

China Uranium

Negative

Neutral

Positive

A primer on the “Third Bull Market”

- Uranium spot price rallied by >80% in 2023 and >450% since 2017, to a large extent on the nuclear energy renaissance confirmed at COP28
- We expect supply-demand of 74.2-78.0kt for 2023, 76.5-76.8kt for 2024E and 82.0-78.2kt for 2025E, with huge supply downside risk
- Important near-term events: Kazatomprom updates (1 February), Cameco updates (8 February) and US sanctions updates (February)

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What's new: We offer our research findings on uranium, a commodity with >99% end-usage being nuclear power generation, and a spot price that rose >80% in 2023 or >450% since 2017, and is now near a 16-year high.

What's the impact: Market balance. We expect supply-demand of 74.2-78.0kt for 2023, 76.5-76.8kt for 2024E and 82.0-78.2kt for 2025E. While our maths suggests a surplus in 2025, we see meaningful supply downside risks due to resource depletion and project execution, while the long-term structural shortage concern will continue to offer price support for uranium.

Key variables. We analyse the key supply-demand variables: “uranium requirement”, “investment demand”, “primary supply” and “secondary supply”, in this report. We believe the price rally in 2023 was related in large part to the “uranium requirement” (demand from nuclear plants) variable, with the global nuclear renaissance in 2023, as confirmed at COP28 with >20 countries (including the US, France, Korea, Canada, Ukraine and Japan) having launched the Declaration to Triple Nuclear Energy. We believe this positive catalyst of long-term uranium demand expectations has been largely priced in. In 2024, we believe the market will switch focus to “primary supply”, to see if major producers can keep their promises made in 2023 (we see a risk of some not being able to deliver).

Key focuses ahead. We note multiple important events for uranium in the near term that investors should focus on.

1 February 2024: Updates from Kazatomprom (KAP LN, the world’s largest uranium producer) especially on 2024 and 2025 production as well as commentaries on market concerns over resource depletion.

8 February 2024: Updates from Cameco (CCJ US, the world’s second-largest uranium producer), especially on 2023 and 2024 production.

February 2024: Updates from the US Senate on the Prohibiting Russian Uranium Imports Act.

Aside from these near-term events, investors can monitor: 1) the military situation in Niger which may affect uranium production as well as new mine approvals, 2) uranium production resumptptions in the US, and 3) uranium purchasing activities of Sprott Physical Uranium Trust (SPRUUF US) and Yellow Cake (YCA LN) as well as ongoing redemption clause debates.

What we recommend: We downgraded CGN (1816 HK, HKD2.22, Hold [3]) recently (see [our Report, 24 January 2024](#)) on uranium cost concerns.

How we differ: We likely look into the global uranium market in more depth than other teams at other brokerages that cover the China energy space.

Listed uranium companies mentioned

| Name | Ticker |
|-------------------------------|-----------|
| Kazatomprom | KAP LN |
| Cameco | CCJ US |
| Sprott Physical Uranium Trust | SPRUUF US |
| Yellow Cake | YCA LN |
| CGN Mining | 1164 HK |
| Denison Mines | DNN US |
| Paladin Energy | PDN AU |
| BHP Group | BHP AU |
| Boss Energy | BOE AU |
| Deep Yellow | DYLAU |
| Goviex Uranium | GVXXF US |
| Energy Fuels | UUUU US |
| Uranium Energy Corp | UEC US |
| Peninsula Energy | PEN AU |

Source: Daiwa, Bloomberg

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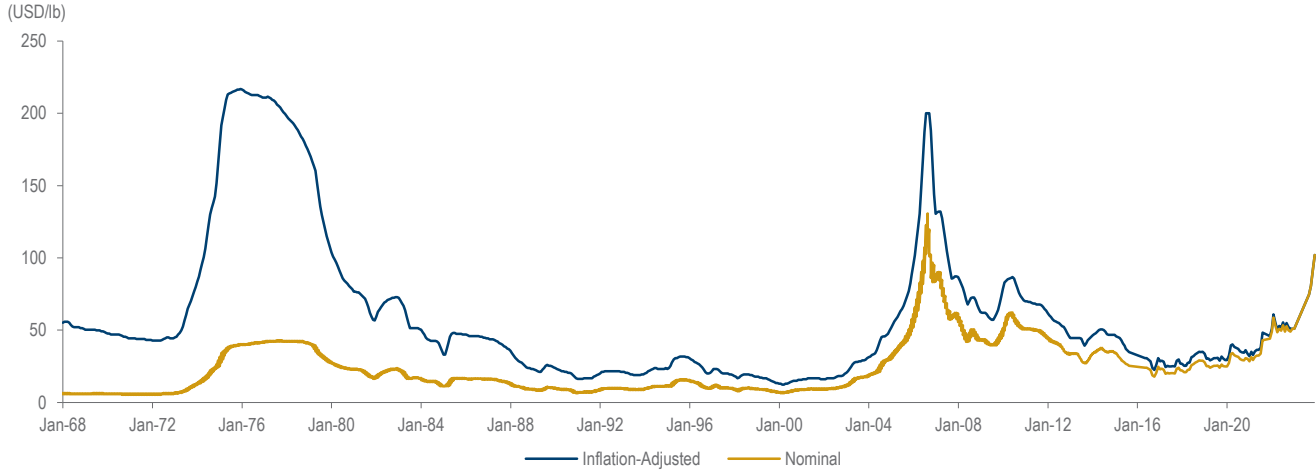
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“Third Bull Market” for uranium in the making

Uranium spot is now near a 16-year high

The uranium spot price rose by >80% in 2023 or by >450% since 2017, breaking the USD100/lb-mark in 2024, a 16-year high, and is being called uranium’s “Third Bull Market”.

Uranium spot price



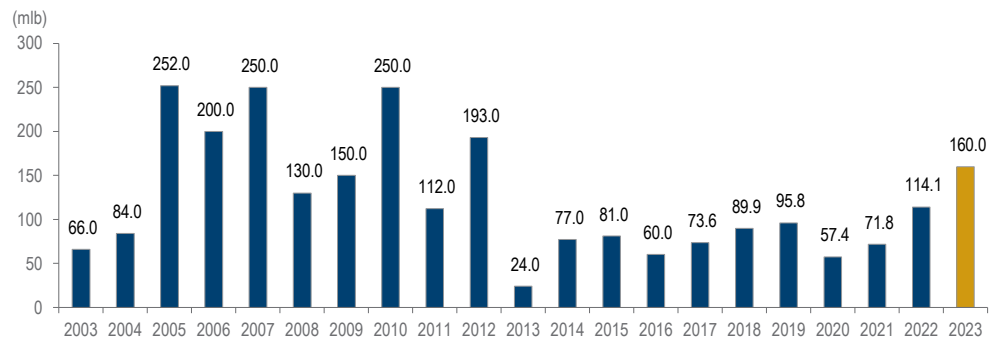
Source: Numerco, Nuexco, Yellow Cake, Bloomberg

Demand-driven rally in 2023 heated up further at COP28

Demand was the main price driver in 2023, with COP28 adding to the hike

We see the rally being driven fundamentally by the global pivot back towards nuclear power. At the 28th United Nations Climate Change Conference (COP28), more than 20 countries launched the Declaration to Triple Nuclear Energy (see [United Nations Framework Convention on Climate Change, 11 December 2023](#)) which outlines the goal to triple nuclear energy capacity globally by 2050, with signatories including 6 countries (the US, France, South Korea, Canada, Ukraine and Japan) that are amongst the global top-10 in terms of operating nuclear capacity. With a meaningful recovery in global uranium contracting volumes in 2023, we see the demand-side consideration being the key growth catalyst behind the uranium price rally in 2023.

