Sankala Group

Private Client - Off Grid/Off Chain

Electricity Demand

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In this letter we are going to explore the very important topic of accelerating demand for electricity or “power”, and discuss potential areas for investment in the coming decade. Our team unanimously agrees this is a multi-trillion-dollar topic, and one both we and our clients need to understand better.

It is plain to see that between electric vehicles (EVs), computing power to serve artificial intelligence (AI), cryptocurrency (BTC, blockchain etc.) and the ever-rising need for data storage, as well as the growing use of residential batteries, backup systems, and the conversion of many other devices from internal combustion to electric motors – “*electrification*” is generally booming.

In order to tell this story in a relatable way, we need to use an unusual number of charts and graphs, so we hope you enjoy learning visually. We also must thank Kate Grace, a Boulder based consultant who helped us significantly on this project. Without her work this letter would be far less informed and digestible.

To begin, some of our clients may have read that economists often use electricity demand growth as a proxy for economic growth when they don't trust published government figures. This approach has been used extensively in the past to "fact check" China's GDP growth against something more tangible like power consumption. You can see this relationship particularly well in the window below, which were some of China's fastest growing years, and ones which naturally caused economists to want to double-check the government's growth figures:

China Power Consumption & GDP (2001-2011)

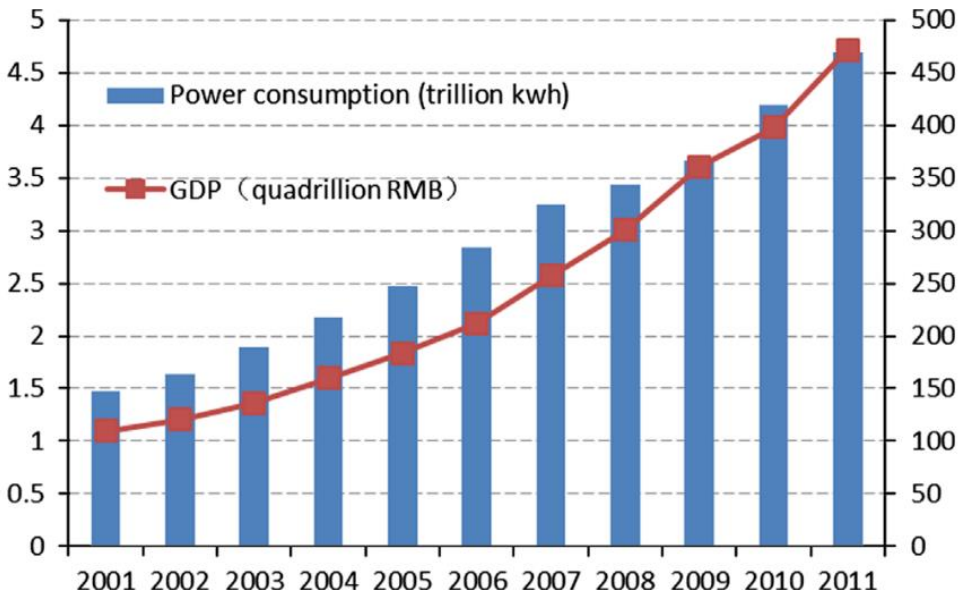
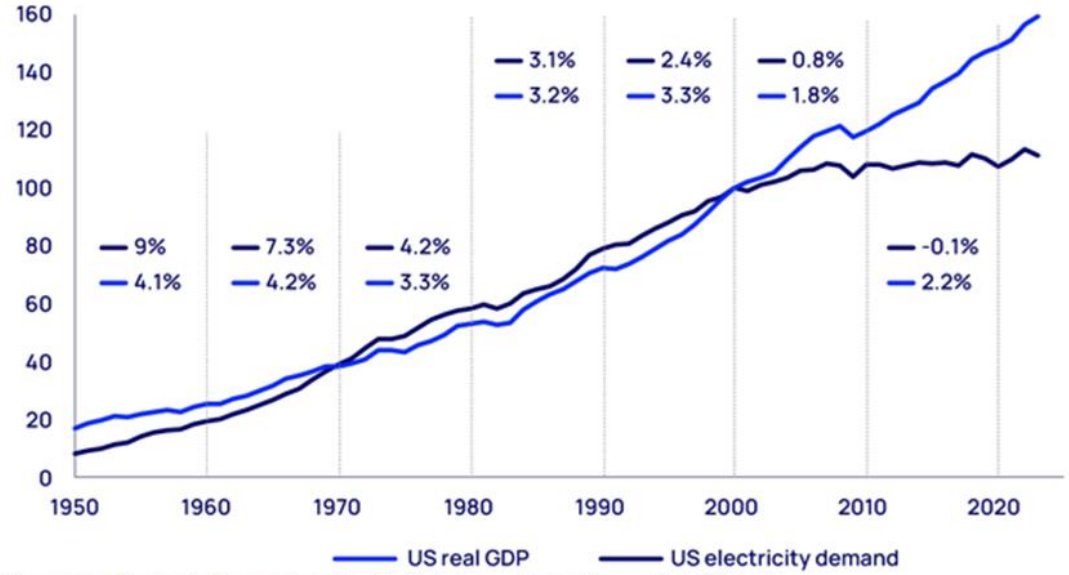


