

Sujet traité : Uranium : une autre longueur d'avance? / Uranium : Another Leg Up?

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INNOVATION THEMES & STRATEGY

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Uranium: Another Leg Up?

2024 has been a lackluster year for uranium equities, defined by a sharp selloff at the beginning of Q3. We believe this selloff resulted from early investors in uranium's initial bull run taking profits, combined with a broader "risk-off" sentiment toward commodities. Yet, since its bottoming on September 6th, the uranium ETF URA has rebounded by 27.6%. Despite URA being in the green YTD, uranium investors remain frustrated by the yellow metal's seemingly persistent inability to overcome short-term "noise" regardless of strong industry fundamentals.

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Despite a disappointing 2024 thus far, we remain bullish on uranium and believe investors with a long-term horizon will be rewarded as the "second leg" of the bull market commences. As we outlined in a July memo¹, a "nuclear renaissance" is accelerating while the industry simultaneously grapples with a persistent structural supply deficit.

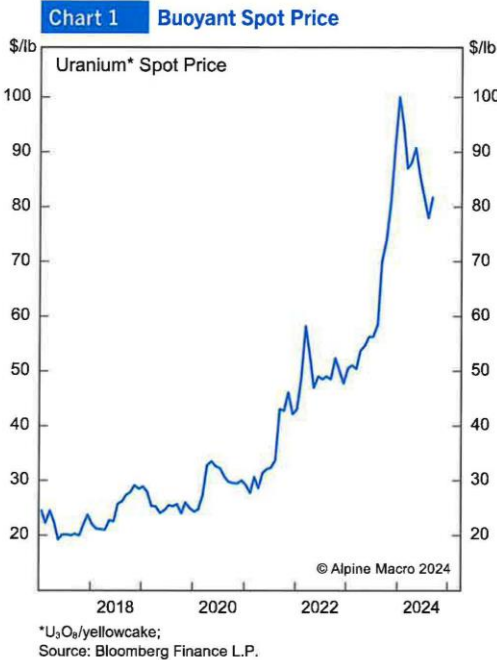
Globally, support for increasing nuclear capacity continues to grow driven by growing energy demand and a cumbersome renewable energy rollout. Reactor construction is gaining momentum in China and India, while Western nations focus on extending the lifespans of existing reactors and prepare to restart decommissioned ones. The International Atomic Energy Agency has increased its nuclear generation forecast for the fourth year in a row, now projecting a 2.5x rise in capacity by 2050. Uranium demand is expected to double by 2040.

This report will build upon our July memo by covering key sector updates that fortify our conviction in uranium, unpack key demand and supply-side developments, and expound on the potential of small modular reactors (SMRs).

A Turning Point?

Coming off a strong 2023 that culminated with uranium's spot price topping \$100 in January of 2024 for the first time in 17 years (Chart 1), uranium appeared to be on an unstoppable tear. Yet, until recently, 2024 has lagged nuclear renaissance supporting "sparks". To our surprise, utility contracting rates remain below replacement rates. Disappointing supply news from miners has hampered excitement. Low contracting rates could be an unintended consequence of a muddy U.S. uranium import waiver process for Russian enriched uranium following the U.S. ban. However, recent developments mark an inflection point and have ignited the next leg of uranium's bull run. Consider the following:

¹ Alpine Macro *Innovation Themes & Strategy Special Report "Uranium: A Nuclear Revival"* (July 1, 2024).



- In a landmark deal with Constellation Energy (the largest nuclear operator in the U.S.), Microsoft has agreed to a 20-year power-purchase agreement from the shuttered Three Mile Island nuclear facility – the site of the most significant nuclear accident in U.S. history in 1979. This deal epitomizes the broader nuclear renaissance and the world's re-embrace of nuclear. It is the first time a tech company will run data centers off of 100% nuclear power. The plant is set to come online in 2028 and stay operational until at least 2054 and provide 800 MW of power.
- The 2024 World Nuclear Association (WNA) Symposium occurred between September 4-6 and realized record turnout. The event's theme

was “turning momentum into energy”, and it did just that. The symposium appears to have played a part in reinvigorating nuclear optimism, as evidenced through its timing coinciding with an immediate turnaround from the prolonged selloff in uranium equities mentioned above.