Global: uranium contracting volumes (2003-23)



Source: Ux, Cameco

Signatories of the Declaration to Triple Nuclear Energy

| | | | | |
|----------------|---------|-------------|-------------------|----------------------|
| Armenia | Finland | Japan | Poland | Sweden |
| Bulgaria | France | Moldova | Republic of Korea | Ukraine |
| Canada | Ghana | Mongolia | Romania | United Arab Emirates |
| Croatia | Hungary | Morocco | Slovakia | United Kingdom |
| Czech Republic | Jamaica | Netherlands | Slovenia | United States |

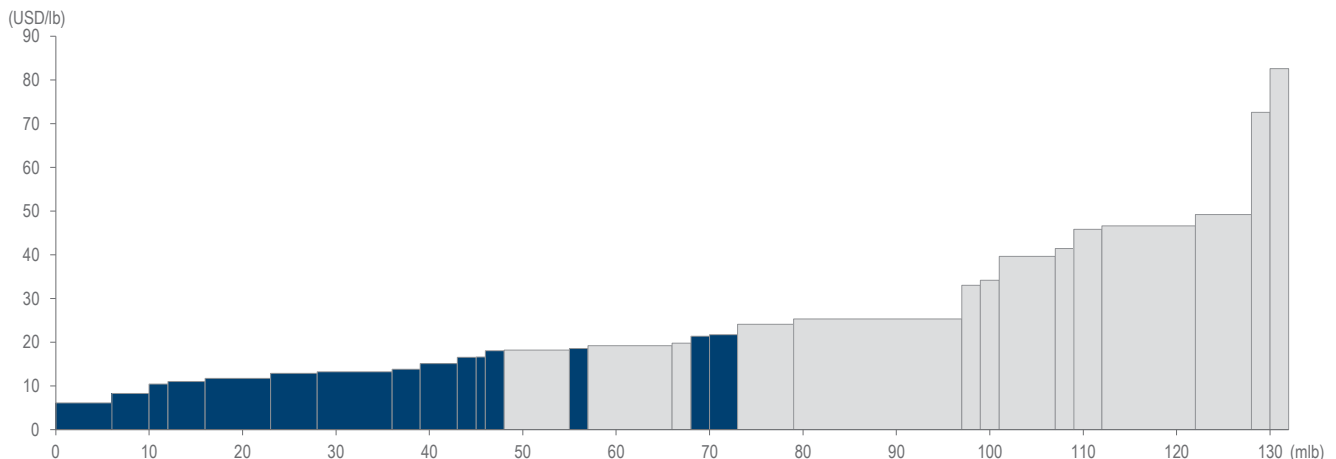
Source: UNFCCC

Focus in 2024 likely to shift to supply constraints

The uranium spot price is already above the uranium incentive price

We contend that the sentiment-driven and long-term-focused rally due to demand-side positive surprises should be largely priced in, especially with uranium spot now already higher than the cost level for all global operating projects in 2022 to incentivise new supply, despite investors already being aware of the fact that the realised ASP for uranium suppliers tends to be lower than the spot price, due to price discounts for long-term contracts when uranium spot prices are at high levels.

Global: 2022 uranium production cost curve (blue = projects owned by Kazatomprom)



Source: Kazatomprom

Cameco: expected realised ASP sensitivity to spot price

| | USD20/lb | USD40/lb | USD60/lb | USD80/lb | USD100/lb | USD120/lb | USD140/lb |
|------|----------|----------|----------|----------|-----------|-----------|-----------|
| 2023 | 46 | 47 | 48 | 49 | 49 | 49 | 50 |
| 2024 | 35 | 41 | 51 | 56 | 58 | 59 | 60 |
| 2025 | 37 | 43 | 54 | 61 | 64 | 65 | 66 |
| 2026 | 40 | 43 | 56 | 65 | 68 | 69 | 70 |
| 2027 | 41 | 44 | 56 | 67 | 71 | 72 | 73 |

Source: Cameco; Note: Based on analysis as at 30 September 2023

Kazatomprom: expected realised ASP sensitivity to spot price

| | USD20/lb | USD30/lb | USD40/lb | USD50/lb | USD60/lb | USD70/lb |
|------|----------|----------|----------|----------|----------|----------|
| 2023 | 40 | 42 | 45 | 48 | 51 | 54 |
| 2024 | 25 | 32 | 40 | 48 | 56 | 63 |
| 2025 | 26 | 32 | 39 | 47 | 55 | 63 |
| 2026 | 24 | 32 | 39 | 48 | 57 | 66 |
| 2027 | 25 | 32 | 39 | 48 | 57 | 65 |

Source: Kazatomprom; Note: Based on analysis as at 30 June 2023

Updates from Kazatomprom on 1 February 2024 will be important

The most important near-term focus – updates from Kazatomprom on 1 February 2024. On 12 January 2024, Kazatomprom (the largest uranium producer in the world, contributing c.40% of the global primary uranium supply) stated that downward adjustments to its 2024 production plans are expected due to challenges related to the availability of sulphuric acid as well as delays in completing construction works at the newly developed deposits, while 2025's production plan may also be affected (see [Kazatomprom, 12 January 2024](#)). The exact magnitude of delay can only be confirmed in Kazatomprom's 4Q23 trading update, which is expected to be released no later than 1 February 2024. The capital market is concerned about the depletion issue at Kazatomprom's mines, with the latest announcement by CGN Mining (1164 HK, JV partner of Kazatomprom) already confirming 4Q23 uranium production miss at the Central Mynkuduk Deposit (see [HKEx, 26 January 2024](#)) due to "the restriction for the purchase of raw materials such as sulphuric acid". As a side note, Cameco (the second-largest uranium producer in the world, contributing 15-20% of global primary uranium supply) will also offer updates on 8 February 2024.

