URANIUM OUTLOOK

Ready for lift off at last

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Mining Journal

In association with: Sprott Uranium Participation Corporation

Editorial

Mining Journal staff

Group Managing Editor **Chris Cann**

E-mail: chris.cann@mining-journal.com

Editor of Mining Journal **Tom Hoskyns**

E-mail: tom.hoskyns@mining-journal.com

Editorial enquiries

Tel: +44 (0) 208 187 2330

E-mail: editorial@mining-journal.com

Design

Group digital & creative director **Abisola Obasanya**

Advertising

Sales Director **Nathan Wayne** **Tel:** +61 (08) 6263 9126

E-mail: nathan.wayne@aspermontmedia.com

Subscriptions and circulation enquiries

Sales director: **Roger Cooke**
Tel: +44 20 8187 2329 E-mail: roger.cooke@mining-journal.com
Senior global subscriptions manager: **Emily Roberts**
Tel: +61 (0) 432 245 404 Email: emily.roberts@mining-journal.com

For *Mining Journal* Subscriptions, please contact
Tel: +44 20 8187 2330 E-mail: subscriptions@mining-journal.com

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Chairman Andrew Kent
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Uranium juniors on their marks as prices start to move

After a decade in the doldrums, the uranium market is spluttering into life. Uranium stocks have seen significant gains in recent months, driven partly by the improving outlook for nuclear power – particularly in the US and Europe – and the expectation of a new buying cycle by power utilities for the yellow powder.

In the US, Joe Biden has stated that nuclear has a clear future within the nation's energy matrix, while European investors appear increasingly confident the EU will designate nuclear power as a green technology.

However, there is still a long way to go. Prices still need to double to reach the minimum incentive level of US$60/lb, but uranium explorers and producers believe recent increases in their stock prices could just be the start.

One company of the many poised to pounce as soon as prices rise is Boss Energy, an ASX-listed miner which put out an enhanced feasibility study for its Honeymoon uranium project in South Australia late June, which featured a 35% rise in its pre-tax NPV and paved the way for the project to move to the next stage.

The potential for big move in uranium has not escaped the attention of investment firm Sprott Asset Management, which has departed from its usual precious metals focus to take over the management of Uranium Participation Corporation (UPC) – the world's largest publicly traded investment vehicle – and re-launch it as the Sprott Physical Uranium Trust.

"Bringing in an experienced professional manager in the physical metals space will bring access to a broad base of investors launch a new physical uranium trust," said Cameco's CEO Tim Gitzel.

Bearing in mind the exciting opportunities in the space, Mining Journal has increased its coverage of the uranium sector in recent months, and this report contains a selection of the features which sparked particular attention among our readership over that time.

Please be aware, however, that the status of certain projects may have changed since the time of their original publication.

"Explorers and producers believe recent increases in their stock prices could just be the start."

Mining Journal, Tom Hoskyns

Alligator steps ahead with key uranium partnership

Australia-based Alligator Energy is taking a big league approach as it advances its flagship Samphire uranium project, just as nuclear power is being embraced as part of a zero-emissions future.

Alligator has its recently-expanded Samphire and the Big Lake uranium projects in South Australia, the high-grade Alligator Rivers Uranium Project (ARUP) in the Northern Territory and is keeping a sharp eye out for more uranium acquisitions, targeting certain jurisdictions in Africa, the US and Australia.

The company also has an asset attracting interest in Europe, the Piedmont nickel-cobalt-copper-gold-PGM project in Italy, where it's in discussions regarding a strategic partnership in line with the increasing focus in the region on energy-related minerals.

Importantly, in a strategic move designed to smooth its transition to becoming a uranium producer, the explorer recently formed a landmark partnership with global commodities trading group Traxys. It's an unusual step for an early-stage company but Alligator MD and CEO Greg Hall, who has a wealth of uranium mining and marketing experience, believes it's the right time.

Not only will Traxys bring its experience, of covering 15 million pounds of U3O8 annually, to provide marketing services for future uranium production, long-term offtake contracting and assist in acquisition opportunities, it will also provide up to US$15 million towards project development finance.