Fig. 1. China GDP and electricity consumption from 2001 to 2011 .
Statistics Source: China Statistical Yearbook, China Electric Power Yearbook.

As you can see, electricity consumption and economic growth tracked each other fairly closely and were a decent proxy for each other. However, if you look deeper into this relationship, it certainly doesn't track everywhere, or at all times. The plot below shows the same relationship in the United States, over the longer term. You will see that electricity demand growth was faster than GDP growth from 1950 to 1980, and then materially slower from 2010 to 2020 as the economy "matured" and became less reliant on heavy industry:

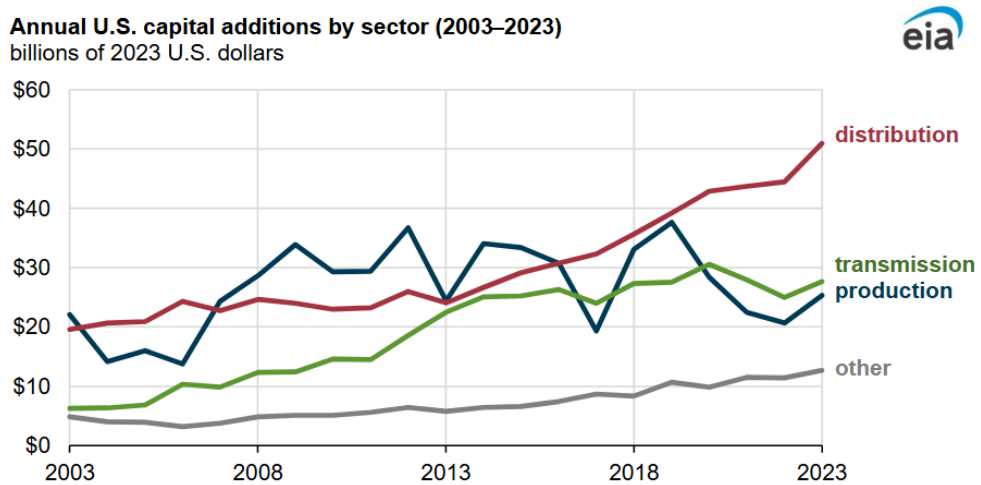
U.S. Power Consumption & GDP (1950-Present)



Source: Wood Mackenzie, Energy Information Administration and Federal Reserve Bank of St. Louis

As you might expect from the plot above, during the period from 2010 until recently, conditions were not especially attractive for making large new investments in the production of power in America because demand was not growing materially. However, it turns out quite a bit of new investment in grid infrastructure was required during the period, focused on *transmission* (long distance / source to neighborhood) and also a very significant amount of new investment in *distribution* (short distance / neighborhood to final customer):

U.S. Electricity Capital Investment (2003-2023)