Supply misses by major players likely to translate into higher uranium spot price via 2 channels. The first channel is that traders will likely take into account tighter-than-expected supply-demand in the future, and thus assign higher value to uranium. The second channel is that these major players may have to purchase uranium from the spot market to fulfil offtake obligations, thus pushing up the uranium spot price.

2022-26E global uranium demand estimates

We expect moderate 1-2% growth per annum for uranium demand over 2023-26E

We project global uranium demand to move from 78.0kt in 2023 to 76.8kt in 2024E (-1.6% YoY), 78.2kt in 2025E (+1.8% YoY) and 79.3kt in 2026E (+1.4% YoY), based on our summation of the uranium requirement plus investment demand. We derive the uranium requirement based on plant-by-plant data of nuclear power capacity from the World Nuclear Association with in-house modification based on >99% of uranium mined being used to produce fuel for nuclear power. With news flow regarding new nuclear project development almost on a daily basis, we highlight in this section key areas of focus.

Global: 2022-26E uranium demand

| | 2022 | 2023 | 2024E | 2025E | 2026E |
|---|---------------|---------------|---------------|---------------|---------------|
| USA | 95.52 | 95.84 | 97.09 | 97.09 | 97.09 |
| France | 61.37 | 61.37 | 63.02 | 63.02 | 63.02 |
| China | 52.18 | 53.29 | 57.78 | 60.48 | 64.74 |
| Russia | 27.47 | 27.47 | 27.47 | 27.47 | 27.47 |
| South Korea | 24.49 | 25.83 | 25.83 | 25.83 | 25.83 |
| Canada | 13.49 | 13.49 | 13.49 | 13.49 | 13.49 |
| Ukraine | 13.11 | 13.11 | 13.11 | 13.11 | 13.11 |
| Japan | 9.49 | 11.05 | 13.43 | 13.43 | 13.43 |
| Spain | 7.12 | 7.12 | 7.12 | 7.12 | 7.12 |
| Sweden | 6.94 | 6.94 | 6.94 | 6.94 | 6.94 |
| India | 6.80 | 6.80 | 8.00 | 10.00 | 11.40 |
| Belgium | 5.94 | 4.94 | 3.93 | 3.93 | 2.08 |
| United Kingdom | 5.88 | 5.88 | 5.88 | 5.88 | 5.88 |
| Finland | 4.39 | 4.39 | 4.39 | 4.39 | 4.39 |
| United Arab Emirates | 4.02 | 4.02 | 5.44 | 5.44 | 5.44 |
| Pakistan | 3.26 | 3.26 | 3.26 | 3.26 | 3.26 |
| Czech Republic | 3.13 | 3.13 | 3.13 | 3.13 | 3.13 |
| Switzerland | 2.97 | 2.97 | 2.97 | 2.97 | 2.97 |
| Bulgaria | 2.01 | 2.01 | 2.01 | 2.01 | 2.01 |
| Hungary | 1.92 | 1.92 | 1.92 | 1.92 | 1.92 |
| Thailand | 1.90 | 1.90 | 1.90 | 1.90 | 1.90 |
| Brazil | 1.88 | 1.88 | 1.88 | 1.88 | 1.88 |
| South Africa | 1.85 | 1.85 | 1.85 | 1.85 | 1.85 |
| Slovakia | 1.75 | 2.19 | 2.19 | 2.66 | 2.66 |
| Argentina | 1.64 | 1.64 | 1.64 | 1.64 | 1.64 |
| Mexico | 1.55 | 1.55 | 1.55 | 1.55 | 1.55 |
| Romania | 1.30 | 1.30 | 1.30 | 1.30 | 1.30 |
| Belarus | 1.10 | 2.20 | 2.20 | 2.20 | 2.20 |
| Iran | 0.92 | 0.92 | 1.97 | 1.97 | 3.03 |
| Slovenia | 0.69 | 0.69 | 0.69 | 0.69 | 0.69 |
| Netherlands | 0.48 | 0.48 | 0.48 | 0.48 | 0.48 |
| Armenia | 0.42 | 0.42 | 0.42 | 0.42 | 0.42 |
| Turkey | - | 1.20 | 2.40 | 3.60 | 4.80 |
| Bangladesh | - | - | 1.20 | 2.40 | 2.40 |
| Australia | - | - | - | - | - |
| Denmark | - | - | - | - | - |
| Egypt | - | - | - | - | - |
| Estonia | - | - | - | - | - |
| Germany | - | - | - | - | - |
| Indonesia | - | - | - | - | - |
| Italy | - | - | - | - | - |
| Jordan | - | - | - | - | - |
| Kazakhstan | - | - | - | - | - |
| Lithuania | - | - | - | - | - |
| Philippines | - | - | - | - | - |
| Poland | - | - | - | - | - |
| Saudi Arabia | - | - | - | - | - |
| Vietnam | - | - | - | - | - |
| Total Nuclear Capacity (GW) | 366.98 | 373.04 | 387.87 | 395.45 | 401.51 |
| Requirement Ratio For Operating (t/GW) | 185 | 185 | 185 | 185 | 185 |
| Uranium Requirement (t) | 67,892 | 69,011 | 71,757 | 73,157 | 74,280 |
| Investment Demand (t) | 9,000 | 9,000 | 5,000 | 5,000 | 5,000 |
| Total Demand | 76,892 | 78,011 | 76,757 | 78,157 | 79,280 |

Source: World Nuclear Association, Daiwa estimates and forecasts

COP28 a tipping point for nuclear energy renaissance

COP28 drove global endorsement of nuclear energy

During COP28, more than 20 countries launched the Declaration to Triple Nuclear Energy (see [United Nations Framework Convention on Climate Change, 11 December 2023](#)) which introduced the goal to triple nuclear energy capacity globally by 2050, with signatories including 6 countries (the US, France, South Korea, Canada, Ukraine and Japan) that are amongst the world's top-10 in terms of operating nuclear capacity.