- At Climate Week NYC, 14 of the world's leading banks and financial institutions, including Citi, Goldman Sachs, and Morgan Stanley, announced they would back the globe's goal of tripling nuclear energy capacity by 2050. This marks a watershed moment for an industry plagued by long lead times, heavy CAPEX, and historically wishy-washy support from large financial institutions.
- The DOE and USDA have committed over \$2.8 billion in loan guarantees and awards to reopen the shuttered Palisades nuclear plant in Michigan. High energy production costs resulted in the plant's closure in 2022, but it is scheduled to reopen in October 2025 and provide 800 MW.

A Demand Tsunami

Uranium's demand case continues to strengthen. Importantly, investors should note that uranium demand is highly inelastic as uranium itself only represents 4-8% of a reactor's operating costs. Uranium's "demand destruction" remains unlikely despite rising spot and long-term prices.

The global fleet of 440 operating reactors (Chart 2) requires roughly 180 Mlbs of uranium yearly, already outpacing supply, which is roughly 135-140 Mlbs (Chart 3). Without adding any new generation

Chart 2 Nuclear Capacity Pipeline

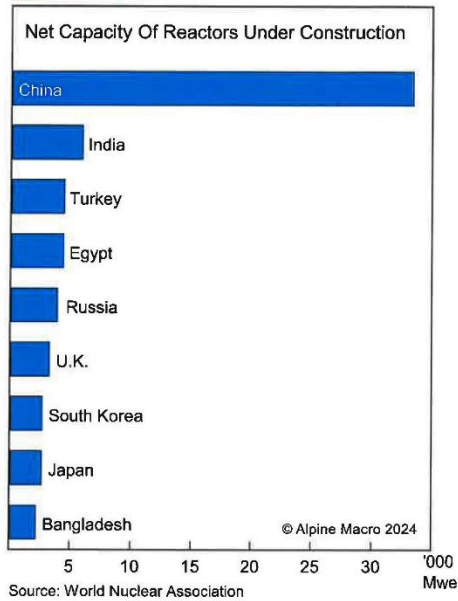


Chart 3 Structural Supply Shortage



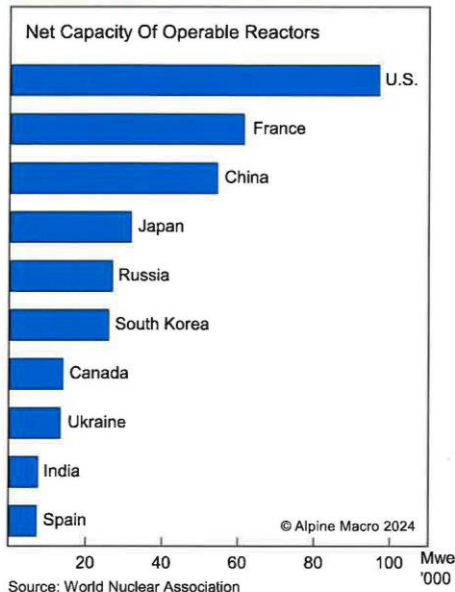
capacity, the industry is already at a structural supply deficit positioned to last for years. Yet, a multitude of factors are driving a demand explosion. We believe the impact of new demand on the supply shortage is underestimated by the market.

- Approximately 67 reactors are under construction and another 300 are in the planning/proposal phase (Chart 4). Importantly, capacity increases are mostly occurring in China and India (Chart 2) – regions with streamlined permitting and fast build times. China continues to successfully demonstrate the ability to build reactors in approximately 5 years, a rate 3x as fast as the last reactor built in the U.S. China alone is building between 4-6 reactors yearly and is ramping up construction to complete 150 reactors in 15 years.

Those alone will conservatively add roughly 100 Mlbs of uranium demand yearly by 2040.

