

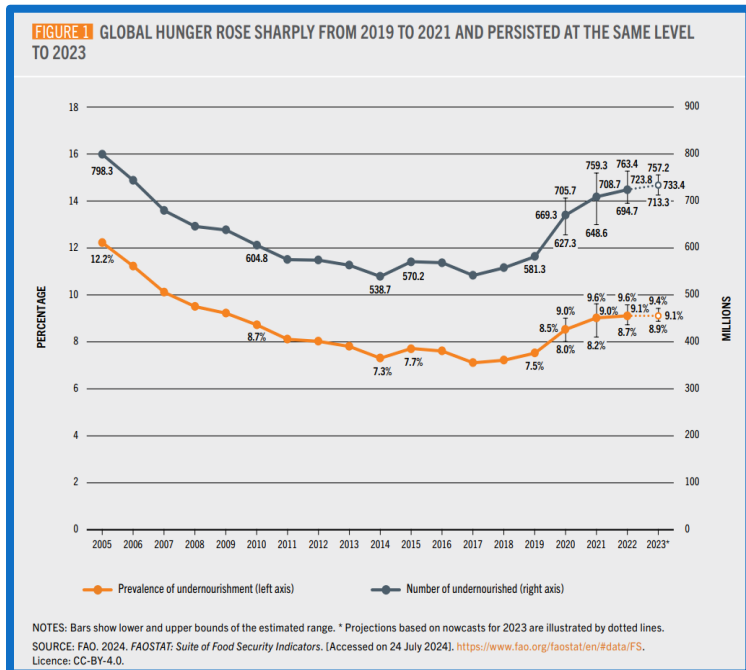


C6 INFRASTRUCTURE PARTNERS EXPANDED UPDATE: Q3 '24

Over the last few months, there has been a significant amount of news regarding the expansion of data centers (hyperscalers), electricity prices, food prices, inflation, and shifting fertilizer and petrochemical assets. Companies are dealing with power and feedstock uncertainties, which are changing capital expenditures and adjusting the global map. The U.S. is being called upon to add significant electrons to our system in a short period of time. But this requires a huge, coordinated effort (and capital!) to achieve. The Independent System Operators (ISOs) are struggling to add baseload to our grid at a time when huge expansion is being demanded. We are in the early innings of a broad buildout across the U.S., and given our readily available feedstocks for heavy industry, we expect to see additional “onshoring” of manufacturing over the next decade. **This puts Artesian in the perfect position to capitalize on small and medium scale hydroelectric assets.**

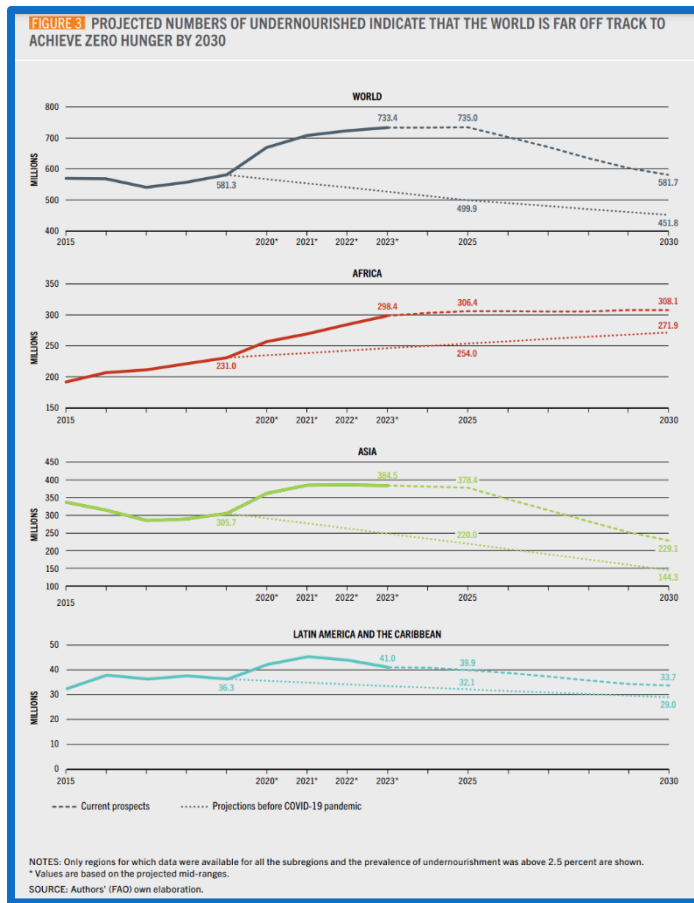
The agriculture markets have always been volatile, but with struggling yields, changing weather patterns, and geopolitical uncertainty, the issues are only compounding.

Fertilizer prices have shifted higher again, while food prices never stopped their relentless climb. This comes at a time when petrochemical and refining asset buildouts are changing—China is bringing new builds online and Saudi Aramco/SABIC are canceling expansion plans in three sites. They’re opting to partner with China for expansion of their liquids-to-plastic strategy. Saudi Aramco believes that plastic demand will outpace gasoline/diesel demand (which we agree with!) and are actively looking to expand liquids production within the



Kingdom, while shifting new downstream capacity into China. This will inherently increase the amount of sulfur that Saudi is producing, and these adjustments play perfectly into Sultech’s expansion plans. ADNOC has officially closed on their purchase of Fertiglobe, and they plan to transfer ammonia assets to the recent addition. ADNOC and Saudi Aramco are each looking to expand their chemicals business, as well as their fertilizer arms. **The shifting markets work in Sultech’s favor, as sulfur production expands and demand for sulfur-enhanced fertilizer grows exponentially.**

Global food insecurity and malnourishment are ongoing, with little progress made since 2019:



“The annual report, launched this year in the context of the G20 Global Alliance against Hunger and Poverty Task Force Ministerial Meeting in Brazil, warns that the world is falling significantly short of achieving Sustainable Development Goal (SDG) 2, Zero Hunger, by 2030. The report shows that the world has been set back 15 years, with levels of undernourishment comparable to those in 2008-2009. Despite some progress in specific areas such as stunting and exclusive breastfeeding, an alarming number of people continue to face food insecurity and malnutrition as global hunger levels have plateaued for three consecutive years, with between 713 and 757 million people undernourished in 2023—approximately 152 million more than in 2019 when considering the mid-range (733 million).”¹

The only way we can truly address the undernourished populace outlined in the chart by 2030 is by changing

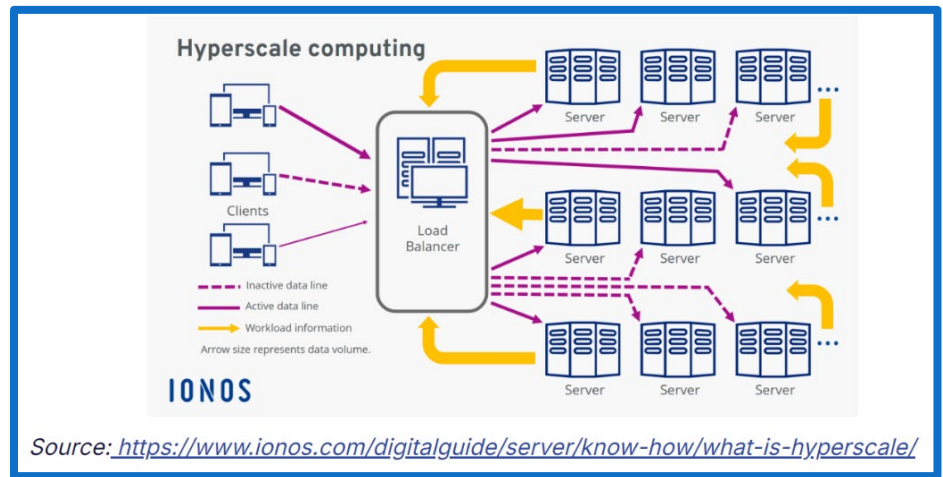
farming practices, such as incorporating new technology and fertilizers to increase yield and repair damaged soils. We are confident that Sultech will be an integral part in addressing yield shortfalls and malnourishment around the world, and bring us closer to the 2030 targets. Hopefully, we can make the Sustainable Development Goal of “Zero Hunger” a reality!

¹ <https://www.who.int/news/item/24-07-2024-hunger-numbers-stubbornly-high-for-three-consecutive-years-as-global-crises-deepen--un-report>

ARTESIAN ASSET MANAGEMENT

Addressing Opportunities in the Hydro & Electric Power Markets

There's been a resurgence in the term "hyperscaler" that first appeared in the 1990s, and again in the 2010s when data centers really took center stage. They consume a huge amount of power—each part of the process consumes electricity: from the client to load balancer to servers to cooling required to process.



The extensive buildout of these assets is putting extra strain on the grid, which will continue to push electricity prices higher. Large companies like Amazon and Citadel have made additional investments to address power concerns in the market. Amazon is investing in X-Energy and joining Washington-based nuclear operator Energy Northwest to deploy nuclear energy in a planned 5GW fleet by 2040. They also signed three new agreements to support the development of innovative nuclear energy projects, including enabling construction of several new SMRs (Small Modular Reactors). As well as a deal with Dominion Energy to explore the development of SMR near Dominion's existing North Anna Nuclear Power Station in Virginia.

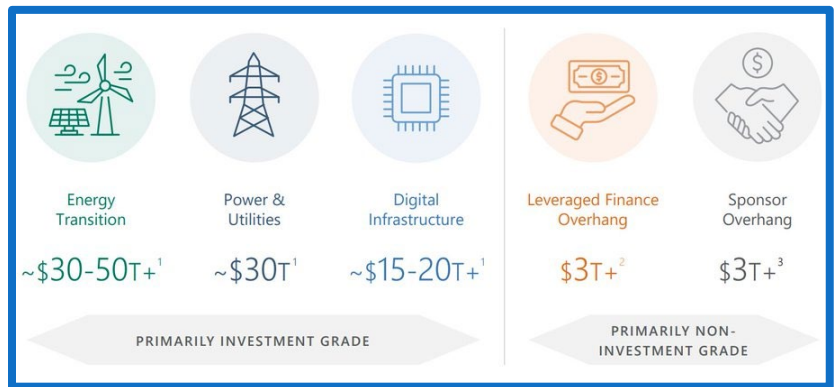
The slow expansion of the grid coupled with the increasing costs of transmission and regulatory delays have pushed data center operators to seek faster solutions. Data centers will pay premiums—sometimes 100% of the prevailing price—for quicker access to electricity. As power becomes more expensive, these rising costs will be passed on to consumers and create a ripple effect that will impact utility rates across the board.



The market continues to recognize the growing need for capital deployment into the U.S.'s infrastructure space, specifically power and utilities. Apollo Global Management recently had their investor day and laid out cost estimates to address some of the world's biggest challenges. **Through**

Artesian, C6 is specifically targeting the power and utilities sector with the ability to structure solutions.

Here is a great chart simplifying some of the largest overhangs with deploying capital. Many people in the market are stuck—completely over-levered with diminished cash returns because their investments relied on cheap money through low rates, subsidies, and government backing. As yields rose and governments struggled to fund deficits, investment firms have been left with elevated costs and debt that is draining resources. There are various forms of “sponsor overhang,” with the most common being structures to take advantage of tax regimes.



As interconnects are delayed and revenue generation is falling short, there is no clear exit for some of these entities without a bankruptcy or broader restructure.

Some of C6’s biggest competitors in purchasing assets are stuck with solar and wind farms that are experiencing an increase in carrying costs, with a shift higher in rates and failure to receive interconnect approvals. These burdens have shrunk our competition.

Artesian is buying assets that already have interconnects, generating cash the day we purchase, and are well below replacement costs. The hydroelectric assets in C6’s fund are particularly well-positioned to benefit from this dynamic. As the cost of electricity rises and supply remains constrained, owning cash-generating power assets like dams allows us to sell electricity at increasingly favorable rates. This is not only a hedge against rising energy costs, but also a direct play on the growing demand for renewable (and more importantly, reliable) power in an energy hungry AI-driven economy.

Publicly traded companies involved in the AI and data center boom of the past few years have seen their stock prices soar—whether they are cloud service hyperscalers, utilities, energy infrastructure, or chip providers. While the public sector reaps these rewards, there remains untapped potential in the private markets. **Bottlenecks in power generation and the grid present a compelling opportunity for private equity funds to step in and bridge the gap. Investments in power-generating infrastructure will generate great returns as the demand for electricity continues to outpace supply.**

There have been many recent developments supporting our thesis in the power markets.

Wall Street and Silicon Valley have increased their investments in infrastructure with billions being deployed in new funds and solutions. This provides even better optionality and economics for an exit, given the demand for generating assets in a tight market, plus we have a head start in accumulating assets. We could easily sit here and say that a large PE firm or tech company will pay 28x for our portfolio, but we want to consider the best path forward for our investors and partners. **There is a growing demand for pure play assets that generate cash—especially as inflation, stagflation, and limited GDP growth grips the market.**

Our fund provides ownership of physical assets that will rise with inflation and generate cash on a commodity that is in short supply. If we get deflation, the asset prices may fall, but the cash we are generating will increase in value as the power markets remain tight. We've created a situation where market dynamics will have limited impacts to our underlying value.

Several recent announcements help support our thesis as well. The global grid is facing huge challenges (especially in the U.S.) when it comes to available power for a hungry industry.

“BlackRock is preparing to launch a more than \$30bn artificial intelligence investment fund with technology giant Microsoft to build data centres and energy projects to meet growing demands stemming from AI. The investment vehicle is aimed at addressing the staggering power and digital infrastructure demands of building AI products that are expected to face severe capacity bottlenecks in coming years. The computing power of AI requires far more energy than previous technological innovations and has strained existing energy infrastructure.”²

“The country and the world are going to need more capital investment to accelerate the development of the AI infrastructure needed. This kind of effort is an important step.”
—Brad Smith, Microsoft President

“Accelerated computing and generative AI are driving a growing need for AI infrastructure for the next industrial revolution.”
—Jensen Huang, Nvidia's CEO

“There is a clear need to mobilise significant amounts of private capital to fund investments in essential infrastructure.”
—Bayo Ogunlesi, GIP's CEO

(all quotes can be found in cited source below)

² <https://www.ft.com/content/4441114b-a105-439c-949b-1e7f81517deb>

The International Energy Agency estimates that global electricity consumption by data centers could surpass 1,000 terawatt-hours by 2026, more than twice the amount used in 2022. In the U.S., which hosts one-third of the world's data centers, electricity demand is rising rapidly for the first time in two decades, driven partly by these energy-intensive facilities. A report from Grid Strategies indicates that five-year projections for electricity demand growth in the U.S. have nearly doubled over the past year, increasing from 2.6 percent to 4.7 percent.

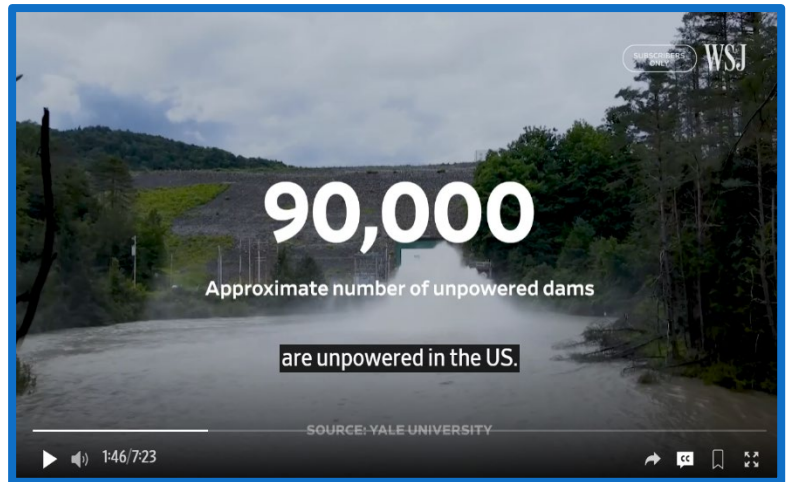
For anyone that's had the chance to speak with Mark or Fernando over the last 6+ years, the above article and quotes will likely sound familiar. We decided to put our money (and yours!) where our mouth is when it comes to providing a broad solution. One that is often overlooked but will play a key role in delivering renewable power.

Microsoft doubled down (at this point, maybe quadrupled!) on locking up long-term power assets, with the most recent being Three Mile Island. *"Big tech has led to a sudden surge in U.S. electricity demand for [data centers](#) needed to expand technologies like artificial intelligence and cloud computing. Nuclear energy, which is nearly carbon-free and broadly considered more reliable than energy sources like solar and wind, has become a popular option for technology companies with uninterrupted power needs and climate pledges."*³ Microsoft will purchase energy for 20 years from unit 1, which will total about 835Mw per year. Constellation will pay about \$1.6B–\$1.8B to bring the unit back into operation, with initial estimates putting Microsoft's purchase price at over \$100MW. This would mean that Microsoft will pay at least \$800M per year over the course of 20 years, or \$16B in total power costs. **We can buy assets that are currently earning \$32–\$34MW, but prices will keep moving higher, giving us a great entry point with strong upside.**

There is always a drive to get overly bullish, but we strive to remain grounded in our assumptions and expectations for the future. Or said another way: We prefer to under promise and overdeliver. When we began this journey in 2019, investors were used to the previous 10 years. Stagnant growth in power sales led them to question our views that the U.S. was shifting in a big way. There was a mixture of coal and nuclear assets being shuttered just as renewed demand was starting on the fringes. The electrification of the grid, EVs, near shoring / onshoring, data centers, and most recently, artificial intelligence. The flat demand was created by a slew of energy efficient programs, such as LEDs, LEED buildings, and energy star appliances. But as things became more efficient, the demand and installation of batteries and electrification only grew. **C6 saw a ticking time bomb of demand, just as supply was being hindered.**

³ <https://www.reuters.com/markets/deals/constellation-inks-power-supply-deal-with-microsoft-2024-09-20/>

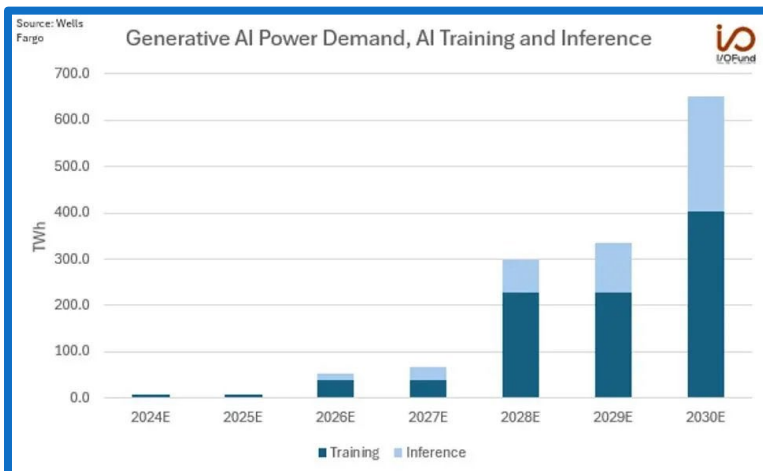
This *Wall Street Journal* video entitled, “The U.S. Power Grid is Failing. Here are Three Ways to Fix It,” focuses on the large number of small-scale hydroelectric assets that are being overlooked, and flood/reservoir dams that can be expanded to include a powerhouse.⁴



C6’s foundation has always been rolling up small-scale hydro with existing interconnects to tap into pre-existing wirelines. This doesn’t

mean we can’t also expand into this sector of building powerhouses; it just changes the time frames and potential delays. A current interconnect could take up to 4 years to get approved, and if new transmission lines are required, about 15–20 years! **The video is just over seven minutes, and we highly recommend that you watch. It hits home with many of the points we’re addressing.**

BUT, in typical Wall Street exuberance, assumptions are quickly becoming a bit absurd regarding the expansion of AI. “*Wells Fargo is projecting AI power demand to surge 550% by 2026, from 8 TWh in 2024 to 52 TWh, before rising another 1,150% to 652 TWh by 2030.*” This would equate to approximately 8,050% growth from their original 2024 projected level. “*AI training is expected to drive the bulk of this demand, at 40 TWh in 2026 and 402 TWh by 2030, with inference’s power demand accelerating at the end of the decade. In this model, the 652 TWh projection is more than 16% of the current total electricity demand in the US.*”⁵



While we want to sit here and yell, “THESE DEMAND NUMBERS WILL DEFINITELY HAPPEN,” this ignores the most basic principles of cost, supply vs demand, and economic conditions. Companies may want AI or data centers, but can you get the interconnect? Can you get the supply to cover your growing demand? What’s the cost of everything—from the chips to the construction?

