are around £40 (\$56)/MWh, with the difference being the subsidy paid to the developer. It is estimated the annualized subsidy for Hornsea Project 2 was £612 (\$850) million last year. For the entire offshore wind industry last year, the value of ROCs is estimated at £2.0 (\$2.8) billion, while CfDs added an estimate £1.2 (\$1.7) billion to the subsidy total. These subsidies are added to customers' bills, and the price tag will increase as more, heavily subsidized wind farms become operational in the next several years.

The "subsidy free" claim is not accurate. The claim was made to appear that it applies to Hornsea Project 2, still under construction, but it will receive a guaranteed price of £68.55 (\$95.17) MWh, which is above the wholesale price of electricity. Besides the cash subsidies, renewables are assured a priority access to the power market, which is also a subsidy, as other power generators without ROCs or CfDs are not afforded the same access guarantee. Might all of this explain why no offshore wind farms have been commissioned without being awarded ROC or CfD subsidies?

According to a new study, however, by emphasizing more offshore wind, and especially allowing wind turbines that reach the end of their subsidies to be entitled to extensions so the developer can affect life extensions, refurbishments and repowering, the cost for the U.K. to reach net zero emissions in 2050 can be reduced by £48 (\$67) billion. The study, conducted by consultant LCP, was prepared for Perth-based energy group, SSE, the owner of the largest renewable electricity portfolio in the U.K. and Ireland. As expected, SSE owns offshore wind farms, so it is particularly interested in profiting from their continued operation, while it sees the current trajectory of the U.K. renewables business driving down profitability.

What the executives of SSE are concerned about is that most of the current offshore wind portfolio was constructed in the past decade, so it will be reaching the end of its 20-year subsidies around 2030. That will necessitate the construction of replacement power, plus additional capacity to meet growing electricity demand. The necessary investment is to be helped by reduced capital costs of offshore wind, and the introduction of larger, more powerful turbines. However, all this wind capacity will, on windy days, drive electricity prices so low, or even to zero, that existing wind turbines without subsidies will become unprofitable. Investment in new turbines could be limited if existing ones are encouraged to be refurbished or repowered by their owners. Continuing the subsidies of existing turbines beyond their 20-year terms would achieve this goal and keep U.K. electricity rates lower than they would otherwise if the power all comes from new turbines.

The outcome of the study is summarized in the following table and chart. Offshore wind, natural gas with CCS (carbon capture and storage) and hydrogen peaking plants are preferred over new nuclear energy to meet electricity demand. This is interesting because it suggests that the idea of nuclear as the best path forward to net zero emissions is gaining greater credibility, as we have been sensing. Kudos to Michael Schellenberger and Bjorn Lomborg who have been arguing for the nuclear investment strategy.

The role of hydrogen is key in the plan, although the economics of this clean energy source are not competitive and likely will not be for two decades. That is part of the justification for extending offshore wind subsidies rather than limiting them for only new offshore wind farms. In other words, don't structure the subsidy program to encourage a wave of building new offshore wind turbines beginning in the 2030s, just as hydrogen may become economic.

The last step of the plan is to increase the network of offshore transmission interconnectors already being developed. U.K. power companies need an expanded network to deal with the abundance of surplus renewable energy they are and will be generating, while also providing more avenues for importing power from the continent, an existing and growing trade. The problem comes when both the U.K. and Europe experience low wind speeds and cloudy weather, thus no one has surplus power for export to help the other.

Exhibit 5. How To Cut Net Zero Expense By Subsidizing Old Wind Turbines

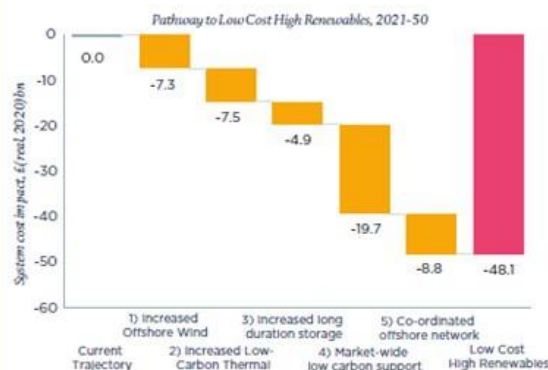
The transition from the current trajectory to a lower cost high renewable pathway is made in five steps:

- In **steps one and two** it is assumed there is no new nuclear build post Hinkley Point C, instead additional offshore wind, gas CCS and hydrogen peaking plant are used to meet the capacity requirement.
- In **step three** additional long duration storage, in the form of electrolyzers coupled with salt cavern hydrogen storage and hydro pumped storage capacity, is introduced to complement the growth in lithium-ion batteries.
- In **step four** market reforms are made to the low-carbon support regime so that capacity reaching the end of Renewables Obligation (RO) or Contracts for Difference (CfD) support is eligible for support, as are life extensions, refurbishments and repowering. Support for existing assets avoids premature closure and reduces the requirement for new capacity.
- In **step five** the benefit of a co-ordinated offshore transmission network, utilised to connect offshore wind farms to the grid in a cost-efficient manner, is included.

These steps result in a system cost benefit of just over E48bn up to 2050.