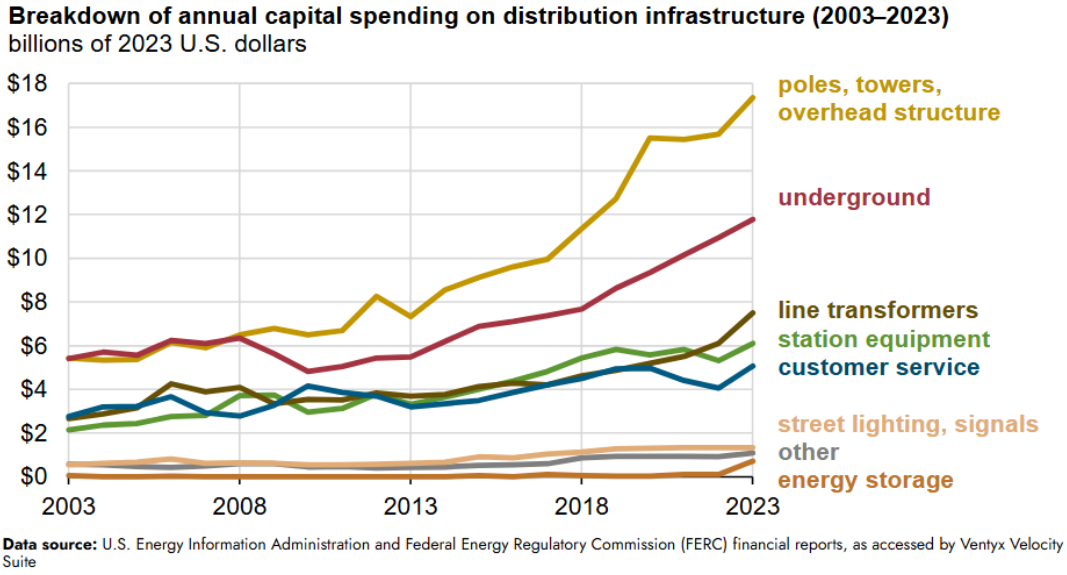


Data source: U.S. Energy Information Administration and Federal Energy Regulatory Commission (FERC) financial reports, as accessed by Ventyx Velocity Suite

(Interestingly, in reading the detailed notes from the EIA (U.S. Energy Information Administration) on this plot, the 2023 uptick recently seen in *production* spending was largely due to the Vogtle nuclear plant, operated by Georgia Power, which came online in 2024. Nuclear projects remain *extremely* expensive.)

If we look even deeper into the very large growth in *distribution* spending, we see the following:

U.S. Electricity "Distribution" Capital Investment (2003-2023)



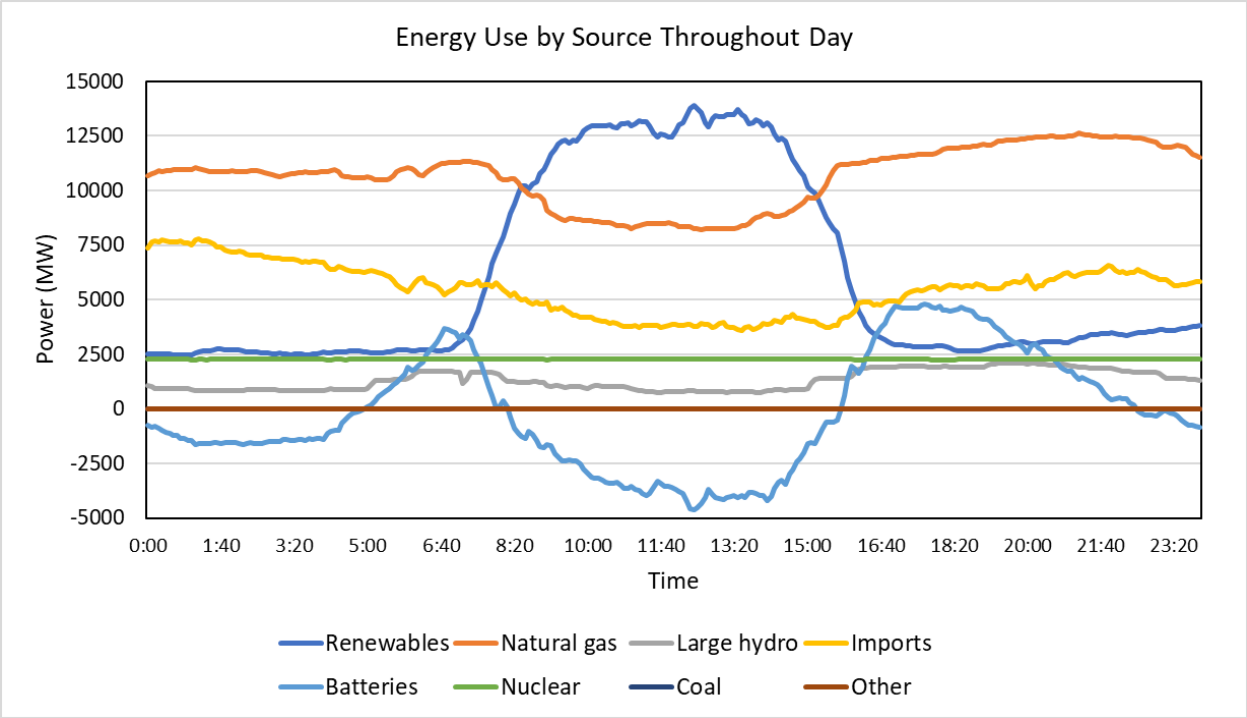
While somewhat boring perhaps, it is unsurprising so much is being invested in maintaining power lines and digging trenchs to put them underground, as the resilience of the grid to weather-related stress rises in value to consumers (and utilities) as more and more of our daily lives depends on electricity arriving at our homes and workplaces. Certainly, recent events in California, where the utility PG&E was sued for liability related to the enormous Dixie wildfire, or here in Boulder, CO where Excel Energy was first sued for wildfire liability, then soon after investigated for proactively shutting off the power to avoid the same problem in the next serious high wind event, have underlined the intense pressure on power companies to make sure their systems are both safe *and* never turned off.