⁴ https://www.wsj.com/video/series/wsj-explains/the-us-power-grid-is-failing-here-are-three-ways-to-fix-it/DEF647B7-5568-41E7-93F2-39A2C224E8EF?mod=WSJvidctr_editorpicks_pos2

⁵ <https://x.com/minenergybiz/status/1824361435847070074?s=48>

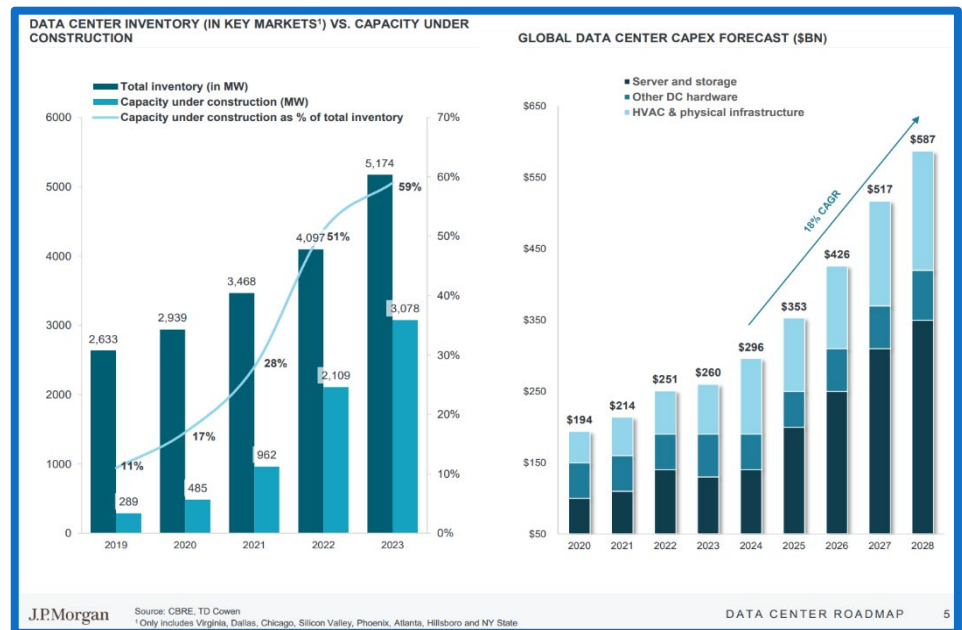
JP Morgan put out a recent piece called “The Data Center Roadmap.”⁶ This summary hits home at the issues:

“Power supply is the critical bottleneck and risks delaying the data center buildout:

- Many regions and utilities have slowed down approving new data centers until completion of lengthy interconnection and grid studies
- Some analysts expect key data center markets like Virginia and Silicon Valley to run out of reliable power by 2027/28 absent grid changes
- Two most logical solutions of (1) building new gas generation and/or (2) building new transmission are increasingly difficult
 - Gas: 4+ year development cycle due to permitting, interconnection and availability of gas turbines. Additionally, natural gas supply challenge as LNG exports and data centers compete amidst lack of pipeline development
 - Transmission: decade-long permitting process (albeit attempts to accelerate that)
- Near-term solutions will look to increase the capacity factor of underutilized gas and nuclear plants.”

C6 is focusing on a lesser-known (or less-appreciated) opportunity: underutilized hydroelectric assets. We believe there is huge opportunity in SMRs, but this will take an extensive change in the way permitting and construction take place. In the meantime, we are looking to roll-up what is currently connected to the grid and optimize the opportunity.

JP Morgan has come to a similar conclusion as C6: “Based on our diligence, we believe that the ~50GW of incremental electricity demand by 2030 may be understated. However, we believe that diversifying geographies and co-locating data centers can bridge the near-term gap to new gas generation to achieve the needed pace of data center development.”⁷ We agree that data centers would rather sacrifice latency to build closer to the power supply.



⁶ “Data Center Road Map,” J.P. Morgan, June 2024, Page 3.

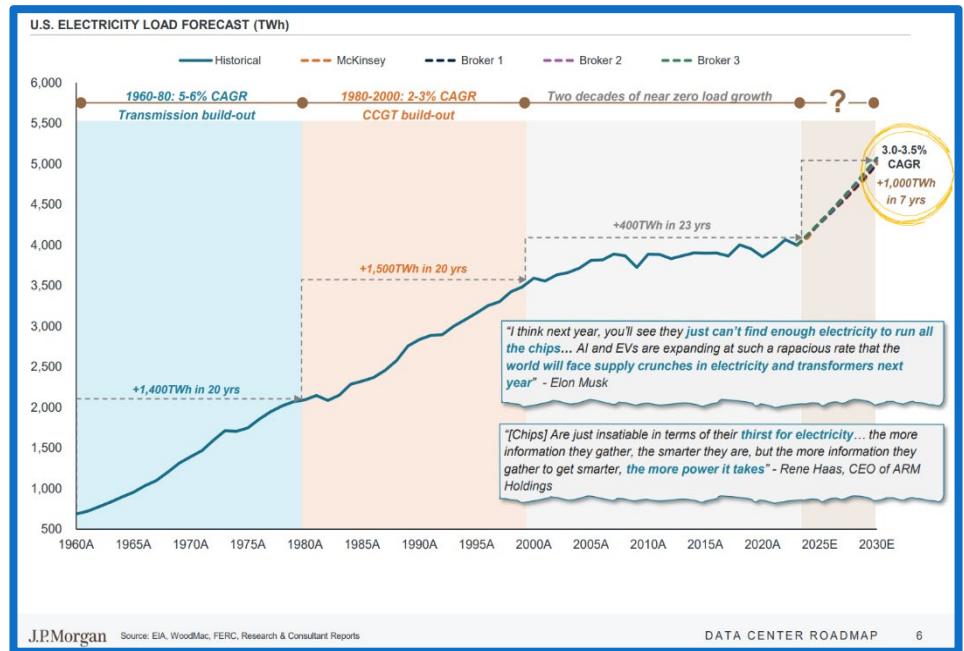
⁷ “Data Center Road Map,” J.P. Morgan, June 2024, Page 3.

As we discussed in our last report, the cost of transmission is the largest hindrance for data centers, so instead . . . bring the data center to the power source! Even as data center construction has slowed, there is still a considerable amount being built, and the question of electrical supply is still huge.

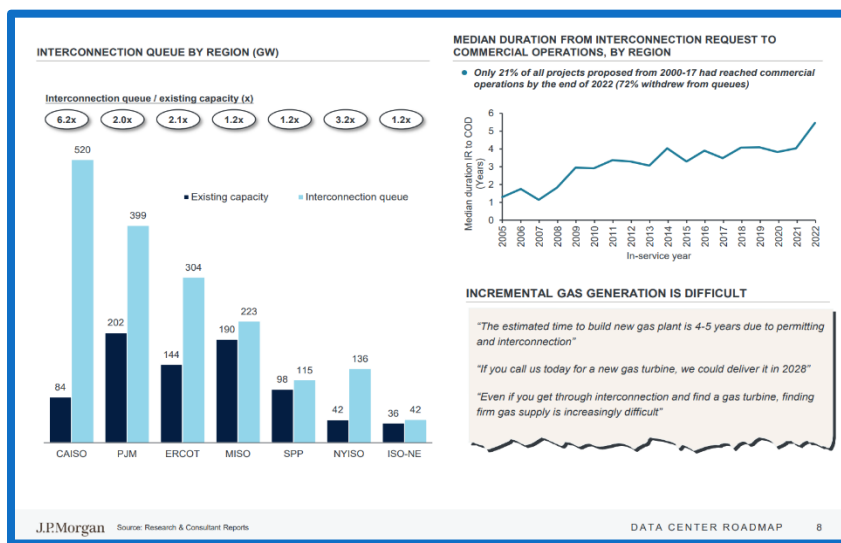
Why does this opportunity exist? Why aren't others doing something similar?

There were some competitors in the small-scale hydro world, but many were lured into the solar and wind category, driven by subsidies and tax avoidance schemes. Our focus has been to avoid construction costs and

delays by purchasing assets already connected. The other reason people haven't engaged in electricity supply is because of the twenty years of no growth. Consumers and companies were lulled to a sense of security by always having power available without any regard to shuttering baseload capacity and potential load growth. Whether it was your smart phone, tablet, Ring, or any other electrical asset—a consumer did



not have to worry about pulling “too much” off the grid. There has now been a monumental shift of growth in power demand that we believe will rival the 1975–1998 period. C6 started to see the pivot in 2019, and we are still in the early stages of capturing this monumental shift.

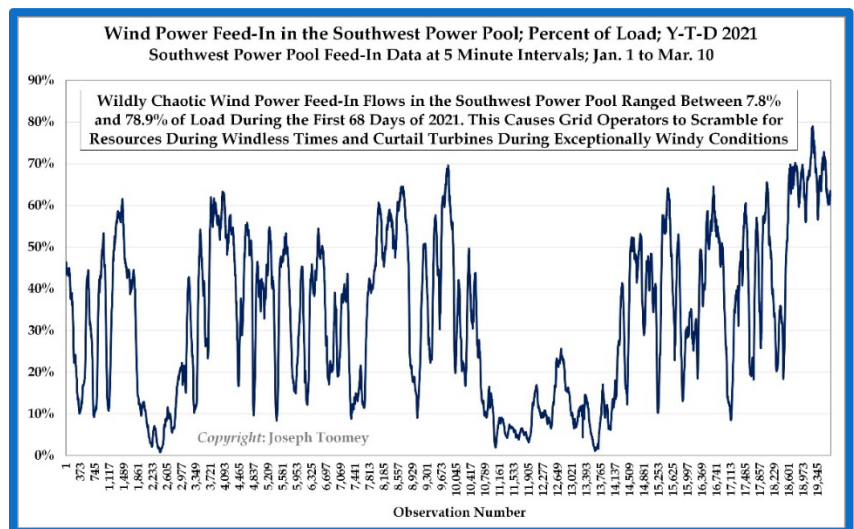


While the market comes to appreciate the situation, it doesn't mean the interconnection queue can handle the growth. There is a LONG lead time to get connections set up because ISOs have to factor in how intermittent the power will be, and if there's enough baseload to backstop wind/solar, which makes up a large part of the queue.

The problem is getting so pervasive that ISOs (Independent System Operators) have begun seeking mitigation costs from intermittent forms of power. “The D.C. Circuit Court of Appeals on July 19 rejected a wind farm’s challenge of FERC’s decision to allow SPP to charge more than \$100 million for upgrades needed to connect the facility to the grid operator’s system. In a unanimous ruling, the court found the commission’s decision to assign mitigation costs to Tenaska Clear Creek Wind to be reasonable because the project caused operational issues for SPP that would not have existed but for the facility itself (22-1059). Clear Creek’s appeal stems from a September 2022 order in which FERC ruled that SPP correctly assigned the facility about \$66 million in network upgrade costs during a restudy of a Missouri wind project. The commission denied in part a rehearing request in December 2022, although it directed the RTO to restudy the project with different planning models. Finally, the court said FERC ‘reasonably’ explained why Clear Creek couldn’t meet the burden of demonstrating that SPP’s use of firm service, or network resource interconnection service (NRIS), was unjust, unreasonable, unduly discriminatory or preferential. It said the commissioned identified precedent that was just and reasonable and that it ‘expertly pointed out’ how Clear Creek’s NRIS request supported SPP’s justification for conducting its interconnection study at the NRIS level. Clear Creek is a 242-MW facility that is interconnected to SPP neighbor Associated Electric Cooperative Inc.’s transmission system. The upgrade costs were assigned as part of an affected system study. The facility became operational in May 2020.”⁸

ISOs are responsible for a myriad of different aspects regarding the grid, but the most important one is “to coordinate regional transmission to ensure non-discriminatory access to the electric grid and a reliable electrical system.”⁹ This becomes difficult when they have to balance intermittency, especially when wind variation is involved. This chart looks at 5-minute intervals, and the massive swings that can happen almost instantly. **There isn’t a grid in the world that can handle this type of variability, which is why ISOs are being forced to find alternatives to offset these wide swings.**

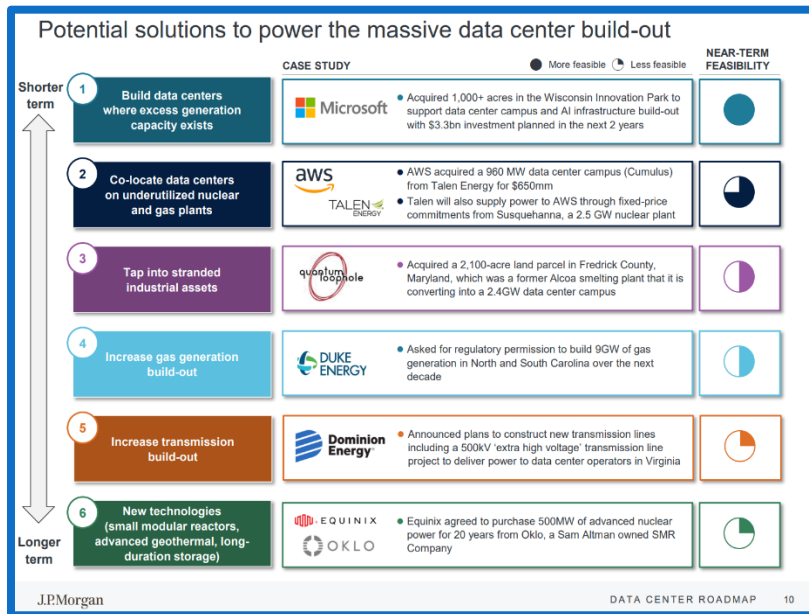
The Appeals court [ruling](#) in favor of SPP



⁸ <https://www.rtoinsider.com/83686-dc-appeals-court-ruling-spp-wind-tenaska/>

⁹ [https://content.next.westlaw.com/practical-law/document/ld4cf18aaf3ad11e28578f7ccc38dcbee/Independent-System-Operator-ISO?viewType=FullText&transitionType=Default&contextData=\(sc.Default\)#:~:text=An%20independent%20and%20federally%20regulated,and%20a%20reliable%20electricity%20system.](https://content.next.westlaw.com/practical-law/document/ld4cf18aaf3ad11e28578f7ccc38dcbee/Independent-System-Operator-ISO?viewType=FullText&transitionType=Default&contextData=(sc.Default)#:~:text=An%20independent%20and%20federally%20regulated,and%20a%20reliable%20electricity%20system.)

helps drive home that fact, and it will cause wind and solar to factor in a higher cost of operation. Each of these power sources are going to face additional scrutiny because they will have to either build short-cycle gas equipment into their models, or be charged by the ISO to address the variability.

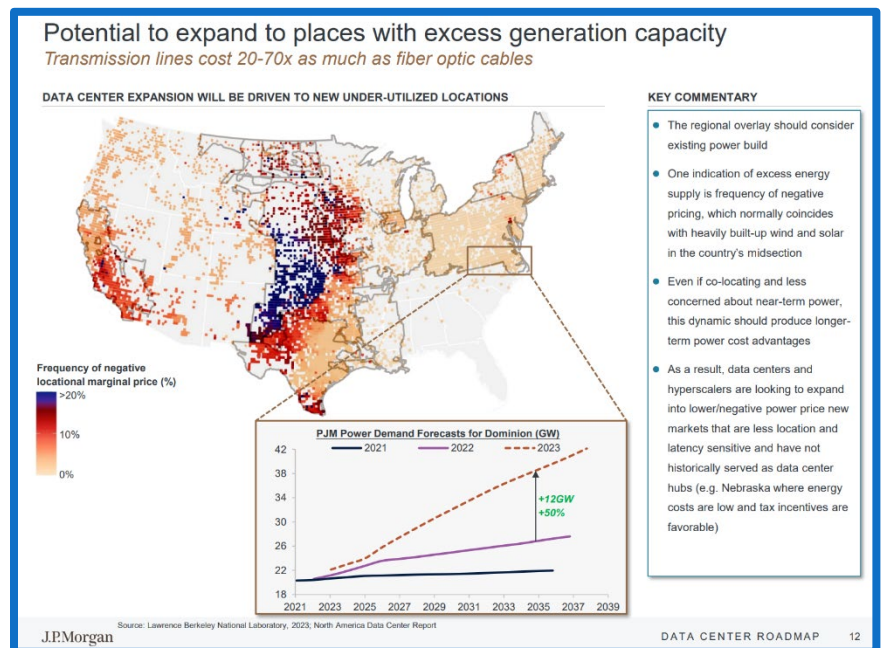


There have been several recent deals with significant premiums over the current wholesale power markets. For example, Microsoft and Three Mile Island struck a deal to bring back unit one (which was shuttered in 2019 for economic reasons) well above initial estimates of \$100 per MWh. “Jefferies estimated that Microsoft might pay Constellation about \$110-\$115 per megawatt hour (MWh) as part of the 20-year-long fixed price PPA.”¹⁰ The deal still requires permits and an estimated

\$1.6B in CAPEX to bring unit one back online. Microsoft is looking to use this 40-year-old asset for the remaining 20 years of useful life. “Former Microsoft CEO Bill Gates invested \$1 billion in a nuclear power plant that broke ground in Kemmerer, Wyo., in June.

The plant will power homes and AI, [Gates told NPR's Steve Inskeep](#).¹¹ We expect to see more long-term deals announced over the next few quarters.

As we discussed in the last update, data centers are looking to branch out from their “clustered” locations to be closer to the end user and power generation. It’s estimated that transmission lines cost 20–70x more than fiber optic cables.



¹⁰ <https://www.reuters.com/markets/deals/microsoft-may-pay-constellation-premium-three-mile-island-power-agreement-2024-09-23/>

¹¹ <https://www.npr.org/2024/09/20/nx-s1-5120581/three-mile-island-nuclear-power-plant-microsoft-ai>

Artesian already has assets in key areas that can address power needs. Most existing data focuses on natural gas and nuclear, which are great options, but the small-scale hydroelectric option is being overlooked. We're focused in areas that have been marginalized or disregarded by the broader market because by the time larger entities "figure it out," we've created a great package for them!

Why are wind and solar options falling flat?

High demand assets will always be limited by capacity factors, which is why data centers are pivoting to nuclear. As mentioned above, intermittency is a big concern for solar and wind when it comes to limitations of demand.

There have been two recent examples of large wind failures to note: Vineyard Wind and Norway's Odal Wind Farm. Vineyard Wind experienced a catastrophic breakdown when a blade broke apart, creating a debris field of over 15 miles, impacting beaches and local wildlife. It appears there was a broad defect in the blade manufacturing process: *"We have identified a material deviation or a manufacturing deviation in one of our factories that, through the inspection or quality assurance process, we should have identified. Because of that, we're going to use our existing data and reinspect all of the blades we've made for offshore wind. For context, this factory in Gaspé, Canada where the material deviation existed, we've made about 150 blades. That gives you an indication and context of the work ahead. But to be clear, this is work we know how to do. The industry uses non-destructive testing, think ultrasound, think radiologists, but for a blade to identify deviations. We're going to go do this on every blade. A prudent, thorough process. We're not going to talk about the timeline today. We have work to do."*¹²

Vineyard wind is a planned 62-turbine project that had 24 completed before the blade failure. Construction has resumed on the remaining 38 turbines, but the blades can't be installed or power produced under the current suspension order. At the time of the blade breaking apart, 11 turbines were generating power, with 13 (including the one that failed) undergoing testing. There have been consistent blunders in the offshore wind space, with poor manufacturing of blades and turbine defects, resulting in large losses and government [bailouts](#).