Source: SSE and LCP

Figure 1: Low cost net zero pathway



System costs are presented in terms of Net Present Value (NPV) assessed across 2021-50, with a 3.5% discount rate applied. This discount rate is consistent with the social discount rate used by BEIS.

One thing we found interesting in the data within the appendix of the report is how offshore wind fares between 2030 and 2050 under the current trajectory and the proposed plan. The difference in the plans is a 32.7% increase in offshore wind capacity, yet electricity output only increases 26.1%. This suggests that many of the older wind turbines that are refurbished or repowered are less productive in the long-term. At the same time, the fixed operating expense per kilowatt in real 2020\$ goes down 10% between 2030 and 2050. To us, that seems inconsistent, and we don't believe it is consistent with recent offshore U.K. wind trends.

Our conclusion about this study is that it recognizes the outcome of the current renewable electricity trajectory in the U.K. It will be expensive. The idea of more offshore wind power instead of nuclear, will only add to the intermittency challenges for the grid. Promoting expensive and uncommercial hydrogen as the solution for clean energy may prove prescient or produce a disaster. It is possible that decarbonized gas may help, but without CCS for natural gas, we are talking about biogas, neither of which is a cheap backup power source. Everything happening with offshore wind in the U.K., and especially the studies of the economics of offshore wind (this study, too), should be studied by those pushing offshore wind in the U.S.

However, it turns out that someone is looking at the cost of offshore wind power. The Chemistry Council of New Jersey, with 45,000 members, employed a consultant to estimate the impact of the state's clean energy goals on the cost of electricity. In January 2020, New Jersey, at the behest of Governor Phil Murphy, passed a new Energy Master Plan to handle the state's transition to a clean energy economy. As part of the plan, the Murphy administration was to hire a consultant to analyze what the transition to clean energy will cost ratepayers. The question was to be answered in 18 months, but due to Covid-19, it has been delayed, and only two months ago was a consultant hired. No answers about the transition's cost will be known before the November gubernatorial election. However, the New Jersey government is making decisions about energy matters and spending taxpayer money without any analysis.

The Chemistry Council did its own in-house analysis, utilizing the data of its members along with other public data. The study examined what utility customers have paid to subsidize the operation of New Jersey's three nuclear power plants over the past three years. They have forked over \$1 billion, so far, and earlier this year the state regulators approved new \$300 million subsidies for the units. According to the member data, a small manufacturer is paying \$8,000 a year, while medium manufacturing sites pay \$80,000 for the nuclear subsidy. For large manufacturers that subsidy is as much as \$320,000. The nuclear plant owners have argued before the regulators that without the subsidies, they would be forced to close them.

Based on the current amount of offshore wind capacity committed to – half of the 7,500 megawatts by 2035 – the Chemistry Council believes the cost for its members will be greater than the subsidies for the nuclear plants. For offshore wind, the Chemistry Council estimates small manufacturers will pay \$14,600 a year, while medium sites would pay \$146,000, and large manufacturers \$584,000.

Dennis Hart, executive director of the Chemistry Council, said, "The lack of a thorough evaluation of our electricity prices is going to hurt our economy." His view was seconded by Ray Cantor, a vice president of the New Jersey Business & Industry Association. While his group supports offshore wind and believes nuclear power has a role to play in New Jersey's future energy mix, he pointed out that "studies like this underscore the need for expeditious analysis of ratepayer impact to understand the total impact of the Governor's energy policies."

Not surprisingly, Doug O'Malley, director of Environment New Jersey, took a different position. "We need to invest in clean energy projects that will scale up and drive down costs," he said.

That is certainly justification for why Gov. Murphy signed legislation to prevent Ocean City officials' intent to block the power cables coming ashore from Ørsted's planned Ocean Wind project. No local government is going to have any say in the development of this resource, at least if New Jersey's governor and other state politicians have any say. The heavy-handed approach to the state's energy transition includes not telling people what offshore wind will cost utility ratepayers. That is probably because these politicians have no idea, nor do they care what state residents must pay.