Signatories of the Declaration to Triple Nuclear Energy

| | | | | |
|----------------|---------|-------------|-------------------|----------------------|
| Armenia | Finland | Japan | Poland | Sweden |
| Bulgaria | France | Moldova | Republic of Korea | Ukraine |
| Canada | Ghana | Mongolia | Romania | United Arab Emirates |
| Croatia | Hungary | Morocco | Slovakia | United Kingdom |
| Czech Republic | Jamaica | Netherlands | Slovenia | United States |

Source: UNFCCC

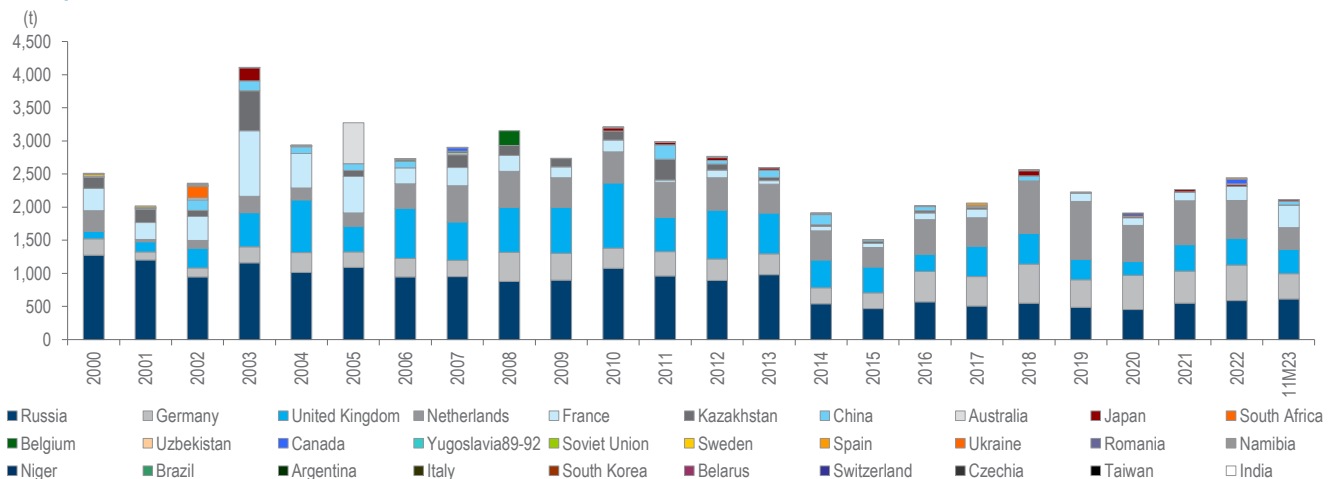
We see COP28 as a watershed moment (re)confirming the role of nuclear in achieving global climate goals. While a re-emphasis on nuclear power as a carbon-free baseload energy source has been seen over the past decade as the aftermath of the Fukushima incident in 2011 gradually comes under control, we see COP28 as a watershed moment with several key countries re-embracing somehow-stigmatised nuclear power. We expect an increasing number of countries to become more willing to discuss new nuclear project development after COP28, which we see as the tipping point that triggered concerns over a long-term structural shortage of uranium.

US sanctions the critical near-term demand factor

The progress of US sanctions on Russian uranium will be an important near-term uranium price driver

In our view, US sanctions on Russian uranium are the most important near-term demand variable. On 11 December 2023, the US House passed the US Prohibiting Russian Uranium Imports Act with bipartisan support, which contains waivers allowing for the import of low-enriched uranium from Russia if the US energy secretary determines there is no alternative source available for operation of a nuclear reactor or a US nuclear energy company, or if shipments are in the US national interest. The act is currently being blocked by Senator Ted Cruz in the US Senate due to an unrelated matter. Nonetheless, with Russia being the top enriched uranium import source of the US, we expect this act, when (and if) passed, to disrupt the global uranium supply chain and trigger further uranium price hikes, despite uranium stockpiling activities by US players likely already having taken place over the course of 2023, ahead of completion of the legislation process. Besides, the development of local enriched uranium capacity in the US will also increase the demand for natural uranium from the US in the global market.

US: imports of enriched uranium over 2000-11M23



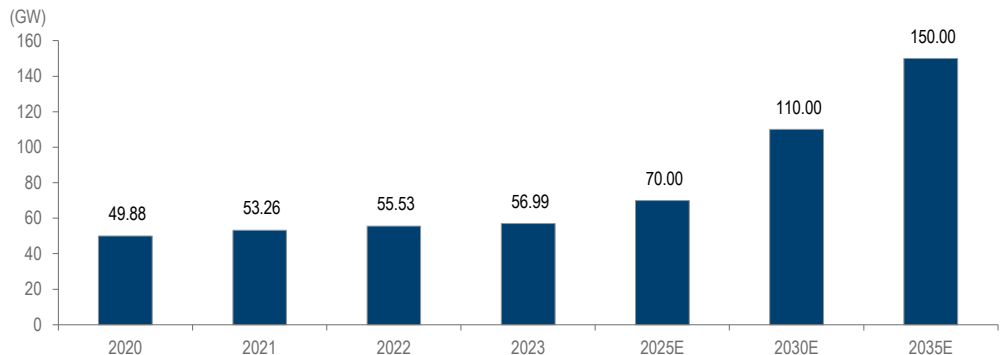
Source: USITC, Daiwa

We see uranium demand upside risk in China

Eye on China for potential uranium demand upside

Investors should note that China, as the 3rd largest operating nuclear capacity country in the world, is not a signatory of the Declaration to Triple Nuclear Energy. As such, the long-term nuclear target of China remains an unknown to the capital market; in terms of official targets, we are only aware of a near-term national installed nuclear capacity goal of 70GW by end-2025 (see [NDRC, 29 January 2022 \[Chinese-language content\]](#)). Yet, we forecast only 57.8GW by 2025E, below the national target. Meanwhile, the China Nuclear Energy Association (CNEA) has national installed nuclear capacity targets of 110GW for 2030E and 150GW for 2035E. We believe that any official confirmation of nuclear development targets by the Chinese government will have a visible impact on demand expectations for the price of uranium. With China approving 10 new nuclear projects each in 2022 and 2023, we see China's situation offering potential upside risk for the uranium price in the case of: 1) faster-than-expected development for projects in the pipeline, and/or 2) stronger-than-expected long-term capacity targets.

China: installed nuclear capacity



Source: NEA, NDRC, CNEA

Another key variable: nuclear plant restarts possibly in Japan and Germany

Eye on Japan and Germany for potential resumption

Japan is already restarting idled nuclear plants with Onagawa 2-3 (1.592GW) and Shimane 2 (0.789GW) scheduled for 2024. The key focus in 2024 for Japan demand is the fate of the Kashiwazaki-Kariwa plant, the largest nuclear project in the world with total capacity of 8,212MW that went offline in 2012, with the green light and details for restart likely to be given in 2024 (see [Reuters, 26 December 2023](#)). Besides, we are also aware of political pressure for nuclear restarts in Germany (see [Nucnet, 7 December 2023](#)), which is an important demand variable in our view, with Germany having >10GW nuclear capacity ready to restart.