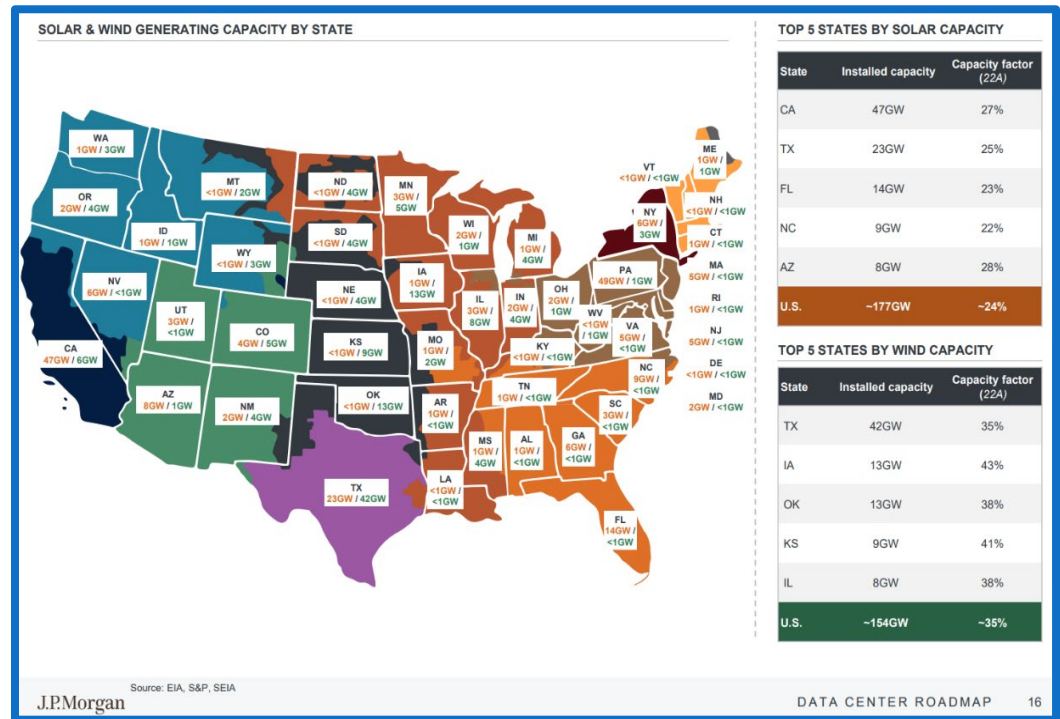
Other wind turbine manufacturers, like Siemens, have fared similarly. Odal Wind has had several delays due to blade breakage and quality control issues. *"Siemens Gamesa has faced quality control issues related to components in its 4.X and 5.X onshore wind turbines. These contributed to substantial financial [losses](#) and the suspension of onshore wind turbine sales."*¹³ There was an expected "restart" of operations set for July, but it has since been delayed due

¹² <https://nantucketcurrent.com/news/ge-blames-manufacturing-deviation-for-turbine-blade-failure-off-nantucket>

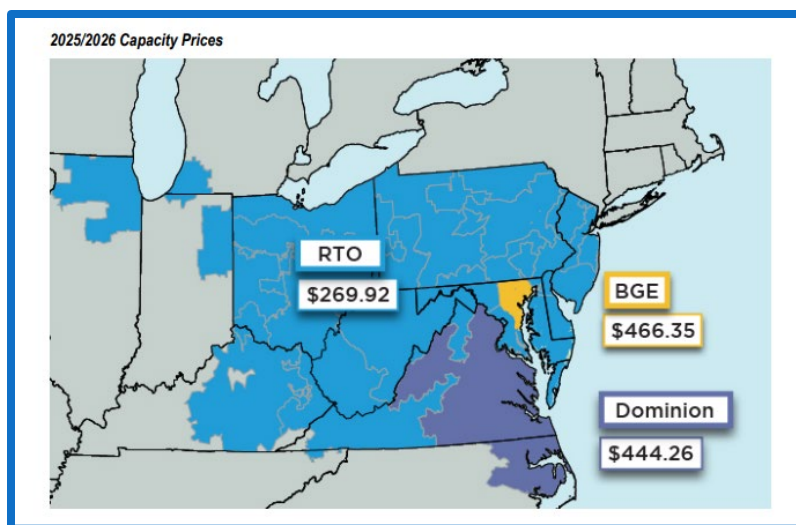
¹³ <https://www.windpowermonthly.com/article/1879064/norwegian-wind-farm-delays-restart-siemens-gamesa-turbine-breakage>

to significant damage detected: “Odal Vind said last month it had already stopped 15 of the wind farm's 34 turbines because of blade damage linked to a production problem.”¹⁴ Remediation is ongoing in a specially built “hall” for repairs, as well as on assets that are affixed and can't be taken down.

There is still a significant amount of wind and solar set to come online over the next few years, but the reliability factors are becoming a broader concern. We question their ability to get a large portion of their plans to market given the rising costs of interconnection, construction, and baseload offset requirements.



The lack of spare capacity in the grid is already driving up the clearing market. Capacity accreditation is a way to assess the reliability of individual resources in meeting the needs of the entire system collectively. The rapid deployment of intermittent renewables, extreme weather events, and shuttering of coal facilities have left large gaps in many ISO plans. This has forced ISOs to adjust the way they accredit generation, which has caused



huge shifts lower in spare capacity.

This adjustment has driven up broader auctions, as we saw in the recent PJM capacity market auction. PJM (Pennsylvania-New Jersey-Maryland ISO) has historically been the “swing” producer of power that exports into MISO, NY-ISO, and NE-ISO. The latest auction saw some of the highest prices ever: “Changed construct with ELCC derates, retirements, and increased load

¹⁴ <https://www.windpowermonthly.com/article/1879064/norwegian-wind-farm-delays-restart-siemens-gamesa-turbine-breakage>

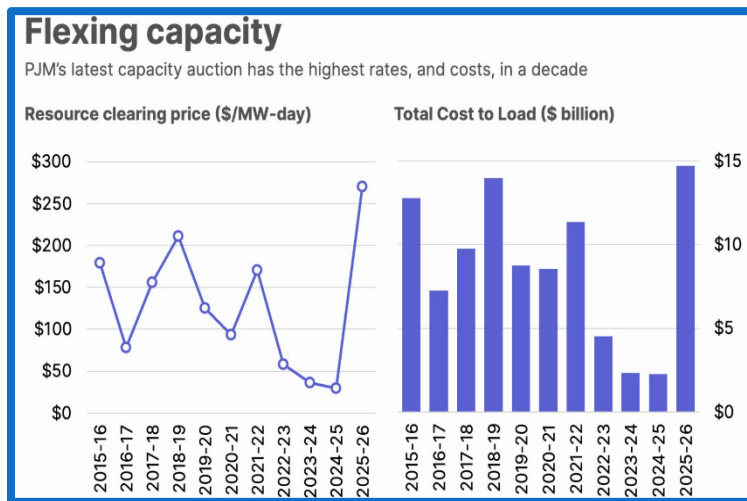
showing up at \$269.92/MW-day for much of the PJM footprint, compared to \$28.92/MW-day for the 2024/2025 auction. While the overall resource mix is adequate, two zones cleared just short of their reserve requirement, resulting in prices being set at the zonal cap. The higher prices send a clear investment signal across PJM’s 13 states and the District of Columbia.”

PJM is experiencing exactly what we predicted back in 2019, and there isn’t anything on the horizon

2025/2026 Capacity Prices

Delivery Area	Capacity Price (\$/MW-day)	Transmission Zone Affected
RTO	\$269.92	
BGE	\$466.35	Baltimore Gas and Electric
DOM	\$444.26	Dominion

that will change the current trajectory. “The amount of supply resources in the auction decreased again this year, continuing the trend from recent auctions and underlining PJM’s stated concerns (PDF) about generation resources facing pressure to retire without replacement capacity being built quickly enough to replace them. Approximately 6,600 MW of generation have retired or have must-offer exceptions (signaling intent to retire) compared with the generators

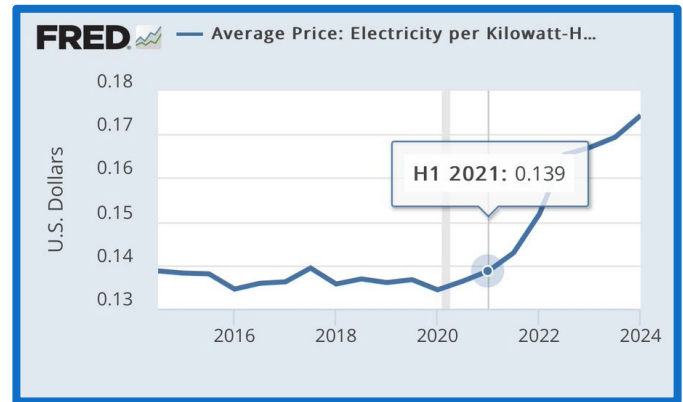


that offered in the 2024/2025 Base Residual Auction (BRA). Meanwhile, the peak load forecast for the 2025/2026 Delivery Year has increased from 150,640 MW for the 2024/2025 BRA to 153,883 MW for the 2025/2026 Delivery Year. Additionally, FERC-approved market reforms contributed to tightening the supply and demand balance by better estimating the impact of extreme weather on load and more accurately determining resource reliability value.”¹⁵

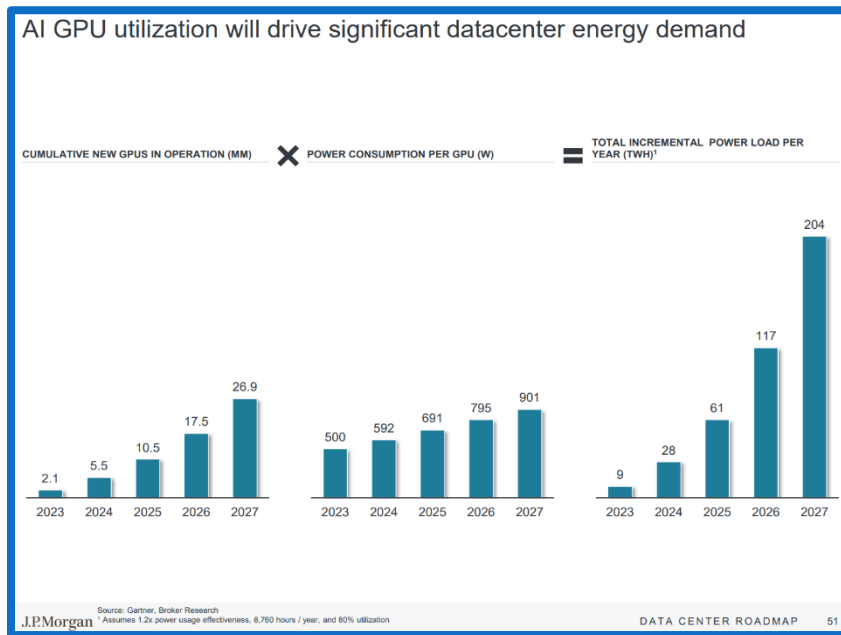
It takes time for markets to adjust, and we’ve taken for granted the efficiency gains in natural gas fired power and cheap gas. As we shutter more coal and limit natural gas fired power plants, the market is relying more on intermittent capacity and Peaker plants. Peaker plants have gone from a utilization factor of 10%–15% to 40%–60%, which also limits the ability to “peak shave” at elevated demand levels. This is exactly what the PJM auction is warning us about!

¹⁵ <https://www.pjm.com/-/media/about-pjm/newsroom/2024-releases/20240730-pjm-capacity-auction-procures-sufficient-resources-to-meet-rto-reliability-requirement.ashx>

It's important to appreciate that this isn't just PJM, but rather, they are the latest to experience a "mark-to-market" on power prices. Electricity prices are up 46% since January 2021, and there is little standing in the way of adjusting this trend. What we will see is a slowdown in new demand being connected, which is why hyper-scalers are looking to secure long-term, round-the-clock power.



Here is a perfect example of how power demand could slow in the near-term. How can a hyper-scaler consume power if they can't connect? Will this amount of AI GPU utilization really be hit? The ISOs and regional power

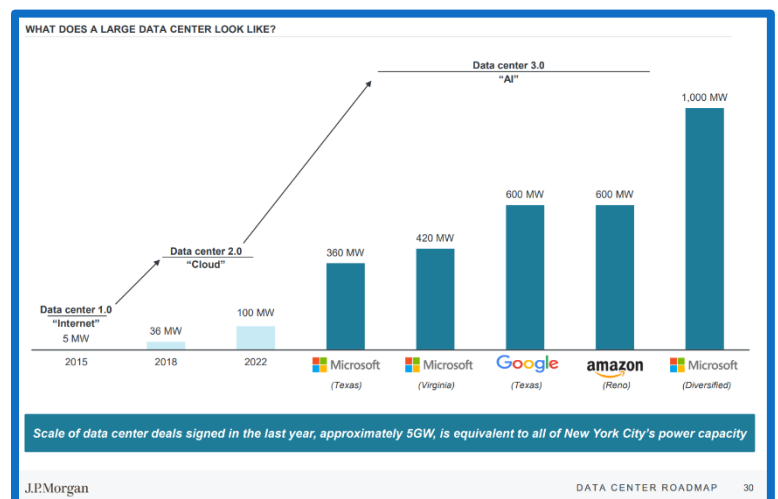


providers are seeing the same chart and have already started tapping the brakes to slow some of this incremental demand. It doesn't mean the demand won't eventually hit the market, but it could slow the pace of new power consumption. **These are factors C6 weighs when setting up our assumptions for power pricing as we evaluate new opportunities.**

When we put into perspective the new demand coming from data centers, this is a

great chart looking at the growth in power demand. It also highlights why there's been such a huge shift, shaking us out of the 20 year "slumber" of electricity growth. It will be VERY difficult to hit some of these lofty demand levels because we just don't have the power available to meet the demand.

The timeline for supply to "get to power" has only grown, and it won't be moving any faster. The large turbine producers (GE and Siemens) have all shifted focus to wind and solar, so even if you get the permitting and gas pipelines, it will take you 5 to 7 years before a gas turbine is ready for your facility.



Will we see an increase in natural gas fired power? Absolutely, but that is a 2030s event. The 2020s will be dominated by optimizing what is already available in the market or what has been mothballed and can come back to market quickly.

Forecasts will always be wrong in both directions: Just as the previous ones were too low, the exuberance of today pushes forecasts to new highs. Wells Fargo, Blackstone, McKinsey, Goldman Sachs, and JP Morgan all have different levels of increasing, but all tell a similar story. Woodmac recently put out a report called: “Gridlock: The demand dilemma facing the US power industry” that echoes

many of our thoughts. **One formative quote that captures both of our views: “While the challenges of meeting electricity demand growth loom large, the prize for both utilities and developers that can adapt most quickly will be substantial.”**¹⁶ Woodmac assembles several different growth drivers to put together a base level of GW expansion over the next six years. A large number of the projects have been approved and supported by government

AI and data center-driven demand could consume more than 400TWh by 2030. This implies new/currently idle capacity supply of ~120GW may be required depending on the underlying technology and associated utilization

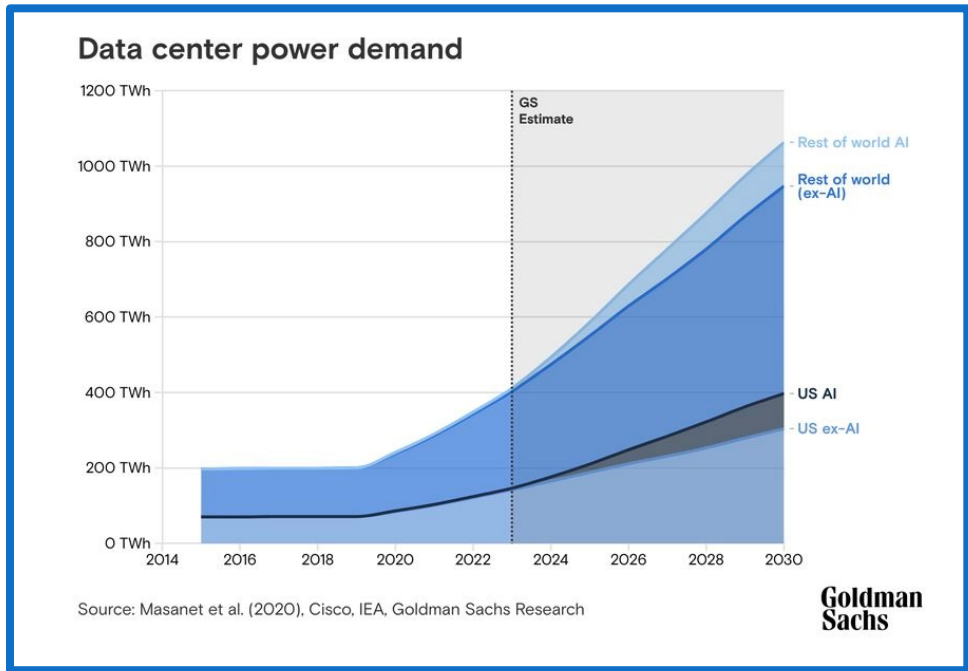
EST. DATA CENTER-DRIVEN CAPACITY

	McKinsey	Broker 1	Broker 2	Broker 3	S&P	Electric Power Research Institute
Current load	~4,000TWh	~4,000TWh	~4,000TWh			
2030 base load exc. AI	~4,595TWh	~4,300TWh	~4,635TWh			
CAGR	2.0% (23-30)	1.0% (23-30)	1.5% (22-30)			
2030 load w/ AI	~5,000TWh	~5,000TWh	~5,035TWh			
CAGR	3.2% (23-30)	3.2% (23-30)	2.4% (22-30)			
Incremental demand (TWh)	~405TWh	~695TWh	~400TWh	~335-390TWh ¹	~380TWh	~300-405TWh ²
As % of total load	8%	14%	8%	7-8%	n.m.	7-9%
As # of homes	~39k	~66k	~38k	~37k	~36k	~29-39k
New generation supply needed before retirements ³	~115GW	~200GW	~115GW	~95-110GW	~108GW	~85-115GW
Implied utilization	~40%	~40%	~40%	~40%	~40%	~40%
Gross capacity needed post retirements ³	~150GW	~235GW	~150GW	~135-150GW	~145GW	~120-150GW

Total load growth from electrification, manufacturing reshoring, etc. In addition to data centers is estimated to be ~1,000TWh, implying the need for ~125-285GW gross capacity, depending on availability

J.P.Morgan Source: EIA, WoodMac, FERC, Research & Consultant Reports; ¹ Depending on AI consumption cases; ² Based on High Growth & Higher Growth cases; ³ Assumes ~130TWh decrease in coal generation by 2030, per WoodMac 2023 Base Case Update forecast

DATA CENTER ROADMAP 31



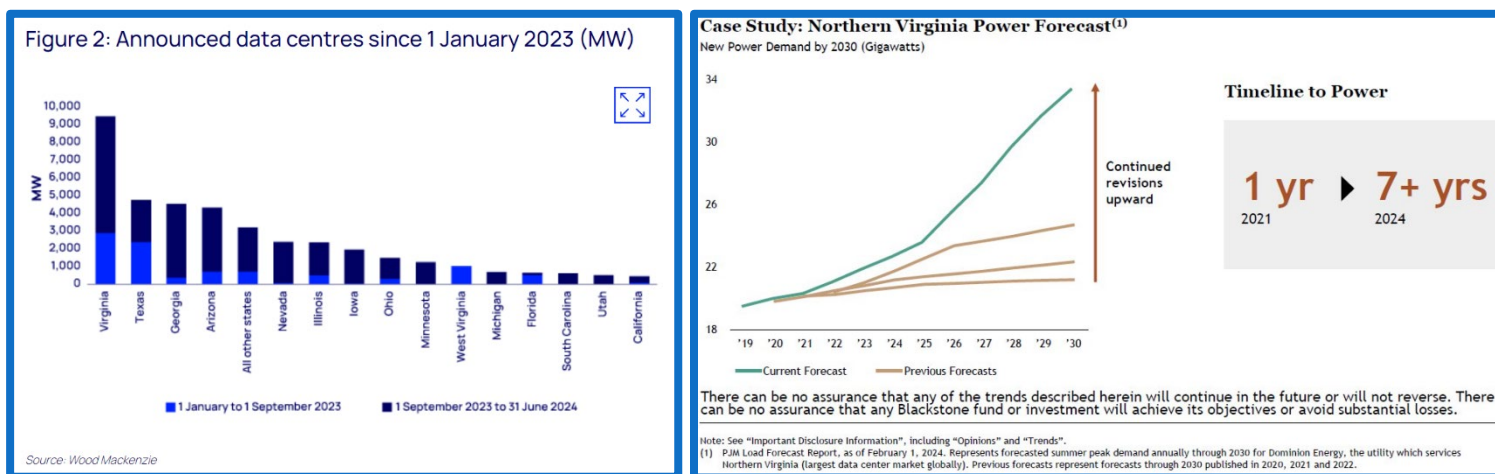
programs such as the Chips Act (Creating Helpful Incentives to Produce Semiconductors Act). These Goldman Sachs estimates could certainly be elevated, but some of it is fixed given approvals already secured, while residents are pushed to convert heating and other household components to electricity.

¹⁶ https://www.woodmac.com/horizons/gridlock-demand-dilemma-facing-us-power-industry/?__FormGuid

“Utilities’ sizeable, large-load interconnection queues also give a picture of data-centre demand:

- Oncor recently said it has 59 GW of data centres seeking to connect to its system.
- Xcel Energy has a pipeline of 6.7 GW of data-centre projects.
- AEP has 15 GW of new load, primarily driven by data centres, wanting to connect to its system by 2030; its peak demand last year was 35 GW.
- PG&E is planning to bring online 3.5 GW of data-centre demand by 2029.
- PP&L has signed deals to add more than 3 GW of data-centre capacity.
- Dominion Energy has customer requests from more than 6 GW of data centres.