Germany Is Heading To Elections: The Message Of Polls

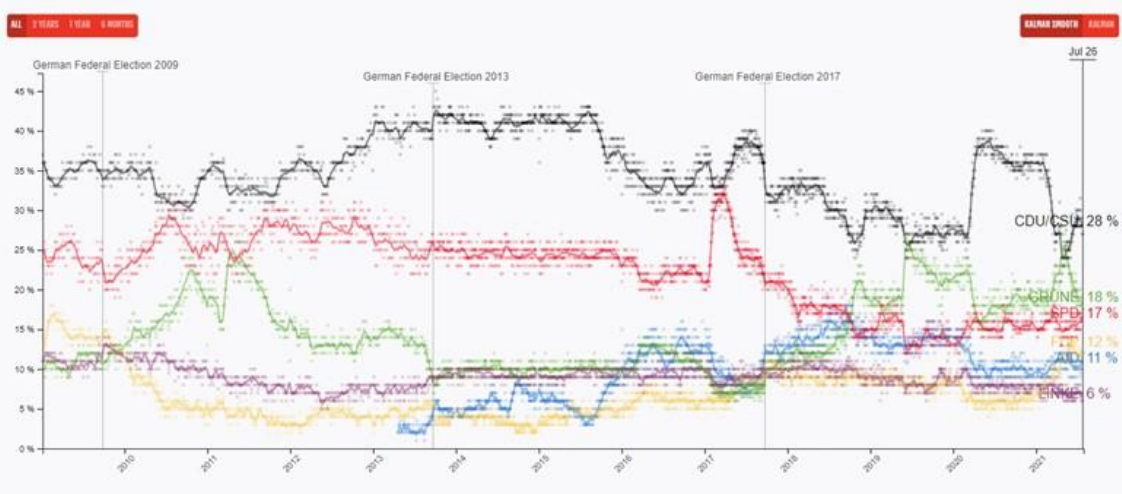
We are less than 60 days away from federal elections in Germany that will mark the end of Chancellor Angela Merkel's leadership. The politics of Germany are interesting. While immigration was a significant issue several years ago, it does not seem to be a key determinant in the upcoming election. The recent flooding devastation has taken center stage, although climate change, energy and electricity remain prominent issues.

The recent unusual rainstorm and resulting flooding, causing hundreds of deaths, has become a flashpoint pitting climate change and its heavy-handed mandates against possible incompetence among local officials and the rising cost of energy. The storm, identified by meteorologists nine days ahead of its arrival, dumped unprecedented amounts of rain in a localized area. It appears that government officials failed to release water from reservoirs ahead of the storm's arrival. Therefore, these reservoirs overflowed their banks, flooding the region downstream. There are also reports that the flood warning system may have proven inadequate, besides being ignored by residents.

While the flood is topical, a more telling issue is the government's plans for its economy for dealing with climate change and reducing carbon emissions. It seems a focus on this issue would benefit The Greens party in the upcoming election. However, the latest polling data shows the party's rapidly eroding political support. At one point earlier this year, The Greens party had the largest backing of any political party, suggesting that environmental focus would drive future German governmental policies, much like the Biden administration.

The chart below shows the percentage support of the public for the respective German political parties since 2009, and offers an interesting history of the environmental movement, at least as represented by political support for The Greens party. While the number of datapoints and percentage figures makes the long-term chart lines somewhat blurry, the general trend and fluctuations of support for the various political parties can be seen. As of July 26th, *Politico's* Poll-of-Polls shows The Greens support is at 18% compared to the CDU/SDU, the current governing coalition, at 28%.

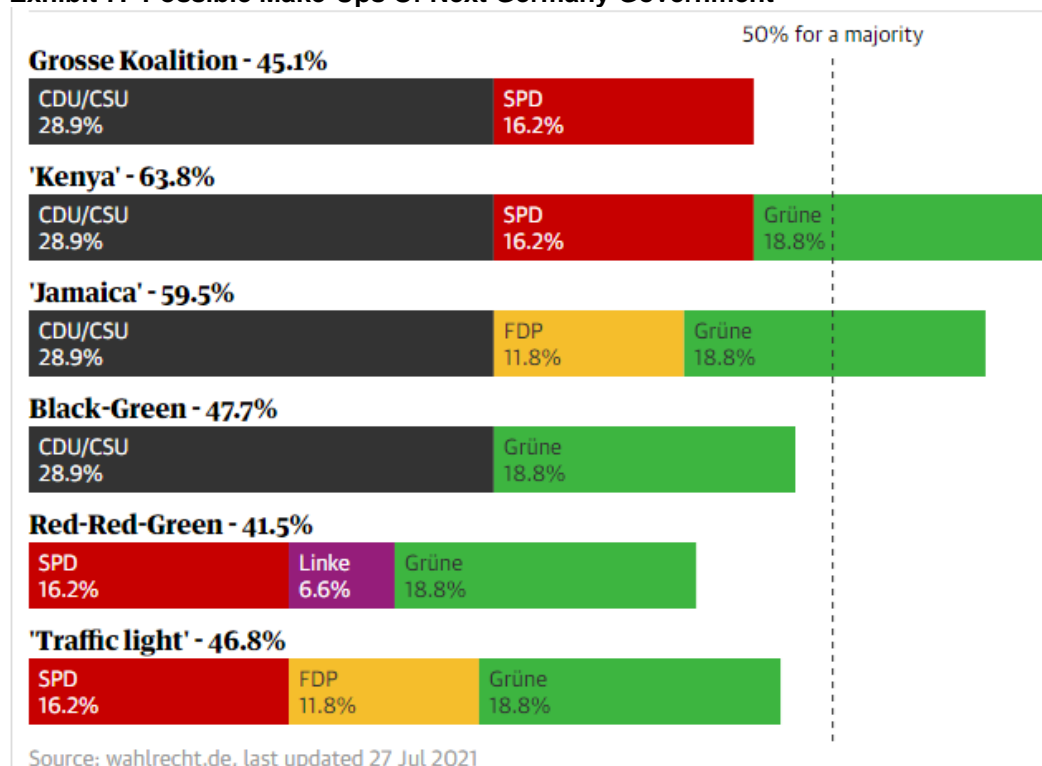
Exhibit 6. German Political Party Support 2009 To July 2021



Source: *The Guardian*

This chart reflects seven national polls, taken within the latest 14-day period, are combined in an unweighted 14-day moving average. This polling data is also used to help determine potential political coalitions that can forge a governing majority in the new parliament. As the chart below shows, the two most likely coalitions will include The Greens, meaning it will be able to leverage its position on environmental issues in governing Germany. The party's leader recently said her party would not join a coalition government that did not embrace a 1.5° C (2.7° F) goal.