- Aside from China, over 20 countries have pledged to triple nuclear power capacity by mid-century (an increase from 400 GW to 1,200 GW). This will send yearly uranium demand soaring to over 600 Mlbs. A 50% increase in generation alone would increase demand by over 2x the current yearly supply.
- Over 140 reactors could see life extensions through 2040, adding up to 70 Mlbs of annual demand, notes the World Nuclear Association (WNA).
- The restart of shuttered reactors represents a novel demand-boosting wildcard. A reactor restart

Chart 4 Current Nuclear Generation Capacity

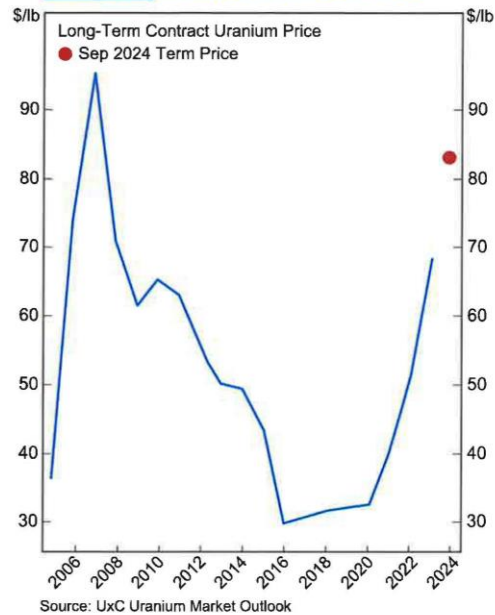


requires roughly 3x the annual requirement of a standard reactor.

- Nations that have historically been anti-nuclear, including Australia, appear to be ready to embrace the energy form.
- By 2026, an additional 29 GW of new nuclear capacity is expected to come online globally.

With the demand factors listed above, one would deduce that utilities would be scrambling to secure their supply. Yet, this has not occurred thus far this year and represents arguably the largest headache to uranium investors. Our view is that the “sticker shock” of near record long-term uranium prices has resulted in utilities dragging their feet to sign contracts. Long-term prices have shot up to

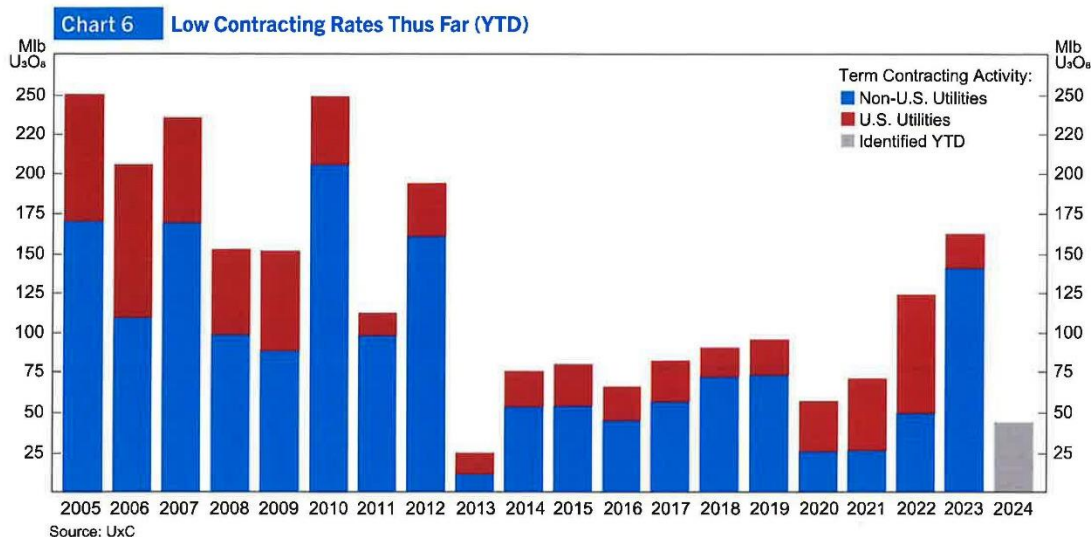
Chart 5 Elevated LT Contract Prices



\$125-130/lb, compared to under \$40/lb from less than 5 years ago (Chart 5). As a result, in the first eight months of 2024, utilities globally only signed 45 Mlbs of long-term contracts (Chart 6).