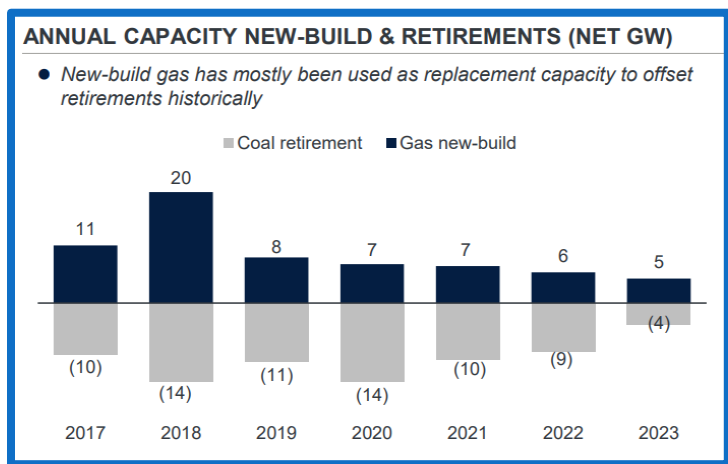
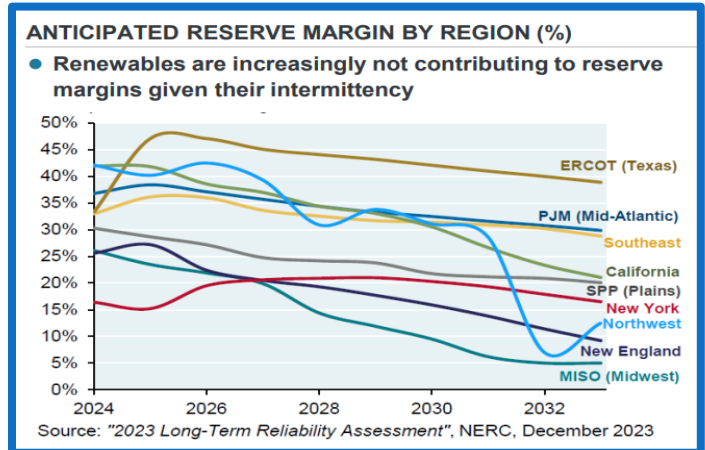
The above group alone adds up to 93 GW of capacity to the U.S. grid, nearly four times the total data-centre capacity of 2023. While many of these requests will not materialize, they illustrate the challenge utilities face in processing and responding to interconnection requests and figuring out how much growth to plan for.”¹⁷



Virginia has seen the largest increase in new data centers, with 3GW announced from Jan–Sept ‘23 and another 6GW from Sept ‘23–June ‘24. Many of these facilities have been clustered around tier 1 and tier 2 cities, but we expect to see broad buildouts in other areas over the next few years. **This provides an opportunity for C6 to bring data centers to our hydroelectric facilities, allowing access to underutilized markets and dispersing computing power.** As we mentioned earlier, it’s much cheaper to run fiber optics than transmission lines, which will bring data centers right next to the power source.

¹⁷ https://www.woodmac.com/horizons/gridlock-demand-dilemma-facing-us-power-industry/?__FormGuid

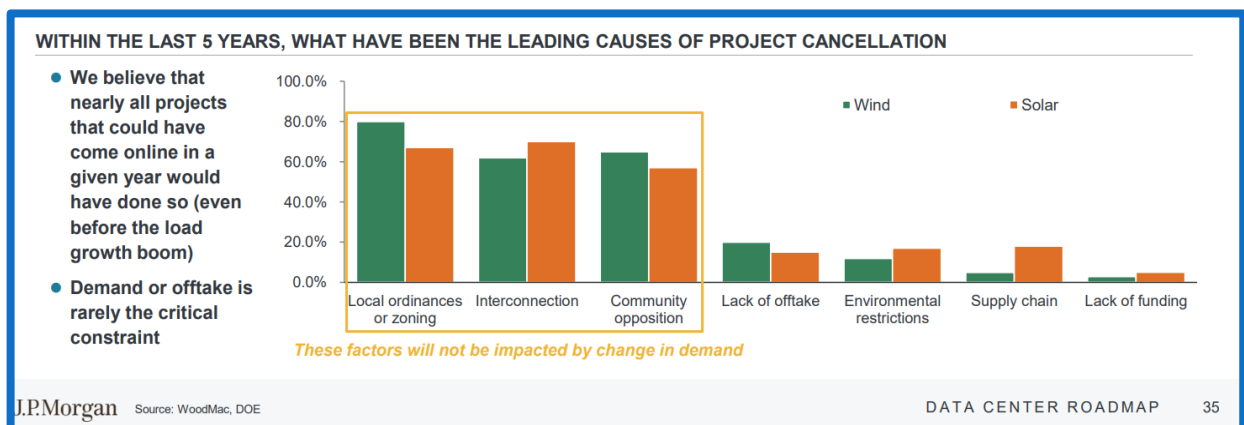
At C6, we are realists. We understand that there is going to be a balancing act between supply and demand. We can assure you that demand will NOT come online as fast as expected, but we also have supply that will keep falling by the wayside. Power prices are heading in one direction, but the pace of that rise may be adjusted over the same period. Reserve margins of spare capacity are getting absolutely destroyed because facilities are being mothballed, decommissioned, and torn down at a rapid pace. The “green dream” has been pulling capacity offline much faster than it can be replaced. And while the pace of closures has slowed, it’s still ongoing.



Initially, one of the biggest pushbacks against C6’s thesis was the hopeful success of wind and solar. But we had seen the limitations first-hand. Mark spent a significant amount of time in the Middle East working with solar, wind, and geothermal at Masdar City, and Fernando has spent his career looking at project economics and break-evens based on utilization factors. It has always been clear to us that these green

solutions would be great supporting power sources, but never baseload.

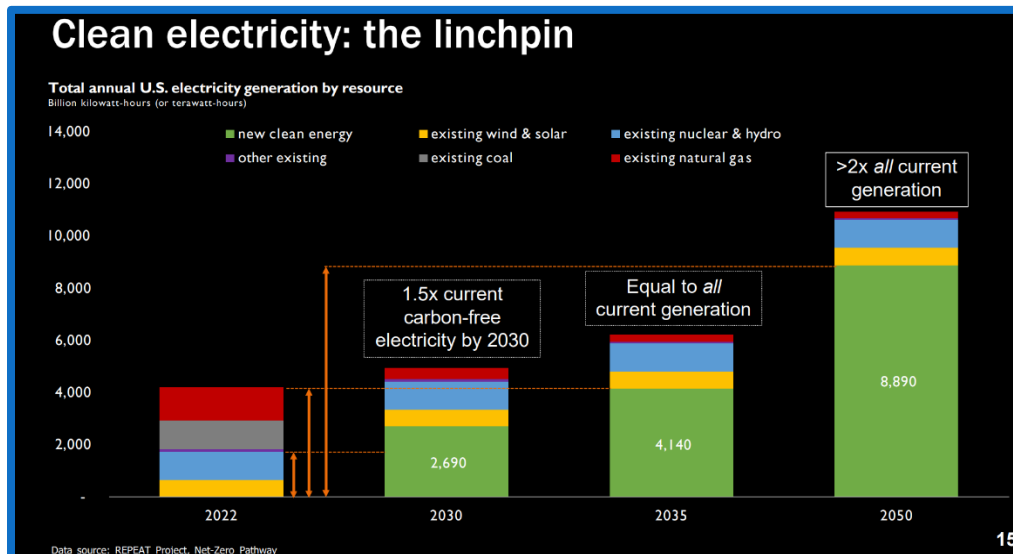
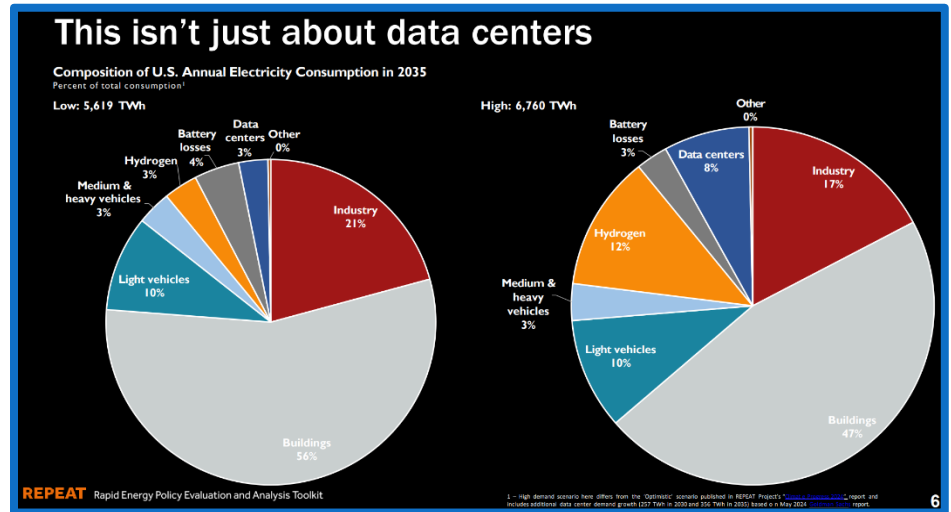
Project cancellations based on the reasons highlighted below are exactly what we expected.



The next wave of power generation will be a basket of solutions, but the demand will be broad, including hyper-scalers, electrification mandates, EVs, and general consumer power increases. There are so many things in today's everyday life that are powered by a battery or electrical source. For anyone with kids, you can attest to the use of iPads vs. textbooks, and computers vs. notebooks, in school.

Current policies and directives are pushing for more carbon-free power, which our small-scale hydro fits into perfectly. There needs to be additional generation created, and if we look at today's expectations, a large portion must be

“new clean energy.” Given ongoing intermittency issues and tightening reserves, there need to be other forms of power to bridge the near-term gap. The opportunity to roll up assets and optimize electrical throughput has never been better. We're in this for the long-haul, creating long-term value with several opportunities for an exit. Companies are searching for power solutions while investors are desperate for ways to “play” the upside potential. C6 has outlined a straight asset sale as well as a public or private REIT, all of which will be evaluated as we approach the end of the fund's life.



Given the way the market is unfolding . . . to think that we don't have options would be to ignore the basic fundamentals of supply and demand!

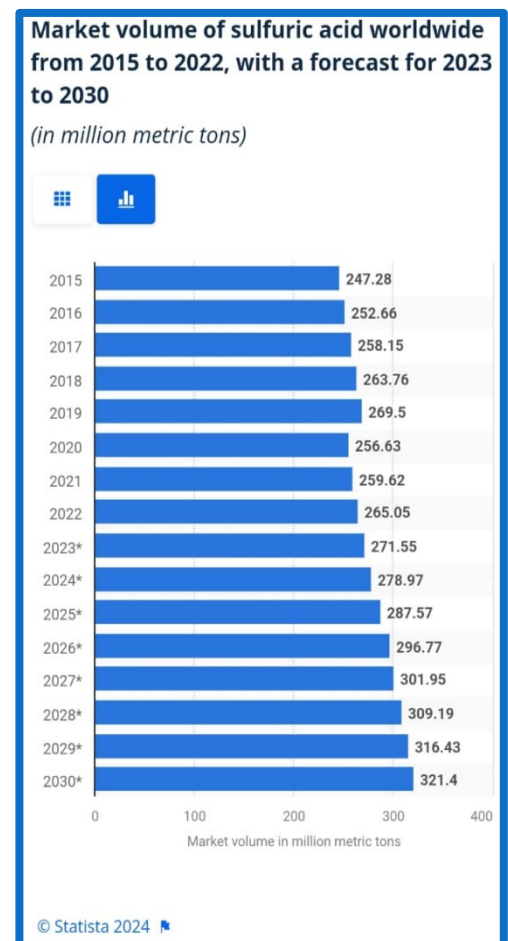
SULTECH GLOBAL INNOVATION CORP.

Poised to Capture on Depressed Global Sulfur Prices

When we turn to the sulfur markets, Sultech sits in a great position to capitalize on a rapidly changing landscape. **The agriculture community is actively trying to find replacements to synthetics and develop alternatives that last throughout the whole growing season. The agrochemical market is shifting, and Sultech’s products provide a solution without the environmental impact of burning sulfur to create AMS and other fertilizer products.** The sulfur market has become oversupplied for the foreseeable future. This will keep prices pegged to the lower end of the price curve. It took a global pandemic and broad economy freeze for a meaningful price spike, but even that disruption was quickly erased. **Our sulfur solution provides dependable cash flow, a positive sustainable story, and a long-term partnership.**

The petrochemical, fertilizer, and mining industries buy sulfur to create sulfuric acid for processing intermediate and final products. But petrochemical and mining are seeing a reduction in sulfuric acid consumption, driven by reduced run rates and technology improvements when utilizing and recycling the sulfuric acid. This reduces waste and total cost of operation while improving environmental conditions. The fertilizer market uses sulfuric acid to create sulphates that can be blended into different forms, but this process is energy intensive and makes a water-soluble product with a high salt index. The result is fertilizer that is less effective due to the limitation of application and precipitation washing away the sulphates.

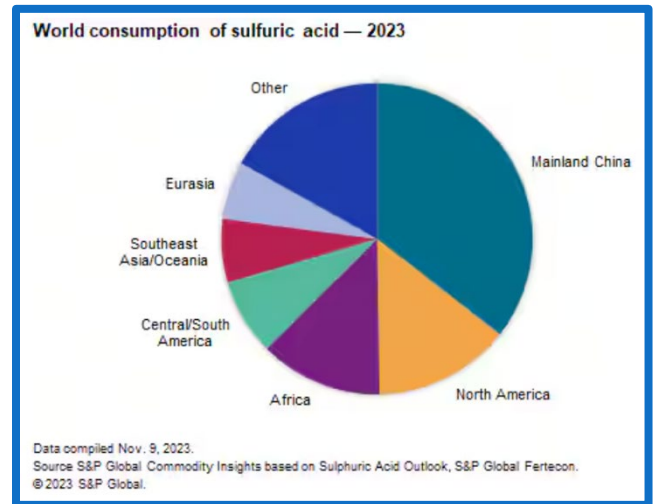
Fertilizer companies are actively trying to replace their exposure to sulfuric acid and find alternatives for producing a sulfur product. The sulfur markets experienced a huge price spike after COVID, driven by a drop in energy production, while demand from petrochemicals and agriculture surged. This created an imbalance in the market that took almost seven months to normalize as oil and natural gas processing came back online. **The “COVID Spike” hides a much broader oversupply that is striking the market, driven by overbuilt refining, new sour oil and gas developments, and a broad slowdown in sulfuric acid demand at the petrochemical level.** The 2023 demand numbers for sulfuric acid shown here are estimates and were still below 2019. In 2024, we are finally back over 2019 levels, but the expectations are for a



steady stream of demand through 2030. The estimates have always proven to be very elevated versus actuals, driven by more efficiency and shifts in consumption across petrochemical and agrochemical demand.

Global demand for sulfuric acid is mostly driven by China, which is currently in the midst of a structural economic slowdown and overbuild of capacity. This hasn't deterred their expansion of refining and petrochemicals (with one creating sulfur and the latter consuming it). Instead, we're seeing China exporting sulfur from refining provinces because they're experiencing an oversupply from more efficient processing and a change in consumption. The estimates below are predicated on a robust Asia (mostly China), and so far, the demand numbers are coming in lower than expected.

Just as demand is waning, supply is surging around the world. The Middle East is increasing capacity as new sour gas and oil fields become operational, flare capture accelerates, and additional refining comes online. The Middle East has seen some of the largest expansion of sulfur production, with ADNOC's Shah gas plant recently expanding from 4.2M to 5.2M tons per year. Saudi Arabia is in the process of building SACE2 (a follow-up project to Jafurah Phase 1), which will double sulfur production in the country. KSA has also announced seven new oil and gas deposits that average between 10%–20% H₂S across over 200TCF of natural gas. Shell stopped operations at the Kidan oil field because of an H₂S content averaging 35%, but this is also being brought back online given the demand for natural gas in the region.



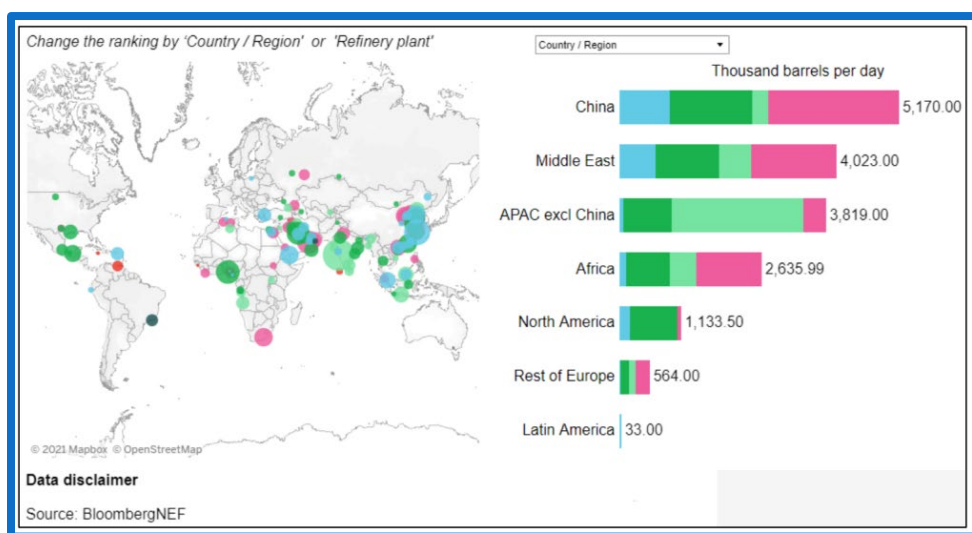
Sulfur can be found around the world in various forms, but only some of these forms can be used in the agriculture sector due to the presence of contaminants and heavy metals. The cleanest form of sulfur comes from the oil and gas sector, when H₂S is removed to meet pipeline and customer specifications. According to the U.S. Geological Survey Mineral Commodity Summaries from January 2022, there's an estimated "600 billion tons of sulfur contained in coal, oil shale, and shale that is rich in organic matter as well as 5B tons in natural gas, petroleum, tar sands, and metal sulfides."¹⁸ This doesn't include the recent finds in Saudi Arabia, Kuwait, Iraq, or West Africa regarding natural gas and crude oil. There has also been an expansion of reserves in Canada and the U.S. as natural gas and crude production expands. Several countries (including the U.S.) have limited the approval of new "acid gas wells," which is how E&Ps can dispose of both H₂S and natural gas. In addition, there are older

¹⁸ <https://pubs.usgs.gov/periodicals/mcs2022/mcs2022-sulfur.pdf>

vintage wells that have reached maximum capacity, causing E&Ps to scramble for ways to get rid of H2S. As natural gas gains more value, there will be more incentives to capture the gas and process the sulfur by-product.