Exhibit 7. Possible Make-Ups Of Next Germany Government



Source: *The Guardian*

An interesting question is why political support for The Greens rose early this year but has fallen since. Equally interesting is exploring why The Greens peak support fell short of its high attained in 2019 and only matched the 2011 high. That high was understandable, as it coincided with the nuclear accident in Fukushima, Japan. The accident pushed Chancellor Merkel to accelerate the planned shutdown of Germany's nuclear power plants. The last nuclear plant shuts down next year. The accident helped the environmental movement target accelerating the energy transition underway and focusing it on wind and solar power. In other words, it was an emotional high. However, support for The Greens only reached 25%, although it exceeded the prior high of 23%. Still, despite that surge, The Greens still trailed the CDU/CSU and SPD parties, although it did, very briefly, pass the level of support for the SPD.

In late January, The Greens rated 19% support, trailing the CDU/CSU at 36%. Then the fortunes of these two parties changed. By May, The Greens were outpolling the CDU/CSU by 25% to 24%, and climate change activism was the rage throughout Europe and in the United States.

May's peak support for The Greens came just after Germany was forced to reopen four large coal-fired power plants in April as renewable energy disappeared as a major source of power due to weather conditions. The realization that coal would need to grow its share of Germany's power mix, plus the recognition that more natural gas would also be needed, caused environmentalists to push for even stricter climate change mandates within the European Union. These efforts were challenged by coal states – Poland and the Czech Republic. At the same time, the price of power in Germany, especially for its industry, which is critical for the health of the economy and jobs, has been escalating.

Then there was the Nord Stream 2 pipeline controversy. Chancellor Merkel's ability to convince U.S. President Joe Biden to approve the pipeline ("it was essentially complete") will lead to more volumes of cheap natural gas coming from Russia. The new pipeline, a direct line from Russia to Germany, will bypass Ukraine and the political risk associated with its struggle against Russian political interference.

The history of Nord Stream provides insights into Germany's energy challenges. In 2005, then-German Chancellor Gerhard Schröder was on the cusp of losing the upcoming election to East German-born physicist Angela Merkel. He moved forward with the Nord Stream pipeline deal, which was less controversial than now, because political views were that Russia was becoming less of an enemy and could be convinced to adopt policies acceptable to the West. Given the intervening history and actions by Russian leader Vladimir Putin, especially in the Crimea and Ukraine, opposition to Nord Stream 2 has been greater.

Now, with the U.S. approval, Nord Stream 2 will deliver gas to Germany. Combined, the two pipelines will deliver about 110 billion cubic meters of gas directly to Germany, circumventing Ukraine. The pipeline running through Ukraine has a theoretical capacity of 160 billion cubic meters, but after 50 years of operation, it needs a substantial upgrade estimated at €6 (\$7) billion. In contrast, the €17.5 (\$20.7) billion Nord Stream pipelines are state-of-the-art versus an old, rickety pipeline. Now, Gazprom can ship gas directly to Germany at a lower cost and with less hassle. It has agreed to pay Ukraine transit fees of about \$2 billion annually through 2024.

What is important is that German industry needs cheap, reliable energy, so it loves the pipeline deal. Next year, Germany turns off its last nuclear power plant, and it plans to ban coal-fired electricity production by 2038, with expensive subsidies to the producing regions. While renewables share of energy in Germany's electricity mix is growing, it is less than 50%, having fallen to 43% during the first half of 2021. Starting next year, Germany has a huge electricity hole to fill and needs natural gas, since it pollutes less than coal. Gas is also used to heat 45% of Germany households.

Structural problems with Germany's energy mix are emerging. The restarting of the four coal-fired power plants, the need to subsidize them, the slow pace of wind and solar power capacity additions, and the prospect of declining gas supply from The Netherlands as it shuts down its Groningen gas field, highlight the challenges. The challenges are translating directly into soaring electricity prices, as Germany's power is the most expensive in Europe, and costs are rising. This situation makes the Nord Stream 2 deal that much more important for Germany's economy.

The chart below highlights how electricity costs have exploded this year. At €90 (\$107) per kilowatt-hour, prices have doubled since the start of 2021 and are touching the peak levels experienced in 2008. The current price spike is assumed to be temporary because it was driven by expensive natural gas and coal due to the colder winter. However, the price of energy is only a portion of residential and business monthly power bills. They are also loaded with taxes and subsidy payments, the reason why the current government is actively working to figure out how to offload some of those costs to the government, i.e., socializing electricity expense, to ease the financial pain being experienced by ratepayers.