Importantly, this is well below the yearly replacement rate contracting of 150 Mlbs. Adding fuel to the fire, Western utilities have been dangerously drawing down inventories for some time now. Specifically, global inventory excluding China is in net decline in most regions or merely increasing by 1-2 million pounds per year. In the U.S. specifically, utilities have about two years of inventories on hand. Only China has been aggressively increasing inventory, and has added 86 Mlbs pounds to a stockpile over the last two years. We believe Western utilities will soon be forced to “face the music” and sign





long-term contracts or risk being left to pay an even heavier premium in a desperate restocking phase

We note there is a 2-4 year lag between the signing of a long-term contract and delivery. Worsening bottlenecks and record prices across both conversions and enrichment services could make this even longer.

Supply Woes

While uranium's demand backdrop is highly compelling, we believe that persistent downside disappointments in uranium's production and delayed mining restarts/openings are the key drivers. Globally, miners are struggling to recruit laborers, and the challenges of restarting idled mines are proving more difficult than anticipated.

The largest news on the supply side this year thus far came from Kazatomprom (the world's largest uranium miner), who cut 2025 production guidance

by 17% to a range of 25,000 to 26,500 tons. State-owned Kazatomprom cited project delays and a lack of sulfuric acid, which is used as a leaching agent in their mining process, as key contributing factors. In addition, Kazatomprom's two key greenfield projects, Budenovskoye 6 and 7 (initially expected to produce 20% of the company's output), have been plagued with challenges. Uranium in the Budenovskoye sites is located approximately 2x deeper than the company's other mines, requiring greater acid consumption. The company has a history of disappointing on production, and we expect this trend to continue and to further exacerbate supply shortfalls. Another emerging development is that Kazakhstan is increasing its Mineral Extraction Tax on uranium production from 6% this year to 9% in 2025.

The largest Western miner, Cameco, is also being negatively affected by the sulfuric acid shortage.



Cameco's Inkai joint venture with Kazatomprom is producing nearly 20% below expectations.

Uranium supply from Niger, historically responsible for 5% of the world's uranium output, has been erased since the July 2023 military coup. Aside from frozen exports, Orano, the largest miner in the region, has also had their operating permit revoked for an undeveloped deposit.

Despite some new capacity coming online in 2024, including the restart of Australia's Honeymoon mine, no major supply is expected to close the supply-demand gap anytime soon. Greenfield mines take between 8 to 15 years to open, and shuttered mines cannot easily be "turned on". NexGen's Rook 1 project is the largest development-stage uranium project in the West. Yet, the project is still moving through Canadian government review and is expected to take at least four years to build. Ultimately, Rook 1 will have a capacity of 30 Mlbs annually. Project costs have increased by 70% from 2021 estimates.

Chart 7 SMR Vs Conventional Reactor



Source: ANSTO

The SMR "Wildcard"

Interest in SMRs is surging. Their modular design enables quicker construction, lower upfront costs, and a much smaller land footprint. They boast advanced passive safety features, allowing them to shut down automatically without human intervention, reducing accident risks. SMRs are a flexible, low-carbon energy solution, easily integrated into modern energy systems (Chart 7).

Currently, there are over 80 SMR designs in various stages of development with four in operation across Russia and China. While the global rollout remains in its infancy, over 200 SMRs have been ordered,

including from large companies like Standard Power and Dow Chemical. In the IAEA's recently updated nuclear outlook for 2050, SMRs account for about 25% of added capacity (230 GW) in the high case and 6% (30 GW) in their low case scenario. This means that even in the IAEA's low case, SMR fuel demand would equate to fueling roughly 30 standard reactors by 2050.