Additionally, the plot above also shows *energy storage* investment ticking up strongly just recently in 2022/23, an idea we will return to later.

So, having looked at what investment in U.S. electricity systems generally looked like in recent years, we can turn attention to where shrewd electricity investment may be headed in the future. To understand that, it's crucial to understand the need for power grids to be

"balanced." In short, power production/supply must match power demand at any given point in time for the grid to function. That is easier said than done, especially as renewables have replaced coal plants in recent years. Renewables make power when the sun shines and the wind blows, yet power is needed by customers at different moments. The best way to see this quickly is by looking at a snapshot of one day of power production on the California ISO, an example "grid":

Example Day in California ISO Production Sources (By Hour)



The key takeaways in this plot are that renewables are producing mid-day, while nuclear is in constant production, hydro is fairly constant, and natural gas and batteries are spooling up and down to balance the system at the margin. It is also important to note that total supply from natural gas not only fluctuates, but is very large. Batteries are a much smaller total source and actually go net negative during charge times, as you might suspect. While this is just a single recent day on the California ISO (Independent Service Organization) "grid", it illustrates how power production generally looks and functions on most diversified grids around the world.

Now we can talk about where we may be headed in a more informed way. First, we accept as our base case that demand for electricity globally will not only keep growing at the ~2.7% per year it has over the last decade, but will accelerate due to the adoption of EVs, AI, Cryptology, Data Storage, and Device Conversion. Let's call this confluence of new demand "new juice" for ease.

We see no reason to doubt reputable sources like Wood Mackenzie, who estimate that demand growth in the U.S. is likely to rise from 0-1% per year, to 1.5-3% per year for the next five years and perhaps beyond due to new juice requirements. That new demand will place strains on a sector that wasn't prepared for such growth, as 3% of a very large number (~4 trillion kWh) is, well, a large number (120 billion kWh annually), especially if you didn't see that coming many years in advance, which big slow projects like power plant construction fundamentally require. They often take 3-5+ years to come online.

Further, new juice will be needed across the whole world. In the last 10 years, global demand growth averaged 2.7% per year. Developing countries, which already have faster demand growth than developed countries, will need new juice just like developed countries do, placing the same strains on their investment planning. Perhaps global demand growth ends up closer to 3.2 - 3.4% annually, which is above most global GDP growth estimates. So, all markets are likely to see an acceleration of demand, and the accompanying strains and bottlenecks will impact most regions.

Close to home, in the U.S., as this new juice gets supplied, given the recent election, we think it is clear production development will be encouraged at the lowest cost, with an environmentally unfortunate move away from the focus on carbon intensity and climate which we saw in recent years. That means investment emphasis will be on combined cycle natural gas power plants, and to a lesser (and slower) degree the potential construction of new nuclear plants and/or the next generation of small nuclear reactors. Environmentally minded investors will be forced to dig deeper for ideas in the coming years. Since utility-scale battery demand is coming off a low base, we don't see that abating materially in this scenario, and it therefore remains interesting in the U.S. as well as abroad.