Exhibit 8. Germany Electricity Costs Have Doubled This Year

Source: ewi.uni-koeln.de

Another issue plaguing German politicians is the rising cost of electricity and natural gas for home heating. The government is considering making landlords responsible for a portion of renters' heating costs. As we know from experience, that means increasing rents, which imbeds the rising cost in the cost of living.

While we are sure there are other political issues influencing German voters as they head to the voting booth on Sunday, September 26th, the erosion of support for The Greens suggests the economics of energy has become a more prominent concern. That issue is not going away, especially if climate change mandates that disregard their impact on costs are embraced. At what point will they declare: "No Mas," or demand less-costly alternatives? Our sense is that point is fast approaching.

Lucrative Renewables Projects Causing Commercial Battles

Who would have thought that commercial considerations would wind up pitting one clean energy company against another? That is happening to the amusement of many observers. Several weeks ago, a solar energy company sued the Department of the Interior (DOI) over its approval of the nation's first major offshore wind farm project off the coast of Massachusetts.

The complaint filed in federal district court in Boston by Allco Renewable Energy Ltd accuses the DOI of overlooking risks that the Vineyard Wind project could pollute nearby waters and jeopardize endangered species should the turbines fail to withstand strong hurricanes. In its filing, Allco accuses the DOI of violating the Outer Continental Shelf Lands Act (OCSLA), arguing the Vineyard Wind farm will unreasonably interfere with some uses of coastal waters that make up the nation's outer continental shelf.

At the heart of the charges is that the DOI ignored its own environmental review of the project that states: "no offshore wind turbine that exists today can survive a Category 3 or greater Atlantic

hurricane.” Additionally, wind farm operators often use specialty lubricants to maintain turbines, which could leak if damaged. The “catastrophic release of oil and contaminants into the marine environment” could jeopardize endangered sea turtles and the Right Whale. This is in violation of OCSLA’s requirements to strike a reasonable balance between the waters’ various uses. The fishermen who have been fighting the offshore wind farms that are targeted for traditional fishing regions were cheering the filing.

This filing is ironic, as it attacks the environmental dream of offshore wind power in a region populated by several of the leading politicians touting the benefits of green energy and demanding their use. Senator Ed Markey (D, Mass) and Senator Sheldon Whitehouse (D, RI) have pointed to the need to embrace renewable energy to curb carbon emissions from burning fossil fuels. One of their claims is that Atlantic hurricane frequency is increasing and their strength growing, due to the warming from greater CO² concentrations in the atmosphere. If they believe this about hurricanes, these senators should be championing Allco’s suit.

Another battle pits two utilities – one north and the other south – over one’s claim that the other is deliberately delaying actions necessary for the other’s project to be a success. CMP’s (Central Maine Power) parent, Avangrid, itself a subsidiary of Spanish utility Iberdrola, S.A., is locked in a bitter disagreement with Florida-based NextEra Energy over the latter’s failure to perform a necessary safety upgrade of a piece of equipment at the firm’s nuclear power plant at Seabrook, New Hampshire. Until NextEra upgrades this circuit breaker in the plant, CMP cannot connect to the \$1 billion New England Clean Energy Connect (NECEC) line and the 1,200 megawatts of Quebec hydropower it would carry to Massachusetts.

Some readers may remember that this Canadian hydropower is to help Massachusetts meet its clean energy goal. The power originally was to flow through a newly constructed 192-mile power line through New Hampshire to Massachusetts and the New England grid. Unfortunately, pressure from citizens convinced the New Hampshire Site Evaluation Commission to reject the proposed project, Northern Pass, by Eversource, even though a third of the length was to be buried to reduce visual pollution. This project had been chosen by the Massachusetts government because it was the most advanced in helping the state meet its clean energy target. They had to fall back to another of the 45 proposed projects. Thus, the NECEC line.

Exhibit 9. Proposed Maine Power Line



Source: *Press Herald*

The project aims to bridge the transmission gap between Hydro-Quebec's massive hydroelectric plants in northern Quebec and the millions of consumers in Massachusetts. It will be funded by Massachusetts ratepayers. The line cuts through 53 miles of forest in western Maine, particularly appalling to conservationists, before following existing transmission corridors to a new substation in Lewiston. The line is supported by Maine Governor Janet Mills (D) and opposed by Maine and Quebec native tribes. It has received state and federal permits but is facing an existential challenge in the form of a referendum question on this November's ballot. Voters will be asked if they wish to ban the upper section of the project and require legislative approval for future ones.

Even if voters reject the ballot initiative and the transmission line is completed, operations cannot begin until the Seabrook nuclear power plant's backup generator circuit breaker is upgraded to ensure it works properly with the higher electricity loads on the grid. NextEra owns the circuit breaker. It also owns an 822-megawatt oil-fired power plant in Yarmouth, Massachusetts that plays a key role in meeting winter electricity demand. NextEra has battled the NECEC line at the various utility regulators in Maine and Massachusetts, as well as in Maine courts and before the state's environmental regulators. It has also objected to the U.S. Army Corps of Engineers, as well as providing \$7 million to a political action committee opposing the project.