Germany: nuclear plants with high chance of restart

| Name | Date of Shutdown | Capacity (MW) | Operating License | Nuclear Stance (Region) | Nuclear Stance (Owner) |
|------------------|------------------|---------------|-------------------|------------------------------|------------------------|
| Isar 2 | 15-Apr-23 | 1,410 | Yes | Pro (Bavaria) | Pro (E.ON) |
| Brokdorf | 31-Dec-21 | 1,410 | Yes | Against (Schleswig-Holstein) | Pro (E.ON) |
| Grohnde | 31-Dec-21 | 1,360 | Yes | Against (Lower Saxony) | Pro (E.ON) |
| Krümmel | 6-Aug-11 | 1,346 | Yes | Against (Schleswig-Holstein) | Pro (Vattenfall/E.ON) |
| Neckarwestheim 2 | 15-Apr-23 | 1,310 | Yes | Against (Baden-Wuerttemberg) | Against (EnBW) |
| Emsland | 15-Apr-23 | 1,335 | Yes | Against (Lower Saxony) | Against (RWE) |
| Gundremmingen B | 31-Dec-17 | 1,284 | No | Pro (Bavaria) | Against (RWE) |
| Gundremmingen C | 31-Dec-21 | 1,288 | No | Pro (Bavaria) | Against (RWE) |
| Total | | 10,743 | | | |

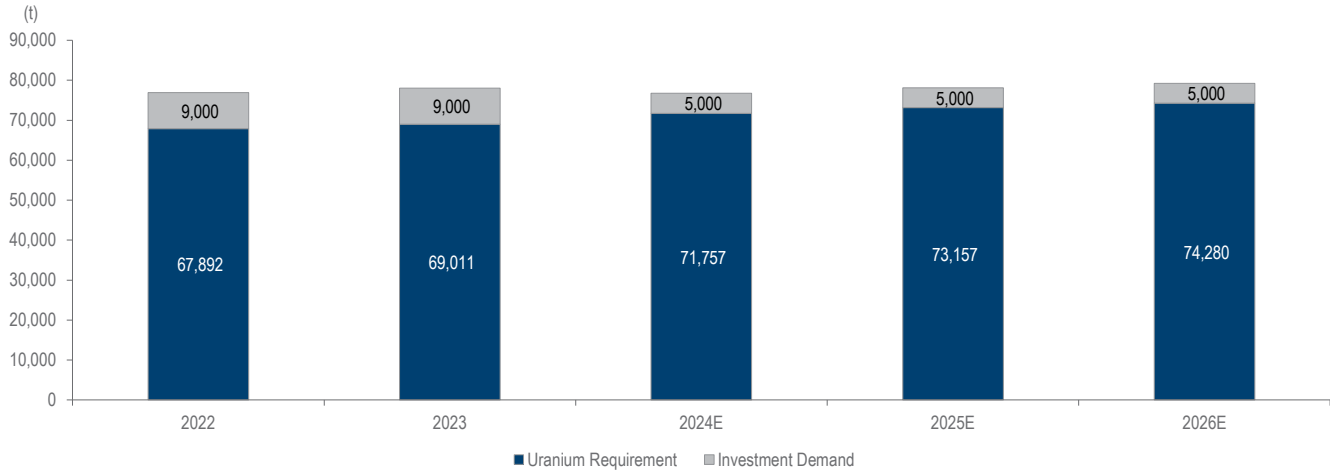
Source: Radiant Energy Group

Investment funds and utility restocking to play a part

Investment demand is different from uranium requirement

Investors may note that our global uranium demand analysis is broken down into 2 parts namely uranium requirement and investment demand. While uranium requirement refers to demand linked to normal operation of nuclear power plant, we use investment demand as a residual to capture demand from investment funds and some utility restocking activities.

Global: 2022-26E uranium demand



Source: World Nuclear Association, Daiwa estimates and forecasts

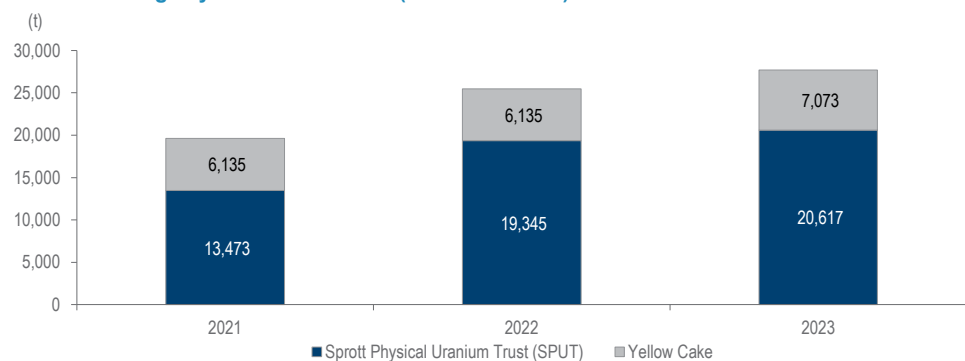
We expect SPUT and Yellow Cake to continue to buy uranium from the market

Investment funds, especially Sprott Physical Uranium Trust (SPUT) and Yellow Cake, have been buying uranium. The formation of these funds allows investors to gain exposure to uranium, while serving as a source of price discovery for uranium on the other hand, by taking uranium out of the normal supply-demand picture. These funds will likely continue to purchase in years to come, thus helping with the clearance of uranium inventory in the open market. Based on respective official documents, we estimate annual investment demand from SPUT and Yellow Cake combined is close to 4kt.

SPUT: It agreed not to purchase more than 9mlb of physical uranium (c.3.45kt) in the spot market during any calendar year (see [SPUT, 3 January 2024](#)).

Yellow Cake: The long-term Framework Agreement with Kazatomprom provides access to USD100m a year of U₃O₈ (c.300t based on spot price of USD100/lb) at the prevailing spot price (see [Yellow Cake](#)).

Uranium holdings by investment funds (non-exhaustive)



Source: SPUT, Yellow Cake

There is also investment demand from other parties that is harder to track. We also see traders as well as utility companies contributing to investment demand but the trade flows are harder to track as they are not obliged to report to the market. As uranium gets to much higher levels, we expect both speculative demand from traders and stockpiling demand from utility companies and countries to reduce. Thus, we assign a conservative total investment demand assumption of 5ktpa over 2024-26E.

2022-26E global uranium supply estimates

Our model assumes marked supply over 2024-26E, for now

We project global supply to rise from 74.2kt in 2023 to 76.6kt in 2024E (+3.2% YoY), 82.0kt in 2025E (+7.1% YoY) and 86.1kt in 2026E (+4.9% YoY) based on a summation of primary supply, secondary supply (recycling) and secondary supply (inventory).