This year, regulatory agencies in major nations including the U.S., Czech Republic, U.K., Romania, and Canada are supporting SMR development. In addition, governments are beginning to financially back SMRs. For example, the U.S. DOE announced



a \$900 million fund to support the initial U.S. deployments of SMRs. Canada is also leading the SMR charge, where utility Ontario Power Generation expects to begin construction work on SMRs in 2025. Later this month, the IAEA will host the first International Conference on SMRs in Vienna.

A Match Made In Heaven

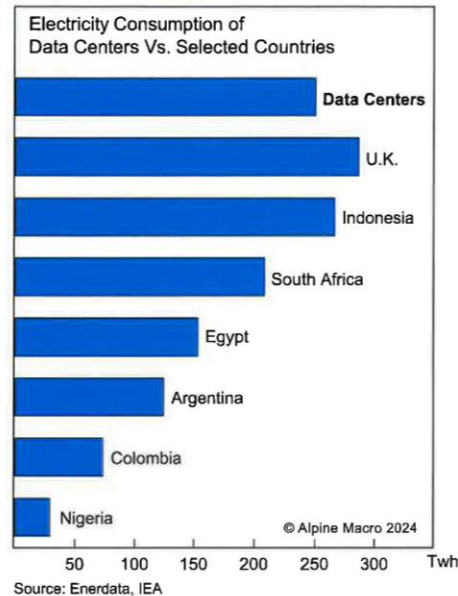
The AI industry is surfacing as a fervent supporter of the nuclear renaissance. Nuclear boasts the highest capacity factor of any energy source – a key attribute that positions it as an unrivaled energy source for data centers that require 24/7 energy reliability. While global energy demand is expected to grow by an average of 3.4% annually through 2026, data centers alone could account for up to 9.1% of U.S. electricity demand by 2030 from an estimated 4% today (Chart 8).

Recently, OpenAI asked the White House to approve a plan that would place 5 GW data centers in different U.S. cities. Roughly speaking, a 5 GW data center has the equivalent energy demand of 3 million homes. This request epitomizes the growing importance of baseload energy for AI development. From the perspective of AI, it can be argued that increasing nuclear generation supports national security interest and would facilitate the U.S. to effectively compete with China in the AI race. Oracle and OpenAI both already have plans for SMRs to power data center infrastructure.

Investment Considerations

Our view is that uranium remains an attractive long-term buy. Large macro factors including energy security, net-zero commitments, and new

Chart 8 Sky High Data Center Energy Demand



drivers including AI's soaring energy demand are strengthening tailwinds for the yellow metal. Global support for nuclear energy is at a record high, as 1.5x more people support the use of nuclear energy than oppose it, according to a multinational poll conducted by market research firm Savanta. At least 30 nations are considering, planning, or starting nuclear power programs, notes the WNA. Global nuclear power generation is forecasted to grow by almost 3% annually through 2026, reaching a new record high next year. A nuclear revival is underway.

A volatile geopolitical landscape typically favors commodities, and uranium's complex, interconnected supply chain is highly susceptible to geopolitical



disruptions. In September, Putin floated limiting exports of key metals including uranium, titanium and nickel in retaliation for Western sanctions.

We are in the camp that uranium's structural supply deficit will persist and likely worsen. Both the uranium spot and long-term price remain below previous inflation-adjusted bull market highs. In 2007, the spot price topped \$135; it currently stands in the low \$80s. The price is poised to rise due to unprecedented industry demand/supply dynamics. While uranium equities will continue to experience volatility, we view significant pullbacks as buying opportunities. Our equity views remain unchanged with our July report. We prefer Tier-1 miners located in Western-aligned jurisdictions, including Canada or Australia, and the URA ETF that provides broad sector exposure.

→ notre position en porte feuille

Uranium's demand inelasticity leads us to believe that the market will top out from news on the supply side, not a demand disappointment. We view this as far down the line, as meaningful new supply remains distant and current mines continue to disappoint on production. However, several unlikely but possible events could send the uranium price on a parabolic tear and could represent compelling exits in an earlier time frame. For example, 1) a self-imposed uranium export ban by the Russians or 2) the signing of a long-term contract at a huge premium from starved Western utilities desperate for uranium.

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