In a Federal Energy Regulatory Commission filing, Avangrid claimed "NextEra is a direct competitor to the NECEC Project and stands to lose significant revenues and profits as a result of the successful development of the NECEC Project." Avangrid also claimed NextEra officials approached it and offered to fix the issue in return for an advantageous power purchasing agreement.

NextEra claims this is purely a commercial dispute. It says it needs "to be fairly compensated for the work that needs to be done at Seabrook. If we're fairly compensated, we're more than happy to perform the work." While Avangrid has agreed to pay for the upgrade, NextEra wants to be compensated for any revenues lost while the Seabrook plant is offline to allow the work to occur. In its filings with the Nuclear Regulatory Commission, NextEra estimated this cost at about \$560,000 per day.

The issue is neither company trusts the other. Avangrid fears NextEra will "slow walk" the work, especially if there is no net financial cost for it to do so. Avangrid argues the work could be done in a couple of weeks and take place when Seabrook is shut down for routine refueling. They had wanted the work to happen during the upcoming October scheduled shutdown, but now it is concerned NextEra's delays will push the work off until the next refueling in May 2023. Avangrid asked FERC to compel NextEra to replace the switch at that time and needs the agency to act before year-end to ensure the replacement is done before NECEC is supposed to start operating. They do not want to miss out on any of the estimated \$60 million a year in earnings the line will generate, especially since CME will not be able to tap any of the power. On the other hand, NextEra has asked FERC to help the companies resolve the dispute.

Battles among renewables developers, or even among utilities hoping to benefit from the push for clean energy, are likely to increase in the future. This is likely because of how lucrative clean energy has become due to subsidies. For traditional utilities, they may see these battles as protecting existing power plants or providing supplemental income to offset declines in the profitability of those plants. These battles are forcing utility executives to rethink their business models, although there are few structural changes they can make. Welcome to the brave new world of electricity.

Thoughts On Current Energy Developments

Is The Paris Agreement In Trouble?

The next big climate change meeting will occur this fall in Scotland, with the U.K. taking the lead. Thousands of delegates from 197 member countries will descend on Glasgow for the two-week United Nations Conference of the Parties (COP26) meeting beginning October 31st – an interesting date selection. The aim of the meeting is for the delegates to finalize the “Paris Rulebook,” the rules needed to implement the 2015 Paris Agreement. The various signatories to the agreement will be updating their targets for reducing their carbon emissions to meet the Paris goal of keeping the rise in global temperatures to 1.5° C (2.7° F) by 2100.

In mid-July, in the run up to the meeting, John Kerry, the US Special Presidential Envoy for Climate, visited London twice around a trip to Naples, Italy for the meeting of the Group of 20 (G20) energy and environment ministers to work on the goals for COP26. That meeting, surprisingly (or maybe not), failed to produce an agreement among the ministers. Italy's Ecological Transition Minister Roberto Cingolani chaired the meeting, and he told reporters at its end that the ministers could not agree on two disputed issues. As a result, these issues were kicked down the road for discussion at a G20 summit in Rome in October, merely days before COP26 starts. Mr. Cingolani said, "Commitments made today lack substance and ambition. It is now up to G20 heads of state and government to discard this document at the October leaders' summit." He also said negotiations with China, Russia and India had proven especially tough.

In the end, China and India declined to accept the two contested points - the phasing out of coal power by 2025 and the wording surrounding a 1.5° - 2° C (2.7° - 3.6° F) limit on global temperature increases set by the 2015 Paris Agreement. In both cases, the objections related to the timetables being too rapid for their countries to meet, so why try to accelerate them? We suspect they were also reflecting the views of other countries who are not members of the G20 wealthy-nation group.

Prior to the Naples meeting, Mr. Kerry stated in a London speech that even if all the countries delivered on their commitments to the Paris Agreement, global average temperatures would still rise by 2.5° - 3° C (4.5° - 5.4° F) or even more. That should be a motivation for a more aggressive push on carbon emissions reduction pledges. Of course, this is the same Mr. Kerry who told reporters last January that if the U.S. reduced its carbon emissions to zero it would have no impact on future global temperatures.

At the G20 meeting, the Indian delegation produced a formal country statement on the issue of carbon emissions and the balance between developed and developing economies. The delegation, headed by environment minister Bhupender Yadav, questioned whether “the pledges made by some countries to achieve net-zero GHG emissions or carbon neutrality by or around mid-century” will leave room for developing economies due to a shrinking available ‘carbon space.’ “Therefore, and keeping in view the legitimate need of developing countries to grow, we urge G20 countries to commit to bringing down per capita emissions to global average by 2030,” they wrote. They were referencing the U.N. policy “Common but Differentiated Responsibilities and Respective Capabilities,” an established feature of climate change negotiations since the UN's first Rio Earth Summit in 1992. Talk about letting a skunk loose at a picnic.

Shifting the debate from total CO₂ emissions to one focused on per capita CO₂ emissions will create significant turmoil, as it raises the issue of why the developing economies should be limited in their evolution by the climate change directions of developed economies. As shown in

the chart below, India's per capita emissions are very low compared to every developed country and the world average, too. Currently, the global average is 6.5 tons per capita of CO₂. India emits just below two tons per capita while the U.S. emits 17.6 tons and Germany 10.4 tons.