The world has recognized that natural gas isn't a "bridge fuel," but rather a fuel of the future, and countries are now tapping broad resources. These assets lean more sour, which will increase the sulfur supply by over 20M tons over the next decade. This comes at a time when flare capture is intensifying, resulting in additional sulfur production. The average flared well in the Middle East contains about 10% H2S, with records showing as high as 20% in the UAE.¹⁹

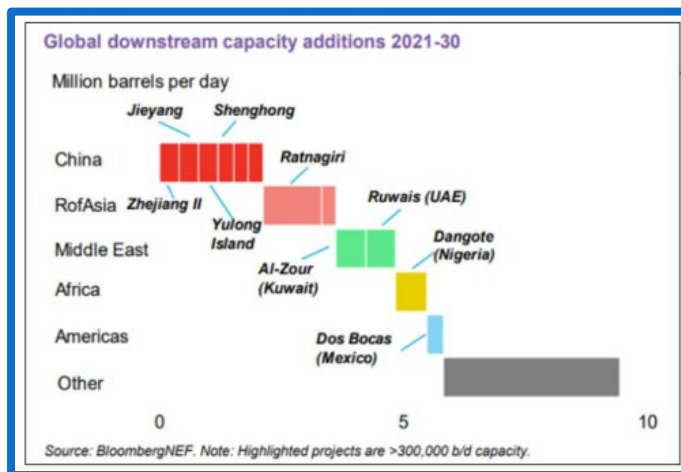
The construction of new refiners in Latin America, West Africa, Middle East, and China has increased the local production of sulfur in some key demand areas. The refiners shown in blue and dark green are now fully



operational. These are "complex refiners," which means they require heavier crude that tends to be more sour, increasing available sulfur. **China and the Middle East have seen the largest amount of additional refining capacity, which has shifted the global sulfur markets.**

Some of this additional capacity

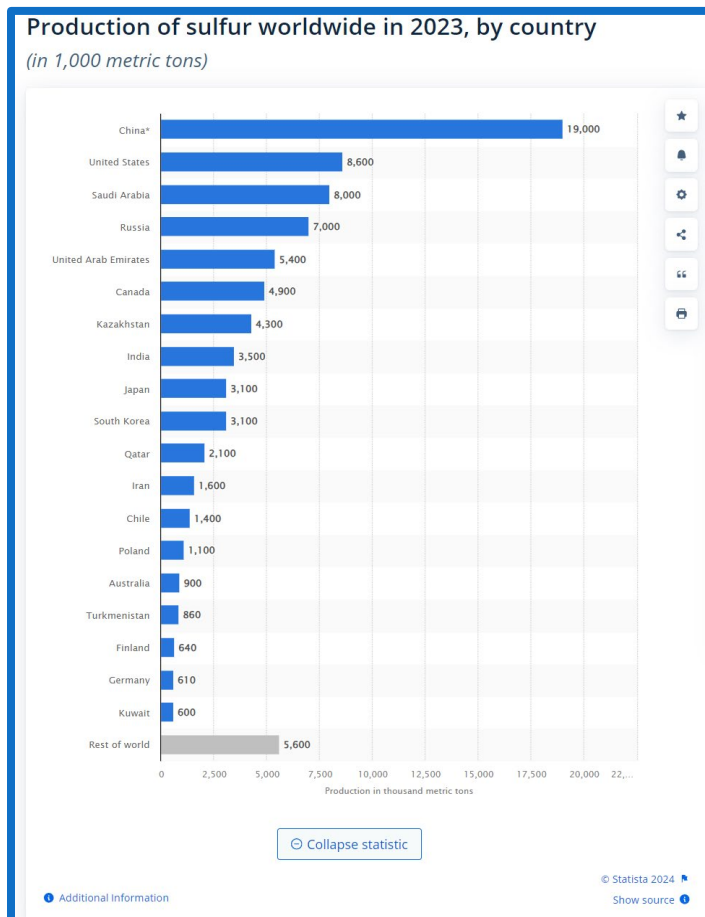
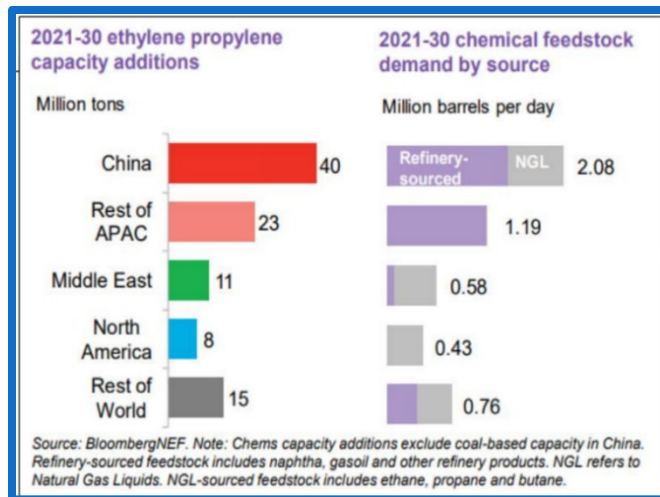
was built as joint projects next to petrochemical facilities. The chart below shows about 3.5M barrels a day of refining capacity in China that was built in conjunction with petchem assets. This provided a natural outlet for NGLs and other refiner byproducts—including sulfur. But the need for sulfuric acid has diminished (processing has become more efficient and sulfuric acid regeneration has become more affordable to implement). The regeneration process sends sulfur from the refiner to the petrochemical facility that converts it to acid for the



¹⁹ <https://africaenergyinsights.com/aei-blog/post/the-10-largest-sour-gas-fields-in-the-world/>

purpose of processing chemicals. Once the sulfuric acid is spent, it's crystallized and sent back to the refiner to be converted into an alkylation unit to high-octane gasoline components.

On the petrochemical side, the market is overbuilt and demand struggles. This has resulted in a broad slowdown in utilization rates, causing a steep decline of input variables (including sulfur). The average run rate has been pushed as low as 72% depending on location, which has forced facilities to reduce their consumption of sulfuric acid. The Gulf of Mexico is a perfect example, as Houston refiners struggle to get rid of the rising amount of sulfur in the region, driven by sour crude runs and reduced petrochemical demand.

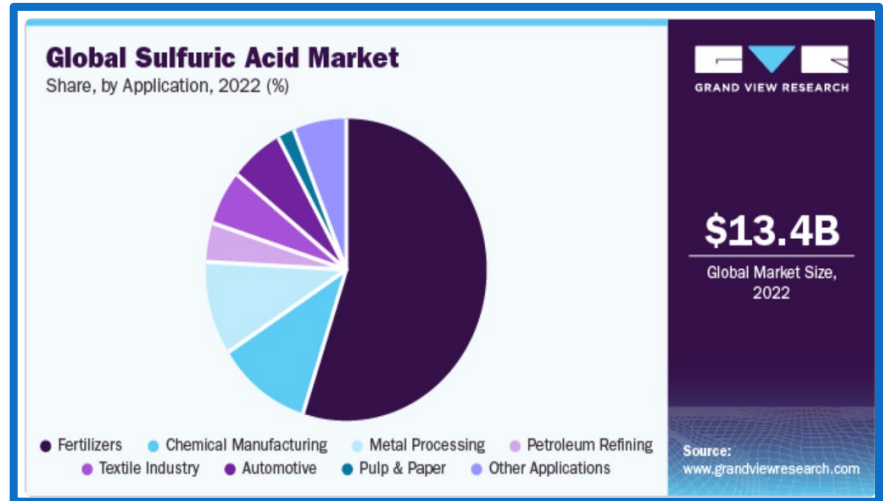


In China, even with refiners operating at seasonally historic lows, they have been exporting more sulfur than any other time in their history because of the construction of new refiners. For example, the Lianyungang refinery in Jiangsu province has sulfur production capacity of 600k tons per year. China now has a total of 19.3M barrels a day of refining capacity, but averages about 14.8M barrels a day in normal operations. Even with low runs, China has been able to exceed the sulfur storage record achieved during COVID: “Sulphur port stocks in China climbed to 3.01mn [tonnes] last week (March 2024), a level last breached in August 2020, when a peak of 3.1mn t was recorded on 20 August.”²⁰ China has seen their capacity expand to such a point that they’ve increased exports into Southeast Asia to address the bifurcation in the market.

²⁰ <https://www.argusmedia.com/en/news-and-insights/latest-market-news/2550695-march-sulphur-port-stocks-breach-3mn-t-in-china>

Typically, the oil and gas industry will produce “sweet” (low sulfur levels) natural gas and oils first because of their reduced cost of production and broad demand in the refining world. As wells age, they inherently get more “sour” (more sulfur present) because humans introduce microbes and bacteria that end up producing more H₂S. **As we consume more energy and turn to new technologies and discoveries, the crude and natural gas available has a much higher H₂S content. This is increasing the amount of sulfur that the energy sector has to sell into the market.**

In 2023, China was the world’s leading producer of sulfur, hitting 19M tons and growing, which is cutting into expectations for sulfur imports. This is creating a problem for Canada, one of the largest exporters of sulfur, especially to China. The problem is compounded by increased exports of Canadian sour crude,



which is expected to grow to 5.2–5.4M barrels a day over the next few years. This delivers additional sulfur into the Gulf of Mexico and Chinese refiners through the processing of crude, while the associated natural gas created by increased oil production has to be treated for H₂S prior to going to market. The sour crude creates more sulfur at the point of processing (China and GoM), reducing imports needed, while the natural gas processed in Canada leaves them with more to sell!

On an environmental basis, we have continued to remove sulfur from diesel, bunker fuel, and other industrial processes to reduce the prevalence of acid rain. This has created a significant glut of sulfur at the refining level, driven by SRUs, because heavy, sour crude oil is required for normal operation.

Reducing atmospheric sulfur particles increases the need for Sultech’s product at the agriculture level. There are new environmental regulations that are changing the way phosphates and AMS are consumed—with fertilizer accounting for the largest consumer of sulfuric acid, the demand is going to struggle as the industry searches for alternatives.

The agrochemical market is rapidly changing, and Sultech’s products provide a solution without the environmental impact of burning sulfur to create AMS and other fertilizer products.

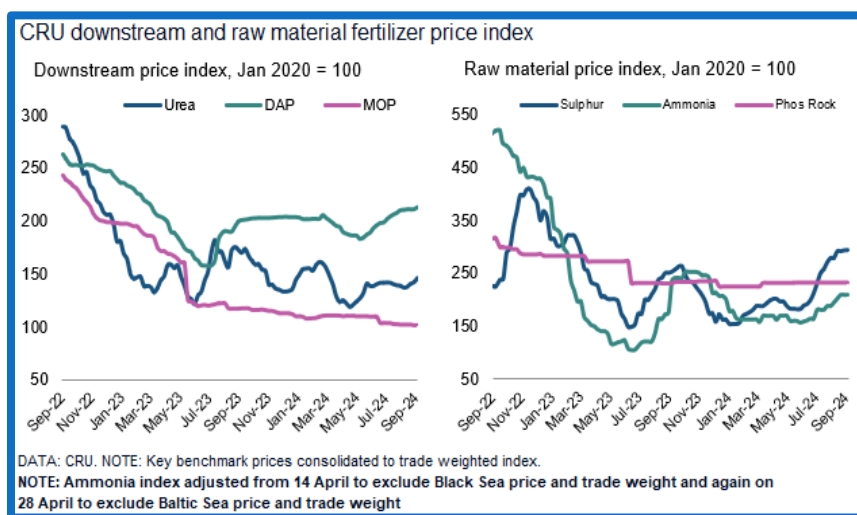
This past September, one of Sultech’s original farming partners reported a record yield of over 68 average canola bushels per acre (with the lowest yield being 48 bushels). This came in a very low precipitation year with

other adverse weather conditions, but by using Sultech's product, there was a huge gain across the planted acres. The farmer also reported a huge increase in canola oil, yielding over 40% more versus his historical crush. This is consistent with other tests done utilizing Sultech's products to support yield and quality regardless of precipitation levels.

Sultech provides an opportunity for the oil and gas industry to avoid uncertainty in the sulfur world, as well as protection from the growing pressure on prices. Sulfur is becoming a headache for many, but Sultech offers a solution that guarantees you money while delivering a renewable, sustainable story. The agriculture industry is short elemental sulfur, and you can be part of the solution while ensuring you never lose money in the sulfur markets again.

The Global Fertilizer Market

The fertilizer market remains bifurcated, with prices shifting higher, driven more by tightness in the ammonia market than a bigger uptick in demand. Fertilizer prices were firmed up into the end of Q3 and kicked off Q4 on a positive note. Urea prices picked up, following over 1M tons of accept tenders in one of the largest demand



centers: India. A wave of India DAP tenders failed to conclude, with buyers resisting prices above \$620/t (though they have since accepted high \$630s/t CFR). There was a push to keep prices capped, but the lack of supply helped push buyers to accept a higher price.

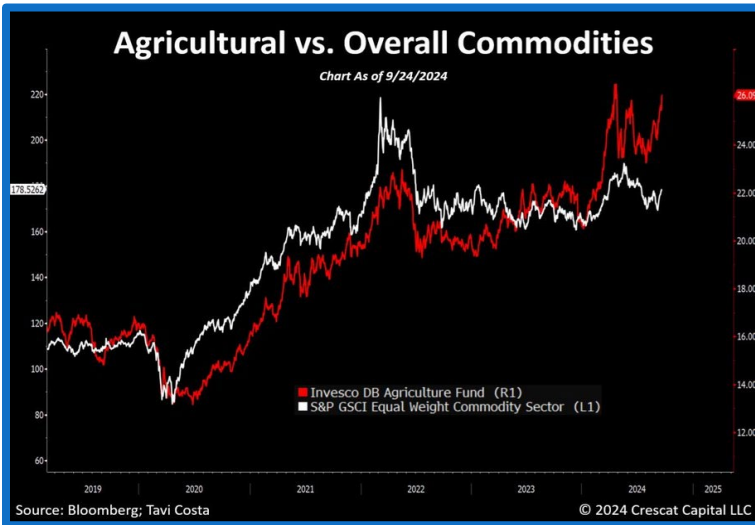
The surprise India urea tender triggered price increases in the last week of

September as most October tons are already committed. Global ammonia benchmarks remained firm amid some further increases in the West of Suez markets. India DAP prices increased further on strong demand and tight availability. Domestic Chinese phosphate markets remained bearish, while U.S. MAP prices softened, despite concerns over supply impacts from Hurricane Helene.

NW Europe ammonia prices breached \$600/t for the first time in 2024 due to lower supply from Algeria, Saudi Arabia, and other sources. Power prices in Europe have also driven up, underlying production costs, which is supporting broad fertilizer prices. This has forced the continent to find alternative supplies to help offset the rise in costs.

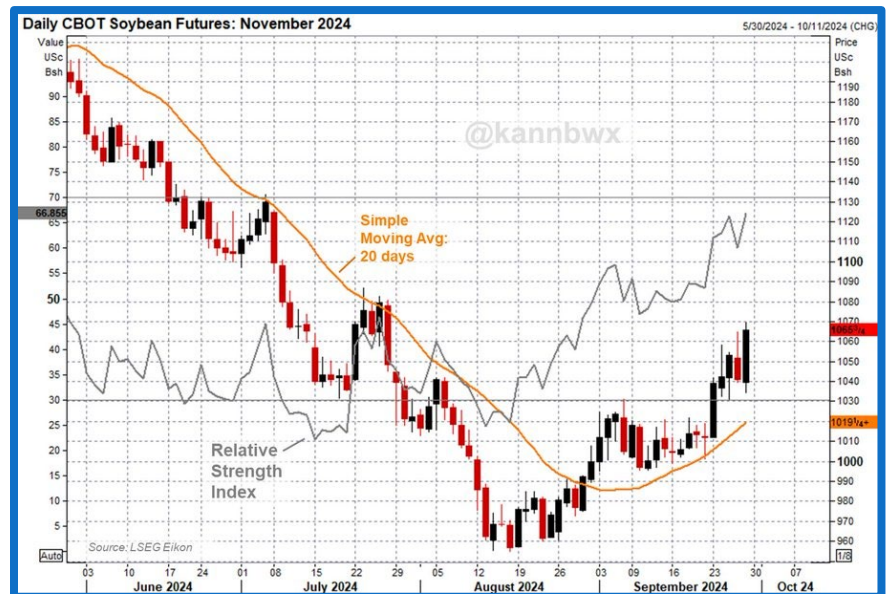
For years, C6 has been highlighting how energy intensive fertilizer is, and now Europe is a perfect example of those inherent costs playing out. The potash markets held firm despite downward pressure in Brazil, and we see a lot of near-term support. There is also growing concerns about Russian and Ukrainian crops following the driest 20-day stretch going back to 1994.

Latin America isn't faring much better: According to AgRural, "Brazil's 24/25 soybean planting at 5% complete with 1st season corn at 37%. Group notes hot weather continues for key growing regions & recent rains have not been enough to 'normalize' soil moisture. Mato Grosso planting pace is the slowest since 15/16 season."²¹



The U.S. has also been facing a mountain of uncertainty as hurricanes rip through the Eastern Seaboard and Florida, with extensive rain damage impacting parts of the Midwest as well. The cost of operations at the farm mixed with global yield uncertainties has pushed agriculture commodities higher. This is something that impacts the consumer directly, in everything from groceries to restaurant pricing.

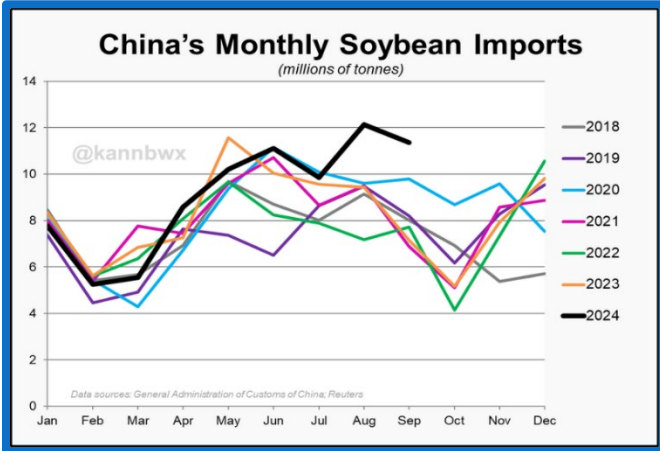
Here's a recent example of the increase: "Sept. 27: CBOT November soybeans hit a two-month high on weather concerns in both Brazil and the USA. Friday's settle of \$10.65-3/4 per bushel is up more than a dollar (~12%) from last month's low."²²



²¹ https://www.soybeansandcorn.com/articles/10089/#google_vignette

²² <https://x.com/kannbwx/status/1839742224382476477>

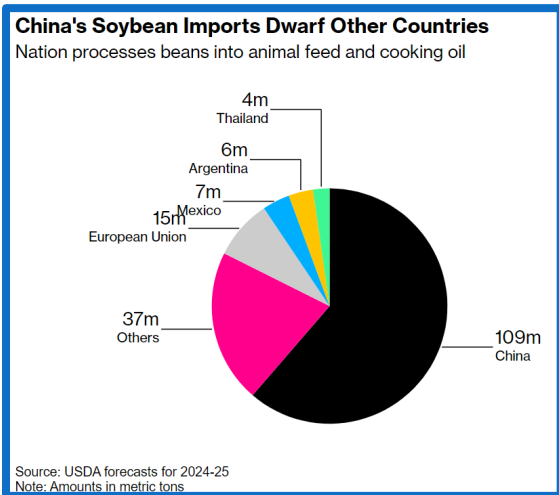
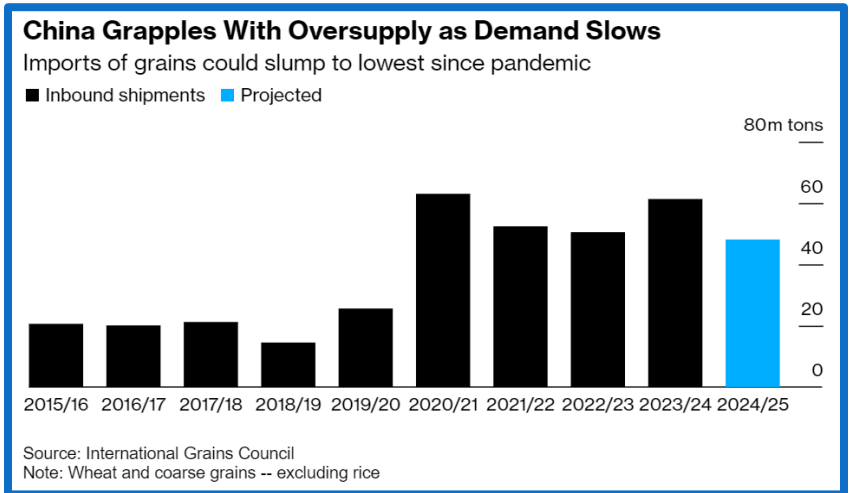
China has been showing some mixed buying patterns in the market, but they have become bigger buyers over the last few weeks. “Beijing has already taken steps to try to protect farmers, asking traders to limit overseas purchases of corn, barley and sorghum — an effort to ease oversupply exacerbated by a buying spree earlier in the year, when merchants snapped up cheap overseas cargoes. These eventually flowed to Chinese ports just as consumption softened. The nation has also moved to reduce the use of soymeal in animal feed. ‘Chinese demand is not as strong as it



has been in the past,’ said Paulo Sousa, the president for Cargill Inc. in Brazil. ‘We are not seeing significant growth like in previous years.’”²³

China has had to re-enter the market following a slew of recent floods impacting crops. Even with the damage, there was an expectation that demand would be muted given the amount of product sitting in storage. So far, they have been very active in the market when it comes to imports.

China imported 11.37 million tons (418 mln bu) of soybeans in September, up 59% from a year ago and easily a record-high for the month. This follows August's all-time monthly record, putting Jan-Sept imports up 8% over the same period a year ago (a record at the time).



²³ <https://www.bloomberg.com/news/articles/2024-09-16/china-s-fading-hunger-for-grain-spells-trouble-for-world-farmers>

These oversupplied conditions drove down prices, but they have since recovered (and then some), driven by broad drought conditions in Latin America, Russia, and Ukraine. The precipitation situation in Rostov (one of Russia's key winter wheat producing regions) shows virtually no rain in two months, plus abnormally warm temperatures. Easy to see why winter wheat planting is not going so well, especially as the forecast isn't favorable, either.