Globally, however, Europe, China, India, Brazil and many other regions/nations remain committed to their climate goals, and present real opportunities for renewables investors. That said, reduced U.S. demand will obviously dampen generalized demand for renewables equipment, so a real choke point for that supply is unlikely. In 2023, prior to any of these changes, China made up 60% of new renewables construction alone and will clearly remain that leader. By corollary, as described earlier, more renewables also means more required supply from natural gas and batteries, to help keep those renewables in balance. So "net/net" what is interesting here is that batteries and natural gas related power infrastructure will see synchronized demand around the globe, regardless of policy and region.

Now you might correctly think—this is not some stunning revelation others don't understand. We only need to look at the stock price of GE Vernova, the best performing spin-off of the old General Electric, to understand how bright natural gas power generation is looking to investors. GE Vernova is the leading multi-national producer of natural gas turbines, and its stock gained ~150% in 2024 since it was spun off.

However, what we have learned about these sorts of “sea change” ideas, ones where others see the tide direction as well, is that it becomes more important to look past the obvious names and much further downstream. The current ideas we are looking at are less obvious. They are what we call *second or third order* ideas, meaning companies few people have heard about, which often make boring products that are somehow obscurely critical to the development of these larger trends. They also force us to look past our most exciting thoughts about how power production might be changing/evolving, and instead focus us on the strong existing trend of heavy investment in transmission and distribution, which not only is likely to continue, but will also be uplifted in this new landscape.

We use this important conceptual approach across many ideas and industries, but it is especially critical in the electricity space. It would be simple enough to say, “Demand for electricity is rising so I should buy utilities.” The problem with that idea is that most utilities which produce and provide power are regulated by governments since they are de-facto monopolies and are limited to a “reasonable” rate of return on the assets they employ to meet the demand. While these might be safe and fairly profitable investments in a new demand growth environment, we think a much better approach is to find companies that serve the trend which can see some sort of spike in micro-demand, which outstrips micro-supply, and puts real pressure on the supply chain for a specific product or service. These companies are generally not regulated, and so you can benefit from unusually good business conditions and margins as pricing responds to inelastic demand growth.

One remarkable illustration of this type of spike in micro-demand was the company Generac (GNRC) during COVID. Generac produces natural gas and propane powered backup generators for residential homes, and during COVID the demand for these generators skyrocketed, lifting the company's shares fivefold. This is a good illustration of a shock to a supply chain from micro-demand, and one which occurred outside the regulated electric utility marketplace.

The current range of firms we are looking at follow a similar logic, and also adhere to the focus areas listed previously in this letter. They include nearshore natural gas turbine related support services, global renewable equipment manufacturers (which are priced far more reasonably these days), and producers of boring electrical products like wire, conduit, armored cable, and the accessories for such distribution infrastructure. We have even analyzed the largest makers of electric golf carts, a mode of transport we visualize more and more municipalities making street legal. We are also looking at global producers of high-voltage transmission equipment as power needs to increasingly be moved longer distances, however, most pure plays in that space are currently stretched on a valuation level and less interesting, much like past ideas in nuclear energy and uranium firms.

Finally, returning to a point from earlier, we are also looking at the various technologies being employed in utility-scale batteries as the need for such grid responsive energy is growing at an unusually fast rate. These batteries come in many shapes and sizes, with

some being so simple as electrical pumps which move water uphill during low demand, such that it can then be released through turbines during high demand. Others are much more sophisticated like flow batteries, which take us on a global search through company names large and small.

Further, smaller batteries that serve point-of-use applications like EVs, household batteries, and construction and landscape equipment are also getting interesting again as the extreme overvaluation of the lithium adjacent firms who serve that space (as well as the utility-scale battery space) has subsided, presenting the opportunity to enter the industry at reasonable valuations again.

The dynamics created by this resurgence in U.S. demand for electricity, and the acceleration of existing demand growth globally, may well cause overall electricity demand growth rates to move above global GDP growth rates for quite a few years into the future. That means we are likely to see short-term bursts of investor enthusiasm in this sector as they rotate in and out of ideas, and as they gain or fade in popularity or media coverage. We are prepared to review our own biases about what stock valuations are reasonable, with our awareness of the likelihood that this is a longer-term trend.