Global: 2022-26E uranium supply

| | 2022 | 2023 | 2024E | 2025E | 2026E |
|---|---------------|---------------|---------------|---------------|---------------|
| Kazakhstan | 21,227 | 21,000 | 22,725 | 27,900 | 31,000 |
| Canada | 7,351 | 11,654 | 12,692 | 12,953 | 13,671 |
| Namibia | 5,613 | 7,230 | 8,235 | 8,398 | 9,481 |
| Australia | 4,553 | 5,091 | 5,550 | 5,940 | 5,940 |
| Uzbekistan | 3,300 | 3,300 | 3,300 | 3,300 | 3,300 |
| Russia | 2,508 | 3,000 | 3,000 | 3,000 | 3,000 |
| Niger | 2,020 | 2,020 | 2,020 | 2,020 | 3,129 |
| China | 1,700 | 1,700 | 1,700 | 1,700 | 1,700 |
| India | 600 | 600 | 600 | 600 | 600 |
| South Africa | 200 | 200 | 200 | 200 | 200 |
| Ukraine | 100 | 100 | 100 | 100 | 100 |
| USA | 75 | 183 | 359 | 1,827 | 1,876 |
| Pakistan | 45 | 45 | 45 | 45 | 45 |
| Brazil | 43 | 43 | 43 | 43 | 43 |
| Iran | 20 | 20 | 20 | 20 | 20 |
| Czech Republic | - | - | - | - | - |
| Romania | - | - | - | - | - |
| France | - | - | - | - | - |
| Germany | - | - | - | - | - |
| Malawi | - | - | - | - | - |
| Total Primary Supply | 49,355 | 56,186 | 59,723 | 68,046 | 74,105 |
| Total Secondary Supply (Recycling) | 8,000 | 8,000 | 8,000 | 8,000 | 8,000 |
| Total Secondary Supply (Inventory) | 14,100 | 10,000 | 8,000 | 6,000 | 4,000 |
| Total Supply | 71,455 | 74,186 | 76,569 | 82,046 | 86,105 |

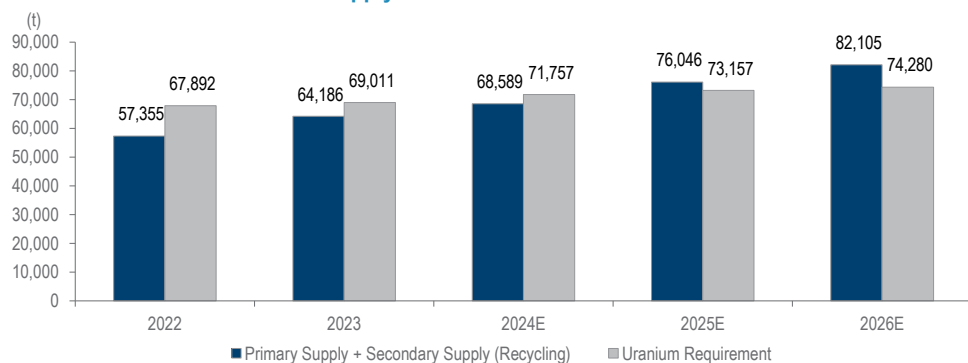
Source: World Nuclear Association, Companies, Daiwa estimates and forecasts

Yet, we still expect a primary uranium shortage, at least in 2024

A comparison of primary supply plus secondary supply (recycling) against uranium requirement makes the most sense, in our view. Investors may notice that in our maths, there are items that capture assumptions for uranium restocking and destocking, namely investment demand on the demand side and total secondary supply (inventory) on the supply side. To track the actual supply-demand balance from production activities, we recommend investors ignore the above and focus on primary supply and secondary supply (recycling) on the supply side, as well as uranium requirement on the demand side. We see a substantial shortage of uranium over 2022-24E, while the balance may resort to a surplus over 2025-26E depending on the progress of new supply ramp-up. We remind investors that we use guidance from producers directly to formulate our supply aggregates, which may be subject to future adjustments, due to the following.

- 1) Some players may not be able to ramp up production as scheduled.
- 2) Some players may announce new projects for production which are currently not included in our model.

Global: 2022-26E actual uranium supply-demand balance



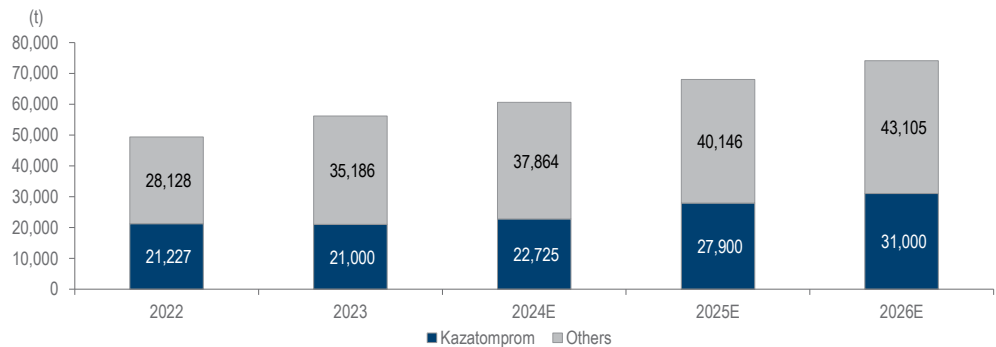
Source: World Nuclear Association, Companies, Daiwa estimates and forecasts

We see production downside risk for Kazatomprom in 2024

Production downside risk for Kazatomprom a key focus

Kazatomprom is the world's largest producer of natural uranium, providing c.40% of global primary uranium supply (on a 100% consolidated basis). On 29 September 2023, Kazatomprom announced its 2025 production plan with a 2025 production target of 30.5-31.5kt (see [Kazatomprom, 29 September 2023](#)). On 12 January 2024, Kazatomprom stated that downward adjustments to its 2024 production plans were expected due to challenges related to the availability of sulphuric acid as well as delays in completing construction works at the newly developed deposits, while its 2025 production plan may also be affected (see [Kazatomprom, 12 January 2024](#)). In our model, we assume capacity expansion plan for Kazatomprom will be delayed for 1 year, while the exact magnitude of delay can only be confirmed in Kazatomprom's 4Q23 trading update, which is expected to be released no later than 1 February 2024.