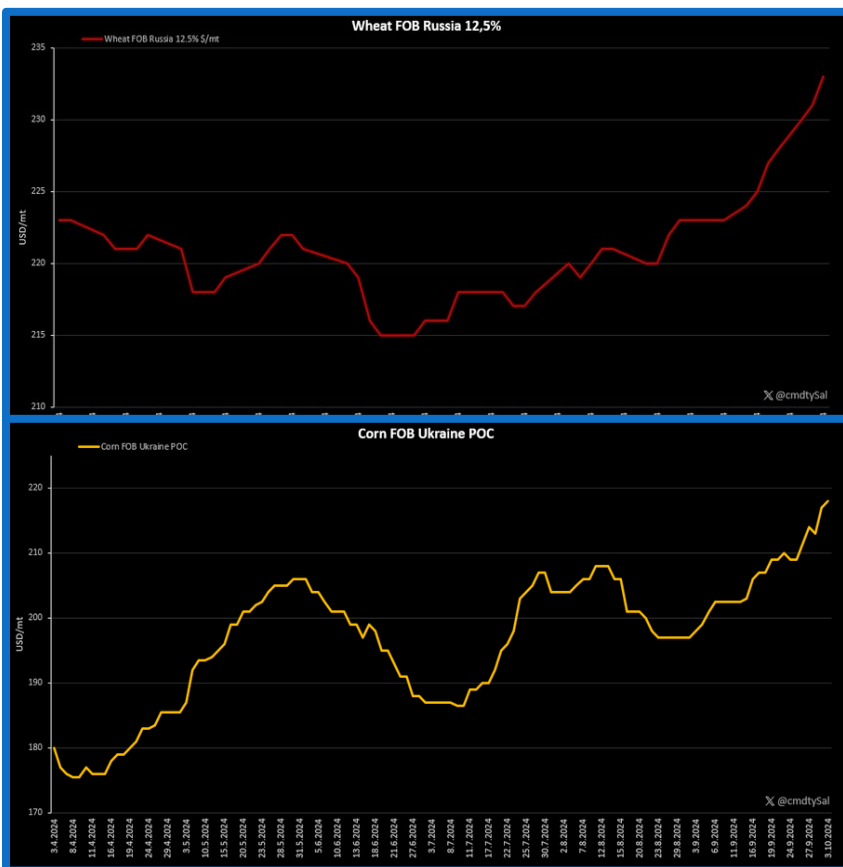


October Russian wheat is fully sold out and November has only limited sellers that are holding back. The Russian Ministry of Agriculture called an emergency meeting for grain exports on Oct 11, and one of the topics was focused on export restrictions. A large part of that is driven by the weak yield-to-date and the uncertainties

with the winter wheat backdrop. These uncertainties are going to expand well past 2024. Here is a fantastic backdrop by @cmdtySal on X²⁴:

"Production Decline: Russia's wheat production for 2024/25 is forecasted to drop significantly—down from 92.8 million tons last year to 82.7 million tons. The Urals and Siberia regions are hit hardest by late-season rain.

Exports Still Strong, But... Despite lower production, Russian wheat exports surged to record levels in August and remained high in September. But this pace could cause stock depletion by the end of the marketing year.



Exports are expected to reach 44.8 million tons, a decline from last year's 54 million tons.

²⁴ <https://x.com/cmdtySal/status/1845831483014922721>

Stock Shortage Incoming: Russia's wheat stocks are projected to drop to just 9 million tons by June 2025—nearly half of last year's 17.6 million tons. This tightens global supply, especially towards the end of the season.

Rising Prices: Prices are climbing. Russian wheat with 12.5% protein is already at \$230+ per metric ton

2025 Concerns: Looking ahead, dry conditions during winter wheat sowing could impact the 2025 harvest. If this continues, we may see even lower production next year.

Global Impact: Russia's role in global wheat trade remains strong, but the reduced availability from both Russia and Ukraine means the world market is entering its tightest phase since 2007/08.

Key takeaway: Watch for rising prices and potential supply shortages as Russia continues exporting at a high pace. Tight stocks could squeeze global supply, and dry conditions may impact the 2025 outlook further!"

As global volumes diminish, we expect to see an increase in food insecurity heading into 2025.

The rise in climate extremes is resulting in droughts and floods. Farmers need additional tools to manage variability. **Sultech products** increase yield regardless of the weather. In extremes, their organic products outperform synthetic yields by about 40%, which enables the farmer to feed a growing population.

The agriculture community needs these types of solutions to develop resilience to a changing world!

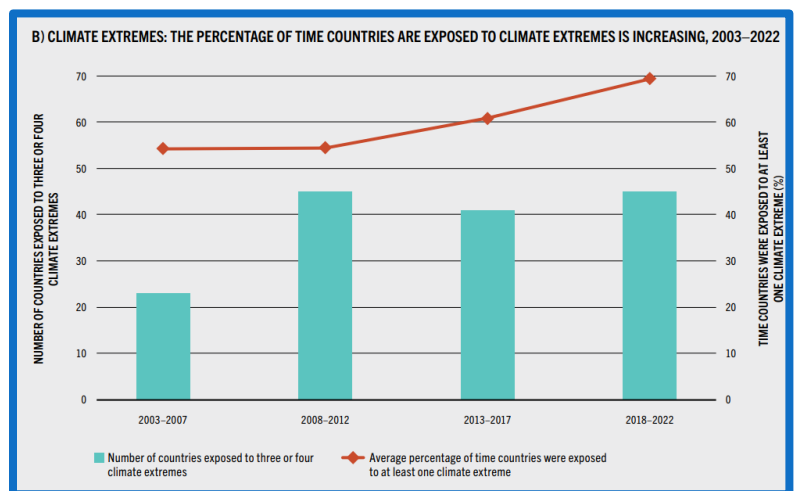
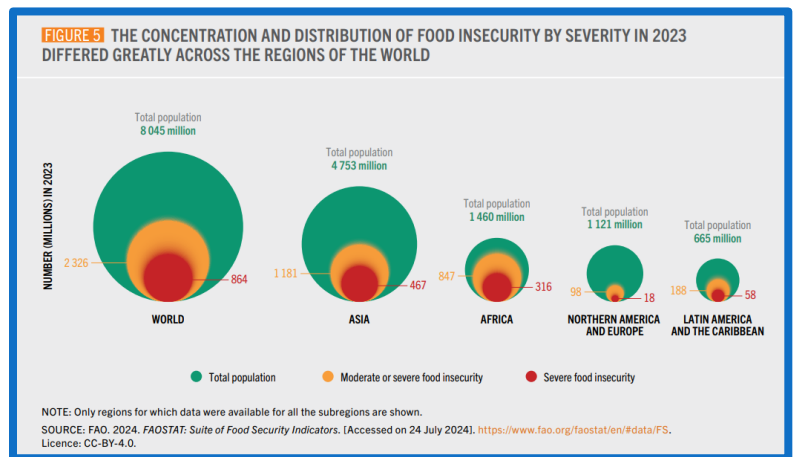


TABLE 1 PREVALENCE OF UNDERNOURISHMENT, 2005–2023

	Prevalence of undernourishment									
	2005	2010	2015	2017	2018	2019	2020*	2021*	2022*	2023*
	(%)									
WORLD	12.2	8.7	7.7	7.1	7.2	7.5	8.5	9.0	9.1	9.1
AFRICA	19.9	15.9	16.0	16.7	17.1	17.4	18.8	19.3	19.9	20.4
Northern Africa	7.8	6.2	5.6	6.2	6.2	6.0	6.2	7.1	7.4	7.8
Sub-Saharan Africa	23.0	18.2	18.4	19.2	19.6	20.0	21.7	22.1	22.7	23.2
Eastern Africa	32.2	24.4	24.5	26.3	26.5	27.4	28.5	29.0	29.6	28.6
Middle Africa	33.7	22.7	23.3	23.8	24.5	25.1	27.8	28.2	27.5	30.8
Southern Africa	4.7	7.1	8.3	6.9	7.0	7.1	8.1	9.1	9.5	9.6
Western Africa	12.2	11.6	11.5	11.5	12.0	11.8	13.7	13.8	15.0	16.0
ASIA	13.9	9.3	7.5	6.3	6.3	6.6	7.8	8.2	8.2	8.1
Central Asia	13.8	6.4	3.9	3.4	2.9	2.6	3.2	3.2	3.1	3.0
Eastern Asia	6.9	2.7	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5
South-eastern Asia	17.0	11.6	7.8	5.9	5.7	5.5	5.6	5.8	6.1	6.1
Southern Asia	20.2	14.9	12.7	10.2	10.2	11.1	13.6	14.5	14.2	13.9
Western Asia	8.7	6.8	9.3	10.2	10.6	10.7	11.0	11.4	12.1	12.4
Western Asia and Northern Africa	8.3	6.5	7.6	8.3	8.6	8.5	8.8	9.4	9.9	10.3
LATIN AMERICA AND THE CARIBBEAN	8.9	6.1	5.2	5.7	5.9	5.6	6.5	6.9	6.6	6.2
Caribbean	18.1	14.3	12.8	12.9	13.7	13.8	15.5	15.4	16.8	17.2
Latin America	8.2	5.5	4.6	5.2	5.3	5.0	5.8	6.3	5.9	5.4
Central America	7.7	6.4	6.4	6.0	6.0	5.6	5.6	5.8	5.9	5.8
South America	8.4	5.1	3.9	4.9	5.0	4.8	5.9	6.5	5.9	5.2
OCEANIA	6.9	7.3	6.9	6.8	7.1	7.0	6.7	7.5	7.1	7.3
NORTHERN AMERICA AND EUROPE	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5	<2.5

NOTES: For country compositions of each regional/subregional aggregate, see Notes on geographic regions in statistical tables at the end of the report. * Values are based on the point estimates; the values of upper and lower bounds of the estimated ranges for 2020 to 2023 can be found in the Supplementary material to Chapter 2.

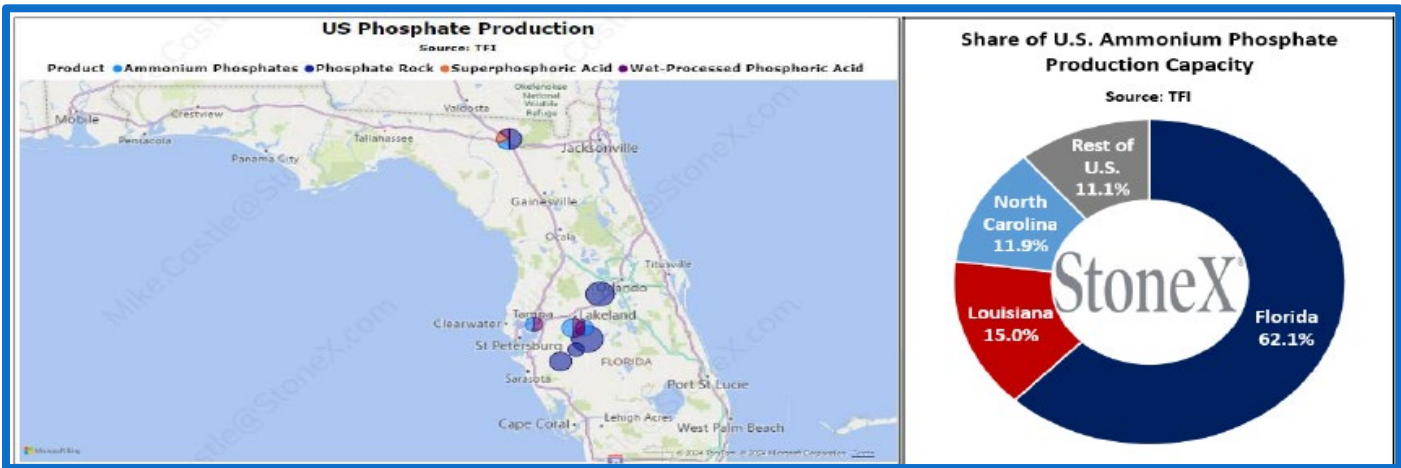
SOURCE: FAO, 2024. FAOSTAT: Suite of Food Security Indicators. (Accessed on 24 July 2024). <https://www.fao.org/faostat/en/#data/FS>. Licence: CC-BY-4.0.

In order to change the direction of malnourishment and starvation, the world must address soil degradation from years of irrigation, synthetic fertilizers, over farming, and other determinant practices. **The market needs flexible, affordable solutions to adjust the negative trend of undernourishment that kick-started in 2016.** Cost is arguably the greatest impediment to changing broad farming practices.

C6 has been highlighting these issues since inception, and we’ve taken action to meet the needs of a changing world.

Farmers must diversify their supply chains as

the world finds itself struggling to maintain fertilizer production. Europe’s power concerns are forcing fertilizer companies to shift operations, while geopolitics and weather patterns alter supply chains. Mosaic is currently in “fall turnaround” and had already slowed production ahead of Helene, but Milton’s strength and storm surge will inherently impact broad infrastructure.



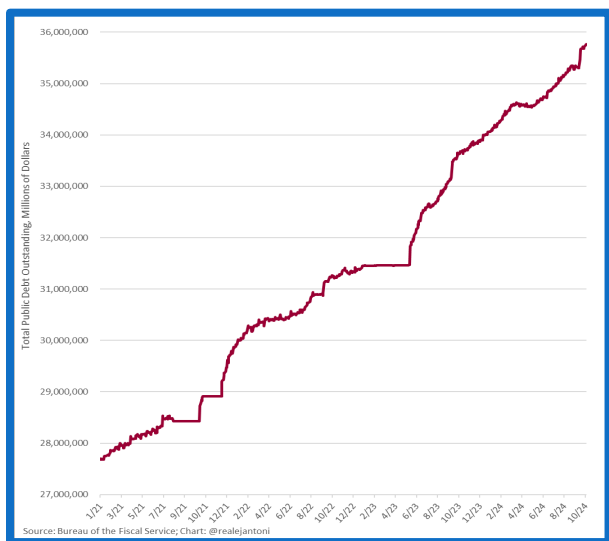
India is just one example of a country trying to find alternative sources of phosphate, with their first import of phosphate rock from Australia. Their supply was historically covered by Saudi Arabia and OCP, but India made their first purchase from a new supplier this year. The goal was to test a new product and diversify resources, especially as OCP moves more phos into battery production. “High-grade Australian phosphate rock will be exported

to India for the first time as that country's growing agricultural sector demands insatiable amounts of fertilizer. Mined in a remote part of north-west Queensland between Mount Isa and Dajarra, the phosphate rock will make its way to South Asian customers via a long inland rail journey to Townsville port.”²⁵ Countries are going to continue diversifying supply chains, especially as uncertainties remain in the broad market. Diversification is paramount in a world that is experiencing changing weather patterns and logistical challenges.

Farmers are desperate for alternative solutions to synthetics. They need products that can drive yield, repair soils, and lower costs. **The market is ripe for a Sultech solution addressing the adverse weather conditions striking farmers globally. The company continues to be recognized around the world for outstanding results. They provide a meaningful solution for both the oil and gas industry and the agriculture community.** It's imperative that companies diversify their downstream sale of all products, including sulfur. As Tampa is cleaning up from a direct hit from Hurricane Milton, oil and gas companies are going to struggle to sell their sulfur as prices fall and supply chains are disrupted. **Sultech has a local solution that provides a floor to the energy sector for their sulfur production. This means a company will never lose money on their H2S recovery again, and they won't be beholden to a single point of sale.**

The missteps from Wall Street just keep coming!

The market recently celebrated a cut of 50bps, but ignored the most fundamental laws of economics: Supply vs. Demand and Diminishing Returns. The market decides the yield curve while the Fed Fund Rate only sets the overnight rate. Investors are looking at the yield curve and factoring in the sheer amount of new supply of debt that has to come to market. The Federal debt hit a new record high of \$35.769T, which can ONLY be financed



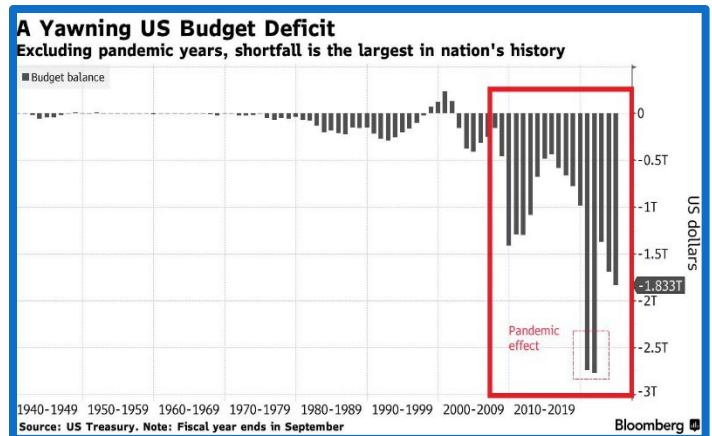
with an increase in treasury bonds and notes.

The Treasury must issue an increasing amount of paper for three key reasons:

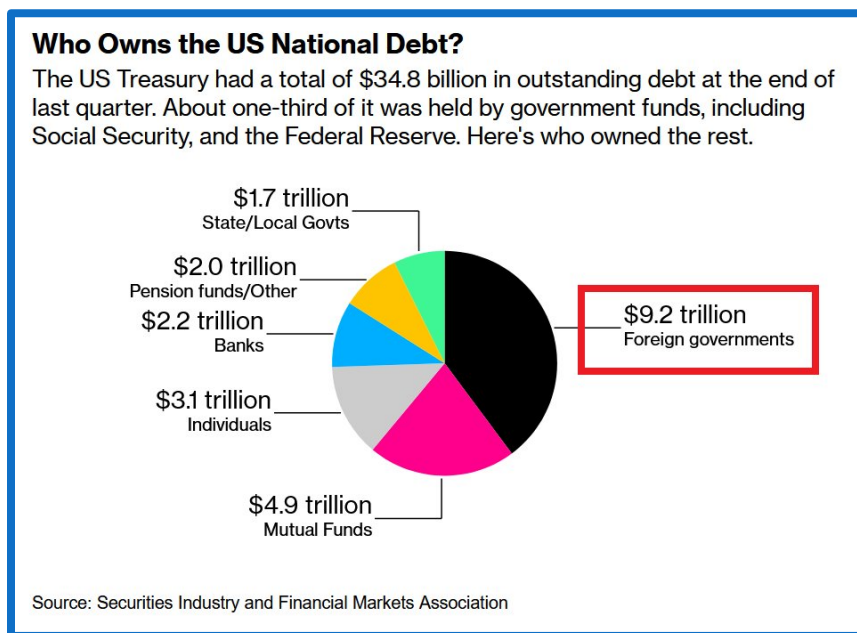
- 1) Cover the deficit, which has only expanded in the last decade. It has now hit \$1.83T or \$5B per day.
- 2) Issue enough debt to “roll” the maturing principal
- 3) Increase borrowing to cover the rising interest expense.

²⁵ <https://www.abc.net.au/news/2024-09-24/phosphate-first-india-export-from-australia/104375436>

These three factors are pushing even more paper into the market, and if you're an investor, how much interest will you demand for a growing risk? What is the clearing price you're willing to accept knowing more inflation, spending, and interest will need to be paid? There are economics "experts" that will yell from the rooftops that the Fed needs to cut rates "to reduce government interest." These are also the people who will be shocked that the 10-Year has crossed back above 4%, even though the Fed issued a 50bps cut. The market is looking at inflation and rising supply and demanding a higher rate to accept additional risk.



As additional paper hits the market, the U.S. government is also maximizing the amount of supply an investor or central bank is willing to hold in treasuries. As the pool of buyers shrinks, the Treasury is forced to find a "clearing" price, which is another issue, as pure supply rises. Foreign governments own about \$9.2T of U.S.



debt, and many of them have reduced their purchases and actually become net sellers. It will be nearly impossible to replace those buyers, which will lead to yields shifting higher over time to incentivize buyers who will demand a higher interest rate to compensate for additional risk.

Said another way: **Supply of U.S. paper (notes and bonds) is surging as demand for it shrinks.**

Think of stimulus as a bow and arrow: the more times you use it, the shorter the distance the arrow will fly. You need to stop and tighten the bow to make sure the arrow flies far and straight. If you don't, the arrow will fall short because the bow will eventually break.

The more "economic savvy" definition comes from the Law of Diminishing Returns. This principle identifies how "useful" this borrowed capital is for generating sustainable growth. For example, the Federal Highway System has generated a long-standing multiplier of 1.8, and at the initial completion of pieces, it reached as high as 5. The multiplier means that for every \$1 spent, it generated about \$1.80 in additional

economic output, or \$5 depending on the piece of the system evaluated. “Dissertational research by Daniel Leff Yaffe of the University of California, San Diego estimates that the output effects of building the interstate highway system has had a long-run relative multiplier of 1.8, meaning that every dollar spent on interstates has led to \$1.80 of additional economic output. In 1991, one year before its completion, the FHWA issued the final cost estimate of the interstate system at \$128.9 billion, over five times the original estimated cost in 1959 — \$27 billion — adjusted for inflation. Assuming the long-run multiplier is 1.8, the interstate highway system has generated over \$283 billion in additional economic output. . . Overall, each dollar of current federal highway grants received by a state raises that state’s annual economic output by at least \$2.”²⁶

As leverage grows, the interest expense and general cost of debt outweigh the underlying GDP growth. It gets to the point where every new \$1 generates a negative “util.” This is economic jargon that means \$1 spent generates negative growth. Stimulus works at the beginning of the process, where \$1 spent generates \$1 of growth, but as the system gets flooded with liquidity, you have to spend a greater quantity to generate the same growth. **If you issue stimulus without a pause to tighten (reduce liquidity)— the ability to generate growth is diminished.**

- \$1 spent creates \$1 of GDP growth
- \$5 spent = \$1
- \$20 = \$1
- \$100 = \$1

This continues until the money spent no longer creates any growth, but rather detracts from expansion. **These are the structural problems a large part of the world currently finds itself facing—especially the U.S. and China. Global economies have a debt problem, which continues to surge quarter over quarter, rapidly approaching \$325T.**

C6’s callback in 2019 was that inflation was grossly underreported, and the surge in liquidity over the previous two decades would result in a shift higher in yields. The COVID liquidity surge accelerated inflation and added so much pressure that it was impossible for the Fed to hide the sheer level of increases. Monetary policy and fiscal spending will continue to support inflation and stagflation environments as yields push higher. There were many talking heads highlighting “restrictive monetary policy” and the need for lower rates. We CONSTANTLY highlighted that was a fallacy, and liquidity wasn’t tight in any shape or form.