As always, you can rely on us to be careful stewards of your resources. We will not chase stratospheric stock valuations, nor will we be making investments in cash-burning startups touting technical innovations we don't fully understand. Instead, we will be focused on finding companies with good histories of generating cash and earnings, who are likely to see better conditions in the future than they have seen for various reasons in the recent past, and who might benefit from some unique surges in demand.

Have a great start to 2025, and if you're a wonk, and still reading, please see one last "bonus plot" below my signature.

Best,

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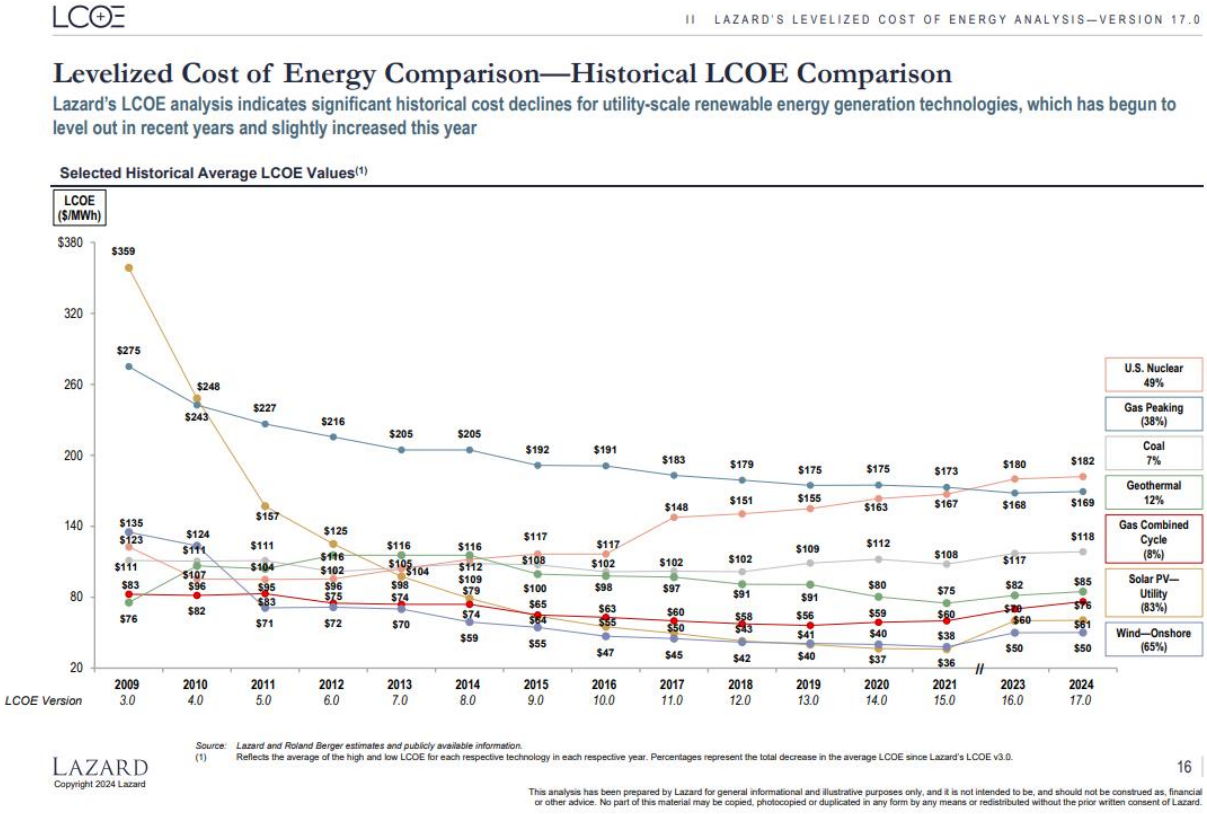
For those who just can't resist understanding the relative attractiveness of various types of power generation, we point you to Lazard's "LCOE+" report, which contains a treasure trove of data they have tracked on the subject for years. This plot shows how the cost of renewables has fallen in the last 15 years, and the cost of nuclear power has risen. But to understand the data further, you need to read the report because policy support is included in these figures and creates future uncertainty which is priced out in "bands" later in the report. Power markets remain materially influenced by policy, and that can't be ignored.

Cost of Power Sources by Production Source (2009-2024)



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