Global: 2022-26E primary uranium supply from Kazatomprom and others



Source: World Nuclear Association, Companies, Daiwa estimates and forecasts

We also see project execution risk for Cameco in 2024

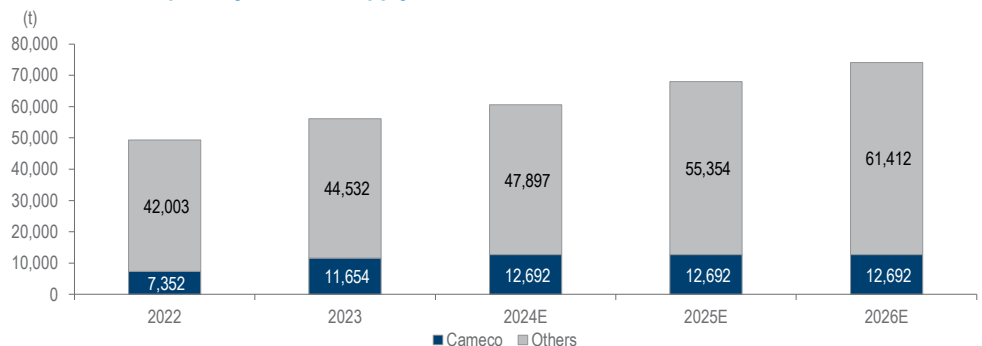
Production ramp-up for Cameco another key focus

Cameco is the world's second-largest producer of natural uranium, providing 15-20% of global primary uranium supply (on a 100% consolidated basis). Currently, it operates 2 mines in Canada called Cigar Lake and McArthur River. We recommend investors focus on 2 key areas for future Cameco updates:

1) Production guidance for its existing operations with Cameco cutting production guidance for both its 2 operating assets in September 2023 (see [Cameco, 3 September 2023](#)).

2) Updates on its idled assets including Rabbit Lake in Canada as well as Crow Butte and Smith Ranch-Highland in the US, especially in view of the resumption of operation for McClean Lake project co-owned by Orano Canada (77.5% stake) and Denison (DNN US; 22.5% stake) lately (see [Orano Canada, 24 January 2024](#)).

Global: 2022-26E primary uranium supply from Cameco and others



Source: World Nuclear Association, Companies, Daiwa estimates and forecasts

Investors should focus on Husab and Langer Heinrich updates for Namibia supply

Eye on Husab and Langer Heinrich for Namibia supply

We forecast Namibia supply to rise from 7.2kt in 2023 to 8.2kt in 2024E (+14% YoY), 8.4kt in 2025E (+2% YoY), and 9.5kt in 2026E (+13% YoY). Investors should focus on these 2 key mines in Namibia, namely:

- 1) **Husab** owned by CGN Group (Not Listed) with annual production upside towards >4ktpa (see [Investgo, 8 October 2023 \[Chinese-language content\]](#)).
- 2) **Langer Heinrich** owned by Paladin Energy (PDN AU) with production resumption in 2024E.

Meanwhile, we expect stable annual production of c.2.2ktpa for the Rössing mine owned by China National Uranium Corporation.

We highlight 4 key uranium mines in Australia

Four key players to monitor for supply from Australia

We forecast Australia supply to rise from 5.1kt in 2023 to 5.6kt in 2024E (+9% YoY) to 5.9kt in 2025E (+7% YoY). Under the “Three Mine Policy” that may still be informally in place, we recommend investors focus on the following.

- 1) **Olympic Dam** owned by BHP Group (BHP AU) which may see expansion in the future depending on copper and uranium prices.
- 2) **Four Mile** owned by non-listed Quasar Resources with limited information.
- 3) **Honeymoon** owned by Boss Energy (BOE AU) with production likely to resume in 2024.
- 4) **Mulga Rock** owned by Deep Yellow (DYL AU) which may become the 4th operating uranium mine in Australia later this decade.

Russian supply miss is likely already priced in

No.6 mine delay for Russian Rosatom likely priced in

We forecast Russia supply to stay at c.3ktpa over 2023-26E. Recently, Russian-based Rosatom made 2 key announcements:

- 1) **2023 production** with Rosatom announcing 2023 production over-fulfilment volume of 3% or 90t, which implies 2023 production level of c.3ktpa (see [TASS, 19 January 2024](#)).
 - 2) **No.6 mine delay** with Rosatom announcing the first production from No.6 mine in 2028, 2 years later than 2026 announced previously (see [Interfax, 20 January 2024](#)).
- Yet, we see both announcements likely being baked into the latest uranium pricing.

The military situation in Niger will continue to be a key supply risk over 2023-25E

Niger production uncertainty due to military situation

We forecast Niger supply to stay at c.2ktpa over 2023-25E before rising to 3.1kt in 2026E. Currently, there is only 1 operating mine in Niger which is 63.34%-owned by French-based Orano and 36.66%-owned by Niger government authority, with c.2ktpa production. In September 2023, Orano confirmed that its uranium treatment in Niger has been suspended due to international sanctions relating to military action (see [Orano, 13 September 2023](#) & [Bloomberg, 9 September 2023](#)). We have not seen an official update on the situation since (despite an industry source claiming that the suspension is still in place). In the case of Orano not being able to source Niger uranium in the near term, spot purchase demand from Orano may increase for the fulfilment of its operation. Another issue with Niger supply is the temporary halt of a mining licence (see [Bloomberg, 25 January 2024](#)) despite alternative sources denying this (see [Goviex Uranium, 26 January 2024](#)). The latest news regarding the exit of Niger (alongside Mali and Burkina Faso) from Ecowas also indicates Niger’s further decoupling from the West.

We see increasing number of suspended US operations planning for output resumption

US supply resumptions worth ongoing monitoring

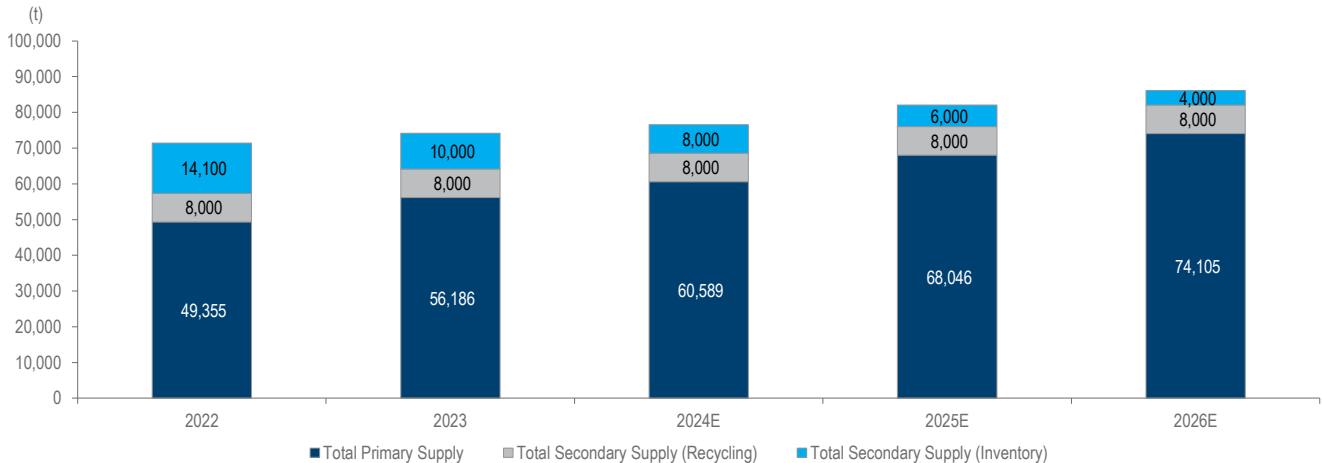
We forecast US supply to rise from 183t in 2023 to 359t in 2024E (+96% YoY), 1,827t in 2025E (+409% YoY) and 1,876t in 2026E (+3% YoY), after taking into account announced production targets from Energy Fuels (UUUU US), Uranium Energy Corp (UEC US) and Peninsula Energy (PEN AU). We do not rule out the possibility for some of these players to have production progress behind schedule eventually, while some other players may announce new production plans at the same time.