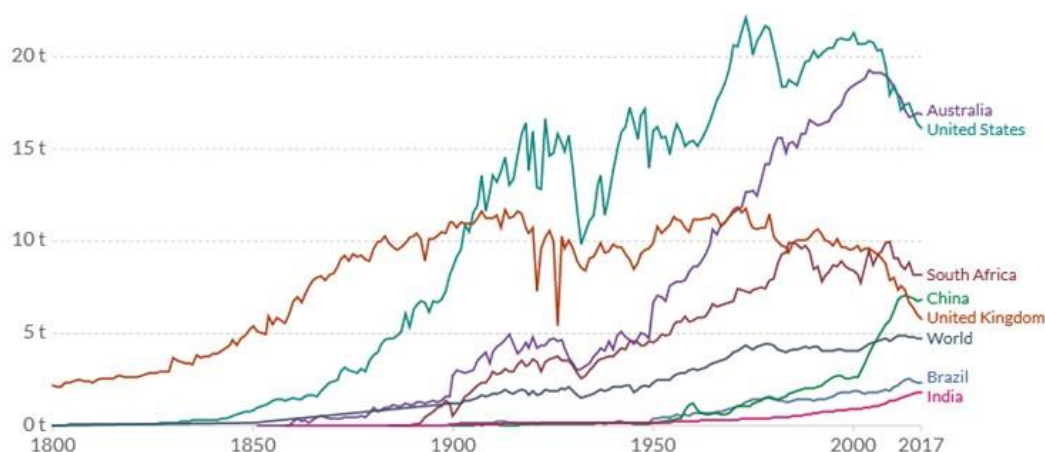
Exhibit 10. India Throws Down The Gauntlet On Climate Change

Per capita CO₂ emissions

Carbon dioxide (CO₂) emissions from the burning of fossil fuels for energy and cement production. Land use change is not included.



+ Add country □ Relative change



Source: Our World in Data based on the Global Carbon Project; Gapminder & UN OurWorldInData.org/co2-and-other-greenhouse-gas-emissions/ • CC BY
Note: CO₂ emissions are measured on a production basis, meaning they do not correct for emissions embedded in traded goods.

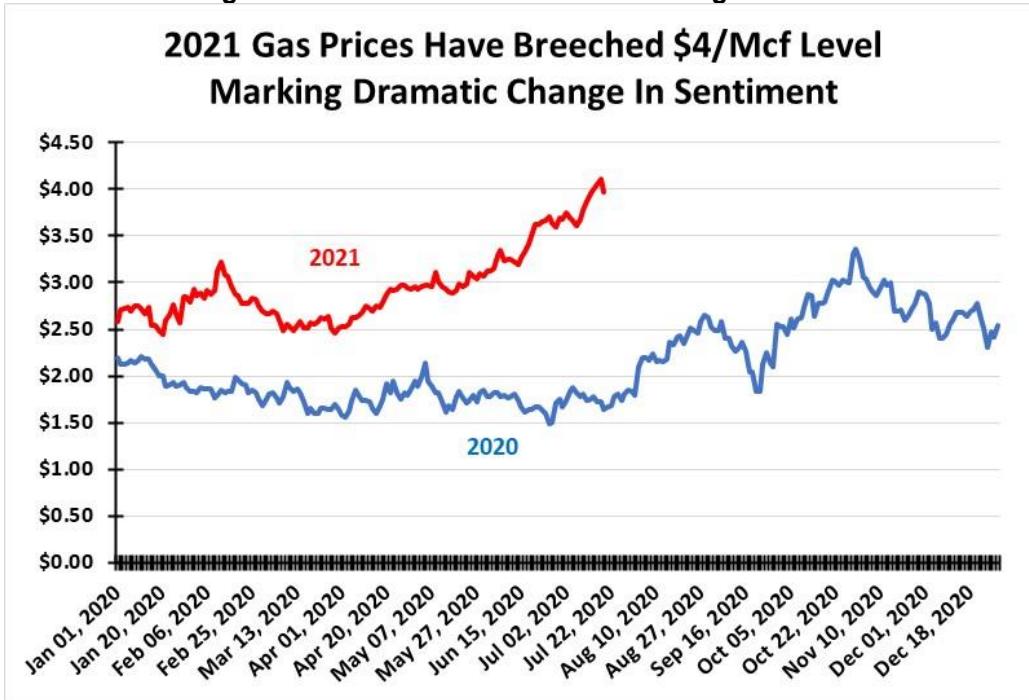
Source: *Our World In Data*

India's demand makes Mr. Cingolani's view of the dispute disingenuous. India wants to renegotiate the playing field, not merely the metrics. If the West thought this issue was settled in Paris, they may be mistaken. India did not attend the COP26 planning meeting in London, claiming it made its position clear at the G20 session. It will be interesting to see how this debate evolves as we head toward COP26. Can we expect to see Hillary Clinton and Barack Obama make guest appearances in Glasgow?

Natural Gas Sheds Its Rodney Dangerfield Persona

Since late spring, natural gas prices have steadily climbed, now above \$4 per thousand cubic feet (Mcf). This is the first-time gas prices have been in such rarified territory since the polar vortex days of December 2018. For part of 2020, gas prices struggled merely to keep above \$2/Mcf. What's changed? Is the new environment for gas going to continue?