²⁶ https://www.richmondfed.org/publications/research/econ_focus/2021/q2-3/economic_history

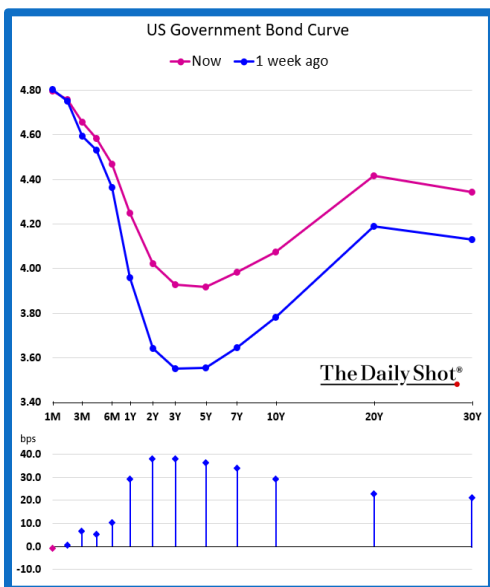


This chart shows just how elevated the global liquidity market is and helps highlight why inflation is going to ramp aggressively. Even the “drop” in Oct of ‘22 isn’t true if you factor in the Fed programs and velocity of money. The velocity of money (also measured by credit impulses) never went below zero, which means the market is primed for an inflationary spike.

The inflationary issues are being priced into the U.S. bond markets, which are getting hit from all sides, including rising issuance size and net foreign sellers. Our view is that the yield curve is going to drift higher, which will be pulled up by the 10-Year. The recent 10-Yr auction showed more problems on the “internals,” which will support higher interest rates.

U.S. 10-Year Note Sale:

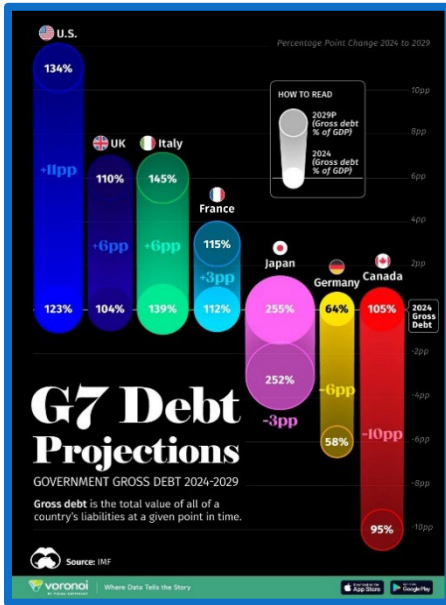
- High Yield Rate: 4.066% (prev 3.648%)
- Bid-Cover Ratio: 2.48 (prev 2.64)
- Direct Accepted: 8.4% (prev 13.7%)
- Indirect Accepted: 77.6% (prev 76.0%)
- WI: 4.062%



We’ve already seen a sizeable change to the yield curve with everything shifting higher, which remains our base case. While an “inversion” may happen briefly, we don’t see it happening in a significant way again, because long duration is going to move higher “faster” than short duration debt. This is driven by a multitude of reasons, but the most noteworthy being that Yellen will have to increase long-term bonds and investors will demand higher interest rates for the risk.

You may think: This is going to CRUSH the U.S. dollar! But you would be wrong, because everyone is in a tailspin lower. The USD has recently seen its largest increase in SWIFT transactions and has reached a 20-year record for the amount of transactions occurring around the world. We're still the "best of the worst," which is keeping the dollar well supported . . . for now!

Eventually the USD will see a sharp drop, but that



won't happen until other countries forgo their dollar

denominated debt and the Eurodollar floods back into the U.S.

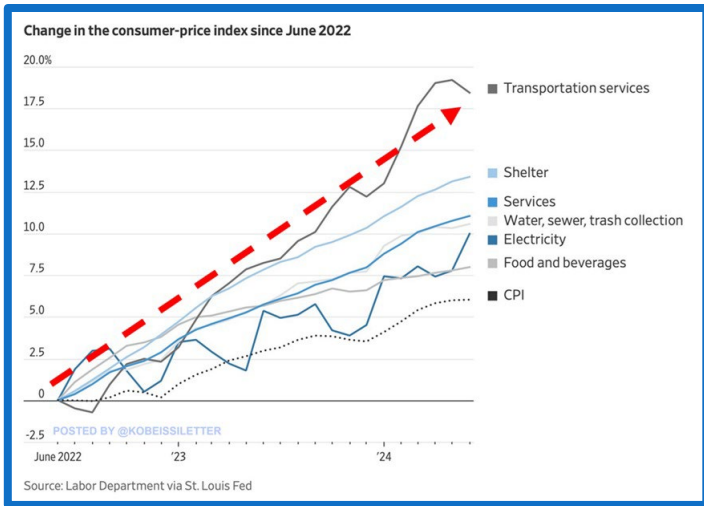
Today's focus is the sheer amount of debt and underlying projections that will keep interest rates moving higher.



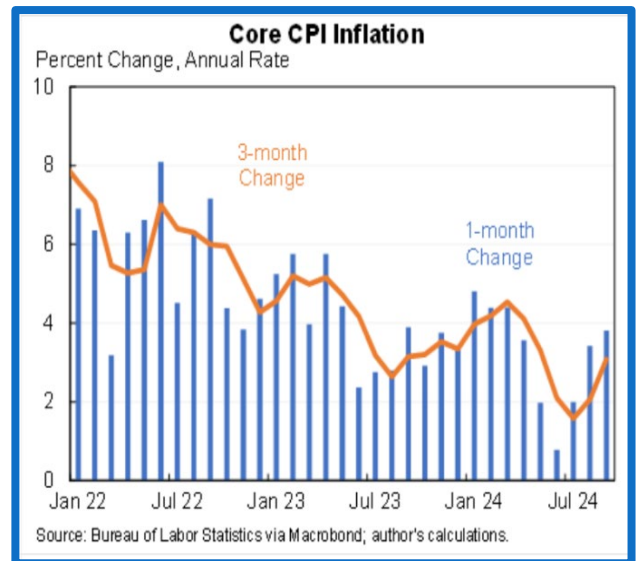
Get ready for the second wave of Inflation!

Inflation has already shifted back up without any meaningful decline lower. While U.S. CPI inflation has risen by ~6.0% over the last 2 years, inflation in many necessities has been much higher.

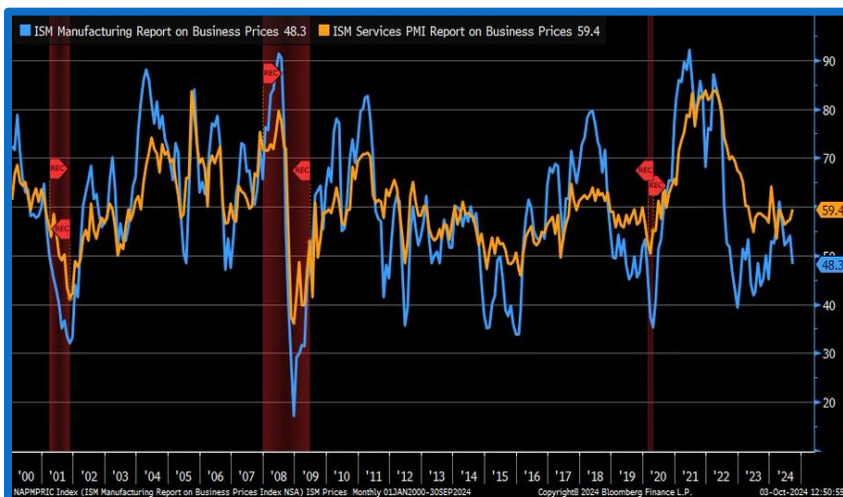
- Transportation services prices have skyrocketed by 18.5% since June 2022.
- Shelter and services inflation have risen 13.5% and 11.0%, respectively, over the same period
- Water, sewer, trash collection, and electricity prices have spiked by ~10%
- Even food and beverages have seen an 8% increase since June 2022
- Affordability is still getting worse



The inflation data that came out on October 10 supported another pivot higher in inflation. While it starts small, there are a lot of indicators showing a rapid expansion across pricing. Core inflation has now shifted higher, driven by services and “sticky” inflation, with more to come on the back of underlying costs rising and fiscal/monetary stimulus. Even goods pricing has now shifted higher after being “negative” or in deflation territory. Everything is now back in expansion mode.

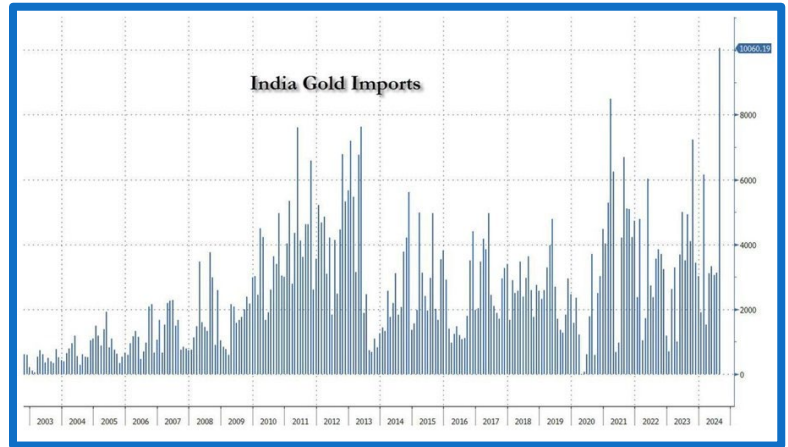


“Prices Paid” in the ISM is a great bellwether for the direction of prices, which have shifted in opposite directions. The U.S. economy is driven by about 70% services, and the consumer basket mirrors something similar. In the PMI calculation, 50 designates that an index isn’t expanding or contracting, where anything above or below will signify underlying positive or negative growth.



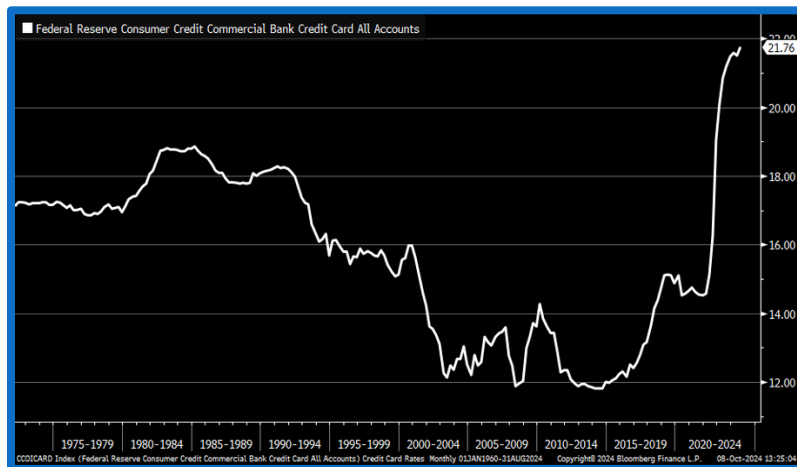
There are a lot of reasons we will see prices paid for goods shift back towards “50,” or near expansion—the pain will be primarily driven by services. These are things the consumer pays for on a monthly basis: internet, cell phone, healthcare, and other monthly needs.

There is a growing chance that the Fed cut of 50bps will be a “one and done,” given the current projects and conflicting data. Gold has been the preferred method for many to help protect against inflation, which has also expanded into gold miners. As JP Morgan famously said, “Gold is money. Everything else is credit.” Central banks and investors have actively been buying gold to create reserves against a broad devaluation of fiat currencies. For example, India has been pulling in a huge amount of gold as collateral and has now surpassed the U.K. for the most gold in their coffers.



How does this affect the Consumer?

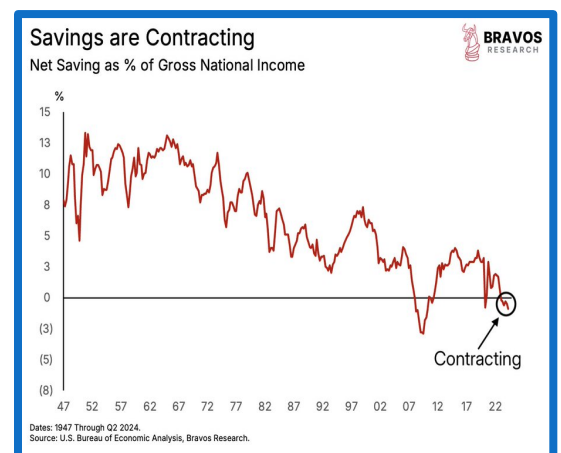
Stagflation will come into play once the consumer pulls back, which will happen rapidly given the financial setup. The consumer is facing one of the worst possible scenarios when it comes to personal balance sheets, as credit card debt explodes, along with rates



in August '24. This is assessed on a monthly basis to credit card balances that average about \$6k PER PERSON in a family. So the average family of four is carrying a \$36k balance that is being assessed with 22% interest. This balloons rapidly, especially as living expenses head in one direction. The direction of credit card interest will continue to head higher as banks face mounting losses and the yield curve edges higher. People are pulling from savings at a rapid rate to help offset some of this pain, but it's falling flat.

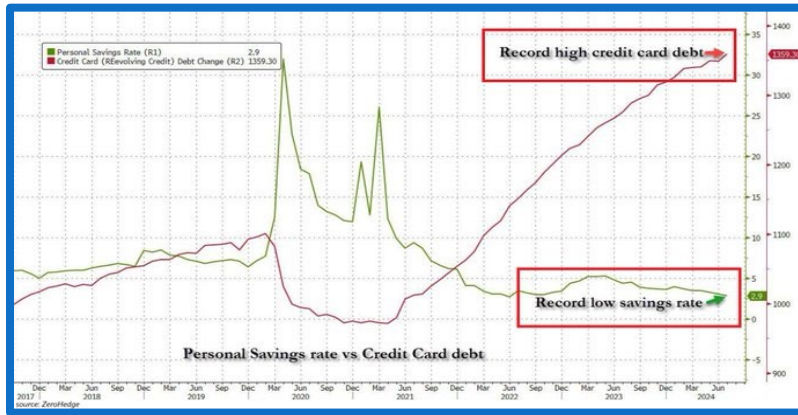
charged on the leverage. All the while, savings rates are dropping to near-record lows and total amounts in these accounts have dropped dangerously low.

The blended rate for consumers and businesses on credit cards is about 22% based on the assessed interest, measured by the Federal Reserve (left) and commercial banks at 23.4%



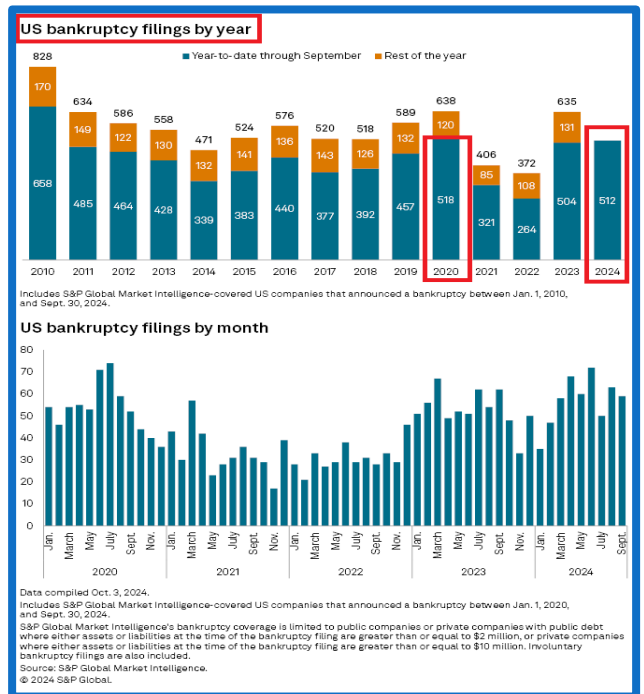
- Americans own an all-time high \$1.3 TRILLION in credit card debt.
- At the same time, the savings rate is 2.9%, the SECOND-LOWEST since the 2008 Financial Crisis. These levels don't point to a strong consumer!
- Americans are paying \$300 billion annually just in interest on their outstanding balances

This is creating a shift in consumer bad debt, which has to be managed at the bank level.



Share of consumer debt unlikely to be collected by banks has more than **DOUBLED** in 2 years and hit 3.0% in 2024, the highest in 13 years. By comparison, during the Financial Crisis, it rose from 2.5% in 2007 to 6.1% in 2010.

It isn't a surprise to see more concern at the small business level, especially as bankruptcy filings by the primary sector rise. U.S. bankruptcies hit 512 year-to-date in 2024, the second-highest level in 14 years (the most since the Covid Crisis of 2020, which hit 518). In September and August, 59 and 63 bankruptcies were recorded, respectively. Bankruptcies have only been accelerating since the end of 2022, as we rapidly approach another year similar to 2020.

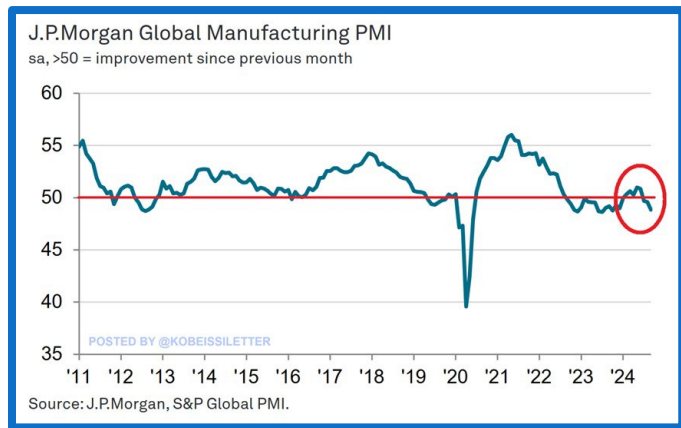


Banks are struggling on multiple levels as they try to manage a rise in bad debt expense, bankruptcies, weakening consumers, and softening asset prices (collateral values).

According to the NY Fed, September credit delinquency expectations have risen to the highest level since April 2020, keeping the pressure on bank balance sheets. The mismatch in duration exposure and stretched leverage ratios will keep banks on the sidelines and reduce exposure. **By having capital available, C6 can be an industry leader by taking advantage of the mismatch in the market and acquire assets at favorable prices.**

We are staring down the barrel of a gun without a clear indication of “what pulls the trigger.” C6 has been hyper focused on the carry-trade and yield curve situations because we're using them to our advantage.

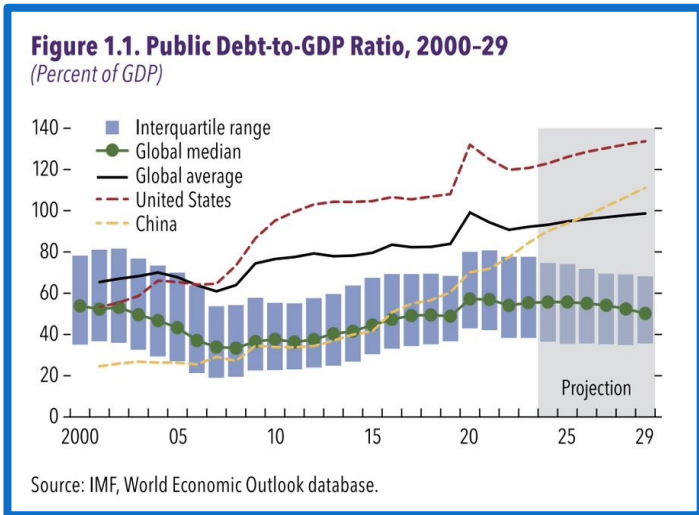
Global manufacturing is heading in the wrong direction, which will put pressure on international markets. **We believe the best place to invest currently is in North America, where there's broad opportunity.** This gives us the ability to create a cash-flowing footprint in a stable economy, while ex-U.S. markets compress. "The Global Manufacturing PMI index fell to 48.8 points in September, down from 49.6 in August, marking the 3rd straight monthly contraction. 4 of the 5 index components shrunk last month including output, new orders, employment, and stocks of purchases.²⁷" This will only be stressed further as the U.S. 10yr moves higher, which is the benchmark that sets the global borrowing rate.