Secondary supply (inventory) a key swing factor

There are 2 major forms of secondary supply

According to the International Atomic Energy Agency (IAEA), secondary supply includes those “existing within the front end, mainly commercial inventories, government-owned uranic materials and international fuel banks” as well as those “derived from recycling”. In our model, we assume a stable annual secondary supply (recycling) of 8ktpa (while we heard from an industry source that the supply can be even higher at 10ktpa).

Global: 2022-26E uranium supply

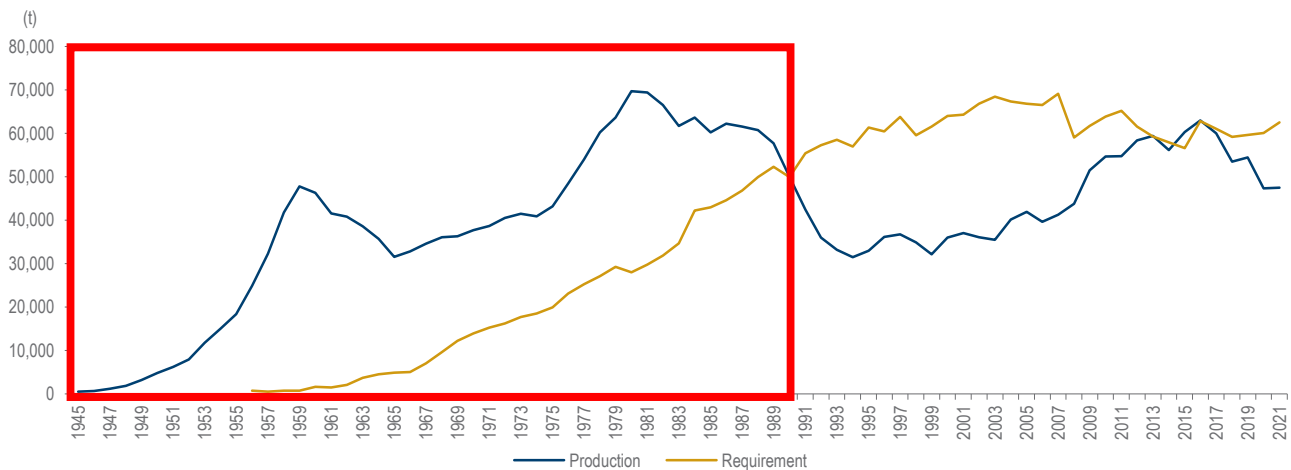


Source: World Nuclear Association, Companies, Daiwa estimates and forecasts

Uranium inventory release a key source of supply

Secondary supply (inventory) is produced in significant amounts due to the nuclear disarmament in 1990. Primary uranium production was substantially above uranium requirements for civil needs over 1945-90 (see the **red rectangle** below) due to military procurement of uranium. Due to the reduction of nuclear arsenals since 1990, the release of inventories has become an important source of secondary supply of uranium.

Global: 1945-2021 uranium production and requirement



Source: IAEA, OECD-NEA, Daiwa

Secondary supply (inventory) can be volatile

Secondary supply (inventory) is a key variable for the demand-supply picture, in our view. Secondary supply (inventory) is hard to predict as different players holding physical uranium stocks, including governments, utility companies, suppliers, brokers, traders, etc., all have different rationales. In our model, we assume a gradual decline in total secondary supply (inventory) from 14.1kt in 2022 to 10kt in 2023, to 8kt in 2024E, 6kt in 2025E, and 4kt in 2026E based on simple assumptions of:

1) The drying-up of marketable uranium inventory leading to a reduction in annual uranium supply from inventory.

2) Expectations of a long-term uranium shortage leading to sellers being less willing to sell uranium now.

That said, we also see the possibility of players releasing more inventories into the market when they anticipate that the uranium price will peak out soon, triggering a vicious price downward spiral. For investors' information, we also summarise end-December 2021 uranium inventory data by region below, extracted from "Global Inventories of Secondary Uranium Supplies" published by the IAEA recently (see [IAEA, 4 December 2023](#)).

Global: end-December 2021 uranium inventories

| (t) | Africa & Middle East | Eurasia | Europe | North America | South America | South & East Asia |
|-----------------------------------|----------------------|---------|--------|---------------|---------------|-------------------|
| Natural Uranium | - | 14,943 | 50,917 | 56,497 | 1278 | 200,679 |
| EUP/Enriched UO ₂ | 5 | 281 | 3,936 | 2,670 | 44 | 4,176 |
| UO ₂ (Fabricated Fuel) | 338 | 502 | 2,424 | 1,605 | 346 | 4,297 |

Source: IAEA

Conversion of investment demand into secondary supply

To recap on topics we touched on in previous sections:

- 1) On **page 9**, we recommended investors focus on primary supply and secondary supply (recycling) on the supply side, as well as the uranium requirement on the demand side to track the actual supply-demand balance from production activities.
- 2) On **page 8**, we dissected the role of investment funds in uranium price discovery via the investment demand channel.

There is a cycle between investment demand and secondary supply (inventory)

Investment funds may also be a source of secondary supply (inventory) in the future. The physical redemption of uranium from investment funds is under discussion. On 5 September 2023, SPUT issued a statement in which it said "the Trust is actively considering the introduction of a limited redemption feature on a not less than annual basis", which allows the trust to sell uranium back to certain parties including utility companies. So far, the latest version of SPUT's prospectus is still non-redeemable (see [SPUT, 3 January 2024](#)). Yet, we expect ongoing discussion in the market over the conversion of investment demand back into secondary supply (inventory), especially if more and more market players believe the purchasing activities by investment funds are creating distorting effects on uranium pricing. The situation of SPUT is specifically under the spotlight mainly because of its large physical uranium holdings as well as its transparency disclosure of purchasing activities and inventory data for investors to track. Investors can naturally think about the fact that other traders are also purchasing and selling uranium in the spot market, yet with less transparency disclosure compared with SPUT.

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| Rating | Percentage of total |
|---------|---------------------|
| Buy* | 75.59% |
| Hold** | 17.59% |
| Sell*** | 6.81% |

Source: Daiwa

Notes: data is for single-branded Daiwa research in Asia (ex Japan) and correct as of 31 December 2023.

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