Exhibit 11. Stronger Gas Prices In 2021 Are Now Soaring

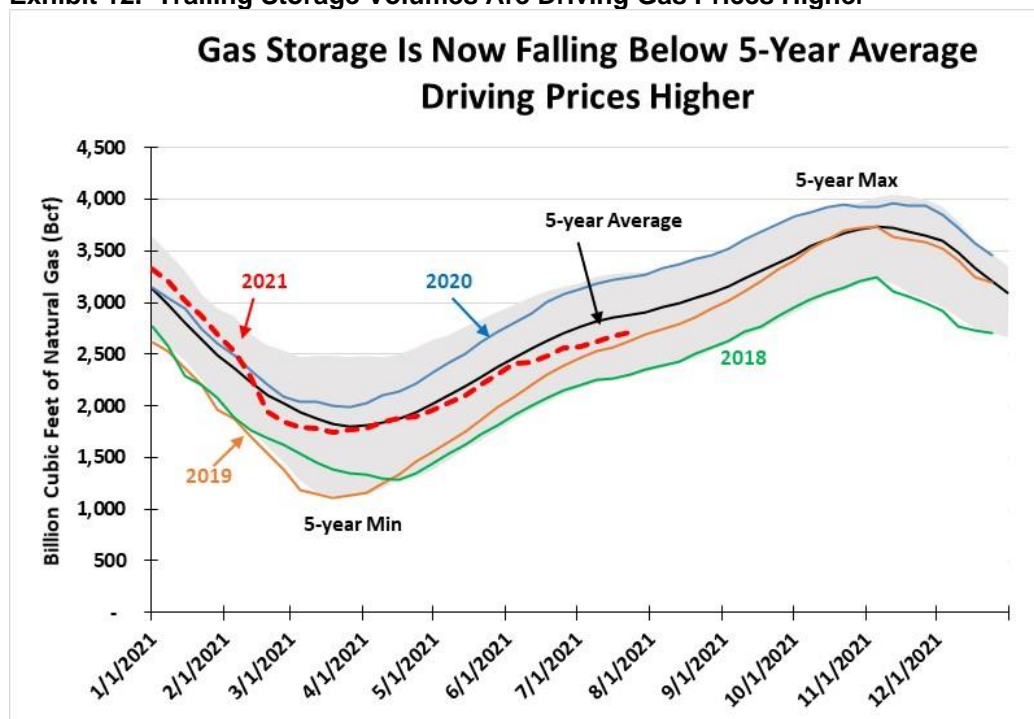


Source: EIA, PPHB

Last February’s bitter cold across much of the nation helped start the natural gas market rebalancing. Since the beginning of June, gas storage volumes, that had been tracking the 5-year average, began falling below it. Gas production has barely risen, and drilling has yet to pick up.

With last week’s gas storage report, current supplies are 168 billion cubic feet (Bcf) below the 5-year average. That shortage is below the 190 Bcf peak in the week ending July 2, or a month ago. With 30 days less time before the end of the current gas injection season, commodity traders are growing concerned over how much gas will wind up in storage, and what it means for storage levels and gas prices next spring. The safest way to protect against having too little gas in storage heading into winter is to lift current prices to encourage reduced consumption, leaving more output available for storage.

Exhibit 12. Trailing Storage Volumes Are Driving Gas Prices Higher



Source: EIA, PPHB

Contributing to higher gas prices is the realization that between February and April, gas production was flat with volumes of two years ago, after years of rapid growth. Year over year, July's marketed gas production was only 2.7% higher. Compounding the supply situation is how E&P company financial discipline has translated into less oil drilling and thus less associated gas output. Since April 2020, when the energy markets hit bottom, the gas drilling rig count has increased by nearly 50%, but it represents only an additional 36 rigs. Today, the gas rig count is about 100 fewer than the last time gas prices reached \$4/Mcf.

With LNG export volumes ramping up after plant and pipeline maintenance was completed this spring, feed gas volumes have increased. Although high international gas prices are providing profitable cargoes for LNG, higher domestic gas prices will squeeze profit margins, possibly keeping some of that export gas home.

As one can see, there are many variables impacting the natural gas market, and all of them are in flux. Whether we are entering a new environment (sustained higher prices) for natural gas remains to be seen. Without a winter weather forecast, we can only speculate on how some of these variables will play out. The gas market bears watching. Maybe it will become relevant once again.

The Next Sneaky Deal For Climate Change

As cited above, the offshore wind battles are continuing as the government's push for more clean energy struggles. Fishermen are challenging offshore wind farms in Massachusetts, New Jersey, Virginia and now New York. We read where the Biden administration is considering payments to the fishermen to buy off their objections to the siting of wind farms in traditional fishing and scalloping areas that will hurt their incomes. This will be another subsidy for clean energy but in

the form of welfare payments. We have learned over our career that once a subsidy begins, it never ends, and instead grows over time. Is this the new page in the playbook to make more Americans beholden to the federal government for their income and well-being in the name of climate change?

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