U.S. isn't the only place feeling the pinch when it comes to weakening GDP and rising leverage.

"Global public debt to pass \$100tn this year, IMF warns. "Risks to the debt outlook are heavily tilted to the upside" and there were "good reasons to believe that future debt levels could be higher than currently projected", IMF said in its Fiscal Monitor report." This only captures "on balance sheet" debt and doesn't recognize "off-balance sheet" risk, or leverage at the municipal level that would roll up to the federal level. As debt levels rise, so does interest expense.

This creates a "debt spiral," where you need a constantly increasing amount of borrowing to cover costs. The IMF openly admits this likelihood: "However, the IMF report found that forecasters had a persistent tendency to underestimate how rapidly debt can rise. Realized debt-to-GDP ratios five years ahead can end up being 10 percentage points higher than expected, said the fund.²⁸"



As GDP falls, the numerator gets smaller as the denominator (debt) balloons, blowing out the Debt-GDP ratio. The world relies heavily on the industrial sector and exports, which are now firmly in contraction. As debt levels rise and a large part is denominated in USD, the pressure will grow on governments and emerging economies. The likelihood of a failed bond auction and/or rolling defaults becomes a more persistent risk.

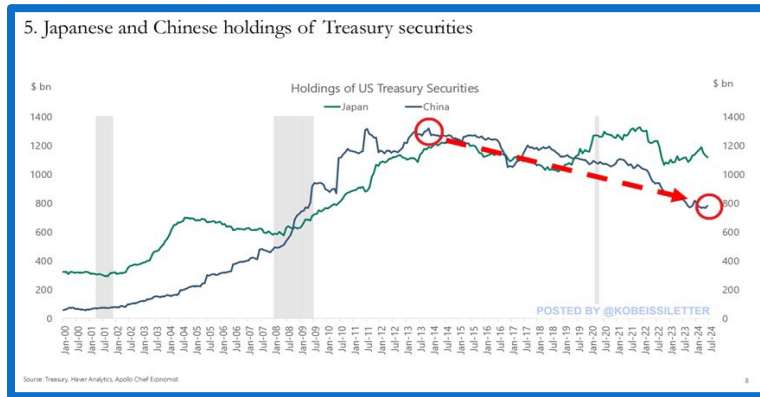
²⁷ <https://www.pmi.spglobal.com/Public/Home/PressRelease/5624ca3680634213a2b58f273ad64c31>

²⁸ <https://www.ft.com/content/6833f2ab-1741-441f-affd-ecfbedeae498>

C6 offers an opportunity to disconnect from the public markets and liquidity whims of central banks and federal governments. We are operating in areas that are pivotal to today's way of life.

The Carry Trade “Black Swan” Risk Only Grows

China and Japan have been selling down their U.S. treasuries to pull forward U.S. dollars and help stabilize their



balance sheets. This is a mixture of countering inflationary pressures (Japan) and filling gaps in collateral against deteriorating commercial and residential real estate (China.) This also creates additional pressure on U.S. notes and bonds as more volume is hitting ABOVE what Yellen is already pushing into the market.

- China's holdings of U.S. Treasuries are down to ~\$780 billion, near a 15-year low.
- Over the last 3 years, China's Treasury holdings have declined by 30%, or \$300 billion.
- Since the 2013 peak, China has dumped a total of ~\$540 billion of Treasuries.
- Now, foreign holdings of U.S. Treasury securities as a share of outstanding federal debt is down from 35% to 24% over the last decade. (This share sits near the lowest level in 18 years)

This isn't some sort of 4-D chess move, but rather a scramble to cover the failures of poor Chinese investments and massive gaps in collateral. China is teetering under their own leverage (far and away over the U.S. leverage) as exports slow, and their housing market maintains negative momentum.

But it's really Japan that will be the spark that carries the wave across the debt markets . . . and it sits in the carry trade. The economic data continues to flip around, but the most important set is the shift in the carry trade. In simple terms, investors would short Yen at very cheap rates and use those proceeds to buy USD to deploy into stocks and treasuries. The Yen inflates as more currency is shorted (pushed into the market), which sends the Nikkei to the stratosphere. Historically, when inflation runs, equities will rise to accommodate those extremes. Another example of the carry trade is when a trader shorts Yen and JGB to purchase USD and TSYs.

In October 2022, Mark predicted how this would all unfold: his view was that everything would hold until the BoJ was forced to raise rates. (link: <https://ny-alt.org/2022/10/21/nyair-episode-84-financial-forecasting-navigating-monetary-policy-in-a-sea-of-macro-risks/>) He believed they would try YCC (Yield Curve Control) followed by direct Yen intervention before they were forced to abandon both and raise rates. The catalyst was the

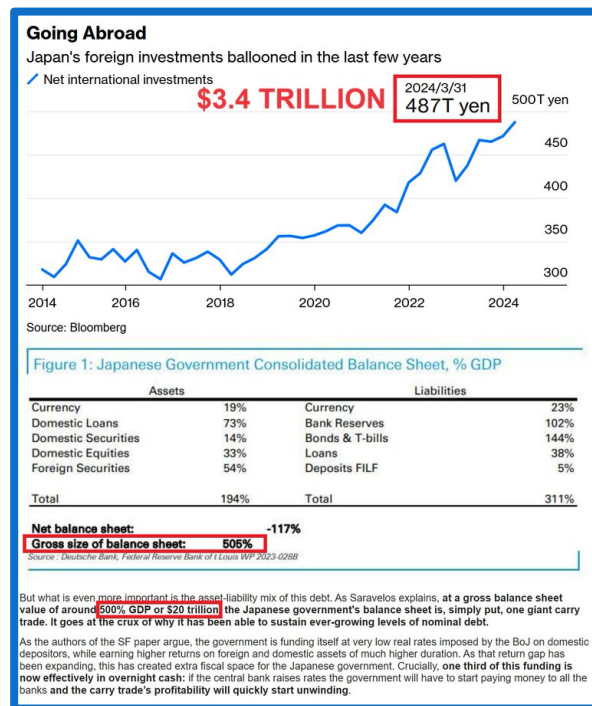
BoJ raising rates to .25%. Yes, you read that right: .25%!!!! This is all it took to make people panic and start unwinding the first leg of the carry trade.

Mark's old boss had a saying, "Too much, too fast!" . . . because you have forced selling, liquidation from risk managers, margin calls, and a gamma squeeze lower. Once this all settles, there is typically a sharp rally higher, but it's usually on razor thin volume. The bigger issue now is that the Fed and BoJ find themselves on different sides. If the Fed cuts rates, it will force additional liquidation of the carry trade. If the BoJ raises and the Fed cuts, it will just accelerate this. BoJ governors were attempting damage control by saying no additional raises would happen in this kind of volatility, so the market got to work challenging that view. It sent the Yen screaming higher, and it will force the BoJ to eat those words.

It's important to appreciate the sheer size of what has been happening with the carry trade over the last 6+ years. The COVID shift only accelerated what has been developing over the last decade.

- Global size of the balance sheet is \$20 trillion, or 505% of Japanese GDP, using its government balance sheet, according to Deutsche bank
- Net international investments sit at \$3.4 trillion (487T Yen) based on Japanese investors' net international investment
- Japanese banks also have broad exposure of about \$1 trillion using Japanese banks' foreign lending data

When we pivot to another metric, you can see the sheer level of the carry trade looking even further out. According to Bloomberg Economics's Taro Kimura, analysis of the Japanese Yen short positions hit the highest level in HISTORY last week. Yen short positions are used as a proxy to assess the carry trade volume, and they recently even exceeded before-2007 crisis levels.



The last look we'll share on BoJ's exposure is the below breakdown of their balance sheet as a percentage of GDP. The BOJ has no choice and is merely prolonging the inevitable: "at a gross balance sheet value of around

Figure 1: Japanese Government Consolidated Balance Sheet, % GDP

Assets		Liabilities	
Currency	19%	Currency	23%
Domestic Loans	73%	Bank Reserves	102%
Domestic Securities	14%	Bonds & T-bills	144%
Domestic Equities	33%	Loans	38%
Foreign Securities	54%	Deposits FILF	5%
Total	194%	Total	311%
Net balance sheet: -117%			
Gross size of balance sheet: 505%			

Source: Deutsche Bank, Federal Reserve Bank of St. Louis WP 2023-028B

500% GDP or \$20 trillion, the Japanese government's balance sheet is, simply put, one giant carry trade." — Deutsche Bank²⁹.

This data gives color to the level of exposure the BoJ has, and some of the things that can be liquidated. The drop in the markets came only when the BoJ increased their interest rate to .25%. So a move from 0% to .25% was enough to send the market into overdrive.

It's important to understand the mechanics of what's to come. The BoJ put their neutral rate (the long-term expectation of their rate policy) at 1%–1.25%, but quickly added color to it saying that they would avoid additional rate hikes in this kind of volatility. The "backtrack" didn't do much to comfort the market because the slide has begun, and it will be impossible to stop. The BoJ tried to intervene and stop the slide, but the intervention and commentary only had a very muted bounce.

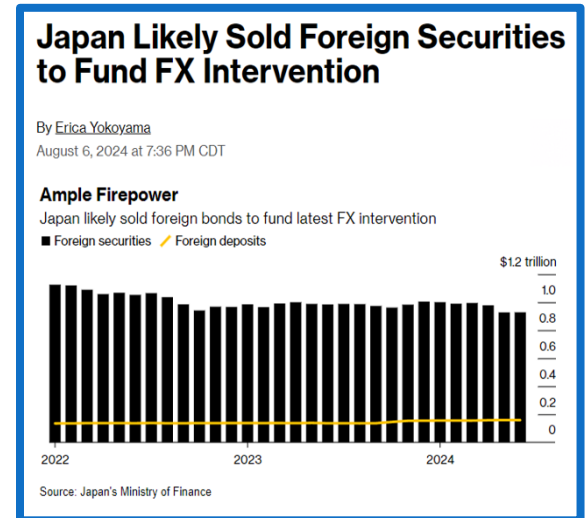


The U.S. dollar has continued to strengthen, and we expect this to remain the case even as inflation fears grow and U.S. bond yields rise. The dollar is still the "safest" currency in a world of terrible options, and it will eventually squeeze the emerging markets that are struggling. Typically, EMs will receive USD when they export products, which is used to cover U.S. dollar denominated debt. As exports slow and the global economy sputters, companies don't receive the same level of dollars through trade and are forced to convert in the open market. This inherently drives up the dollar while depressing other currencies, and these dynamics will continue until exports pick up or bankruptcies/defaults accelerate.

²⁹ <https://www.zerohedge.com/markets/20-trillion-carry-trade-has-finally-blown>

Once defaults begin, these foreign companies and countries won't need the same level of USD in their coffers. This will make the Eurodollar very interesting, and it will likely be the beginning of a broad depreciation in the dollar. We believe this is still several years out, and overall, the dollar will survive this round of economic strife. But this doesn't mean that there won't be adjustment to the seats at the table, which is why countries have been looking to secure more gold and broad commodities.

The BoJ is being forced to raise rates and liquidate foreign assets to strengthen the Yen while the U.S. Fed panic-cut 50bps (while also being pressured now to "pause" their easing). Essentially, we have the BoJ on pace to raise rates by 1% while the Fed is expected to cut 2% throughout 2025. **If the market reacted to a .25% swing like this, what will a 3% swing do to the carry trade?**



The Problem with the U.S. Federal Debt Bubble

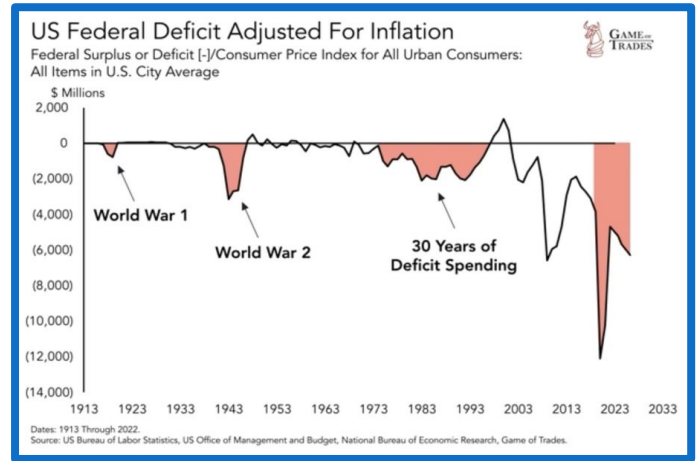
The U.S. equity market and Treasuries are very exposed to the swings that are about to come over in the next few months, only made worse by a huge increase in TSY issuance by the U.S.

- If Fed cuts aggressively here, JPY goes to 120 and every CUSIP has a flash crash as the carry trade blows up. If Fed cuts slowly, then it may just blow everything up anyway, because the economy is rolling over and the "wealth effect" was the only thing holding it up.
- There is a significant amount of new treasuries coming to market that will put additional pressure on yields.
- So if the Fed cuts at all, they blow up the bond market and the banking sector. Realistically, they need to raise rates aggressively to save things (imagine that!!).
- This is becoming the Emerging Market vs Developed Market dilemma. There's been a re-acceleration of inflation around the world, which should keep rates elevated.
 - The EM dilemma: the U.S. 10-Yr sets the rate for a huge part of the global bond market, and the trend is going to be higher. This will put significant pressure on EM debt and push their rates higher when they issue new debt.

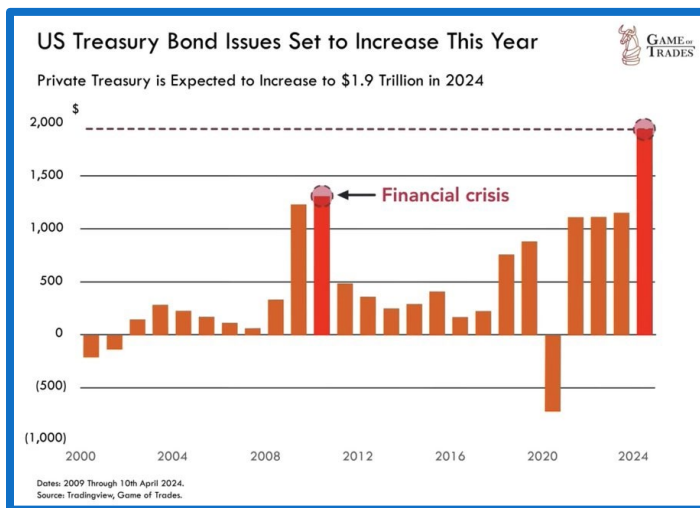
When we look at the recent 10-Yr and 30-Yr auctions, we saw some very weak numbers. The problem is shifting in the market rapidly as foreign buyers disappear, and the market grows concerned about the debt being issued by the Treasury.

The U.S. deficit continues to grow rapidly. Here is some quick data and a chart on the rapid expansion:

- Inflation-adjusted U.S. government spending in less than 4 years now exceeds the combined spending of: World War I, World War II AND 1970 to 1990.
- This is very concerning for the long-term health of the economy. Everyone—except the U.S. government—seems to understand this.



This level of spending requires a huge surge in bond issuance (as you can see in the chart below). Treasury bond issuance in 2024 is expected to hit \$1.9 TRILLION, surpassing levels seen even during the 2008 financial crisis.

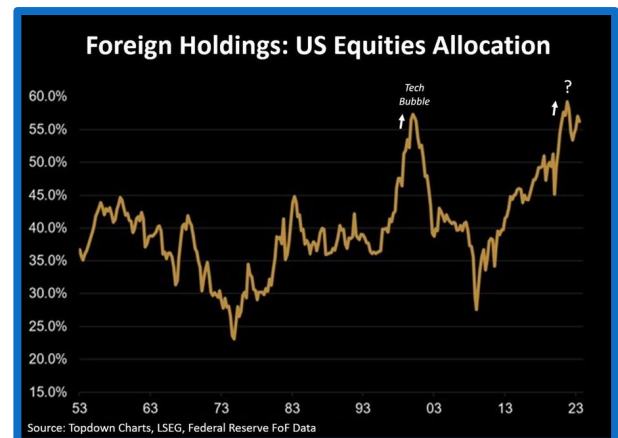


Yellen has also been shortening the duration of the bonds, which means she is increasing the auction sizes of 1-month notes to 2yr Treasury Bonds. This means the government’s “maturity wall” keeps getting shorter, so we have to roll MORE debt MORE often at HIGHER rates and LARGER quantities to cover spending and accrued interest expense.

As the carry trade unwinds, there will be a significant amount of U.S. TSY bonds and notes coming up for sale

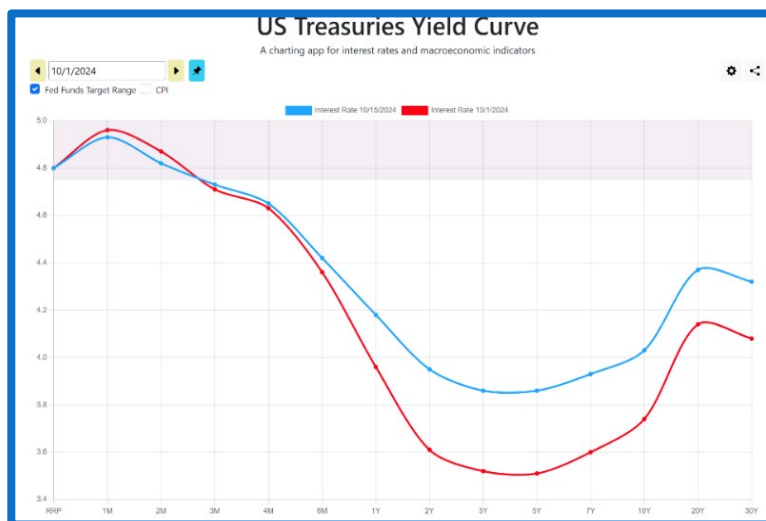
as the Treasury is forced to issue more paper. Our biggest buyers at the auctions have been foreign and macro investors taking advantage of the carry trade. With this gone, our biggest buyers disappear while they liquidate their positions.

Our equity market is also stuck with a huge level of foreign holders. This chart puts into perspective the amount of stock positions that are exposed to a carry trade unwind. “Every few decades, we experience a cyclical shift where investors transition from overweighting U.S. equities to reallocating more capital to other regions, and this trend continuously reverses. Often, investors overlook these crucial moments when



capital begins to shift dramatically, but it appears we are currently experiencing one of these significant turning points. Foreign investors, in particular, have reached a saturation point in U.S. equities, resulting in some of the most extreme valuation disparities compared to businesses in other parts of the world.”³⁰ This quote from Crescat Capital Macro Strategist Otavio Costa is spot-on in terms of the saturation point and the exposure in the public markets.

There’s a view in the markets that all the Fed needs to do is cut to save us all from interest rates. The problem is, the Fed Funds Rate just sets the overnight rate, but the market dictates where the yield curve is priced. We’ve seen forays into “Yield Curve Control” that have ended poorly, so a cut in the Fed Fund Rate might have a moderate effect, but it would reverse RAPIDLY, driven by massive supply and limited demand.



So the view that the Fed “controls rates” is a narrative that is simply not true. The market sets the yield curve, and it continues to pivot higher across the WHOLE complex, and not just in the backend.

This will become the biggest headwind for the Fed to manage, but it looks like they “officially” lost control of yield, as Mark pointed out would happen in Feb 2021: <https://primaryvision.co/2021/12/08/the-fed-party-is-being-crashed-by-yield/>

C6 is Well Positioned to Weather the Incoming Storm

The events highlighted in this newsletter were part of the “base case” when Mark and Fernando constructed the C6 Infrastructure Partners fund. We’ve created a fund that thrives regardless of high rates, rising yields, inflation, stagflation, disinflation, deflation, or any headline worthy term. **C6 and our portfolio companies have demonstrated operational excellence and sit in industries that are “recession resistant.”**

- The world is sitting in a difficult spot, with rising power shortfalls from under investment and overreliance on intermittent capacity.
- Global soils have hit a point of diminishing returns from overuse of synthetic fertilizers and shifting weather patterns.

³⁰ <https://x.com/TaviCosta/status/1821382713003409903>

C6 is delivering real world solutions to build up society as defined by Maslow’s Hierarchy—Food, Water, and Safety are paramount to establish a base of growth, and none of that is possible without fertilizer and power. There will always be concern about first time fund managers—especially in uncertain times. But we found the “next big thing” five years before any of the big investment firms decided to address infrastructure.

C6 has a huge head start. Once our portfolio is closed, we’ll have a perfect offering for any big firm chasing our assets, and a built-in exit plan that will reward our investors.