"That's very valuable in that it will assist in getting the rest of the finance," Hall said.

"They know the uranium and nuclear fuel business very, very well."

He puts the deal down to the prospectivity in Alligator's existing uranium assets, plus the experience within the company. Hall's previous roles include marketing manager for uranium marketing and sales for Rio Tinto Uranium, and mine manager at the Ranger uranium mine in the Northern Territory and Olympic Dam in South Australia.

He also founded Toro Energy and was at the helm when the company was granted approval for its Wiluna uranium project in Western Australia.

Fellow director Peter McIntyre was MD of Extract Resources during the discovery and pre-feasibility stage of the Husab uranium project in Namibia.

"Now we're combined with Traxys, Alligator has one of the most experienced uranium management, advisory and board teams on the ASX," Hall said.

"We have the experience in uranium development right from exploration through to production and marketing.

"We have the expertise to manage mines, develop mines, we've operated with governments, operated with community, and we now have a resource project on the books that we can help take forward, and we're looking for more."

The Samphire project has an existing 47Mlb inferred uranium resource across two deposits, Blackbush and Plumbush. Alligator acquired the project in October 2020 and recently expanded it, acquiring an exploration licence south of the Plumbush deposit.

Blackbush has quickly become the company's key focus, holding the bulk of the resources and containing a higher-grade core demonstrated through historical work and updated desk top studies to be amenable to in-situ recovery. A resource upgrade drilling campaign is set for the second half of 2021 and Alligator is aiming for a scoping study by year-end.

It's also establishing procedures with ANSTO, Australia's Nuclear Science and Technology Organisation, for updated uranium recovery test work.

"We think that will position us to make decisions around a big step up next year," Hall said. "Essentially starting the project approvals, undertaking feasibility, undertaking a field leach trial and undertaking the detailed environmental work there."

> "Now we're combined with Traxys, Alligator has one of the most experienced uranium management, advisory and board teams on the ASX."

The scoping study will consider open pit mining as well as in-situ recovery but Hall believes ISR will be the likely outcome.

"The in-situ recovery looks like the ideal form of extraction there because the uranium is in sand beds," he said.

"It's permeable, there's already been enough test work by the discovery company to show that ISR is amenable there

Reverse circulation drilling at Alligator Energy's Alligator Rivers Uranium Project in the NT with sampling being conducted by AGE personnel

and in terms of open pit, you've got to move a lot of waste rock to get down to the deposit so you've got a lot more environmental impact."

Another advantage of Samphire is its location in the pro-uranium jurisdiction of South Australia. The state has the Beverley-Four Mile uranium operation, the Olympic Dam mine and the previously mined Honeymoon uranium ISR project.

"They've got the skill sets in government and the environmental authority to manage the industry, and the community has familiarity," Hall said.

"We believe it really gives that level of comfort with the community knowing the industry is modern, it's innovative, it's managed well, it can be monitored easily, the government knows what it's doing and that's one of the reasons why South Australia is a very good jurisdiction."

Recently-completed geophysics at Samphire and Big Lake is helping define drill targets at both of Alligator's projects in South Australia.

At ARUP in the Northern Territory, Alligator has re-evaluated the geology of West Arnhem Land, and completed an agreement with traditional owners over the prospective Nabarlek North tenement package, which increases the company's exploration footprint by 80% and lies 11km from the former Nabarlek uranium mine.

"The positive market support for uranium is continuing, which reinforces our strategy of multi-project resource and exploration work, as well as a continued evaluation of further external uranium resource opportunities," Hall said.

He said there were many factors behind the uranium sector seeing a long-awaited resurgence, among them looming long-term contract renewals, nuclear energy's role in a low-carbon future, government support, improving technology and an emerging supply/demand imbalance.

"For the very first time, the Democrat government in the US under the Biden administration is saying they want nuclear to be part of the mix going forward - that's never occurred before," Hall said.

He also noted new-generation reactors were more advanced and did not require power to safely shut down if a major issue occurred, and some were being designed to load-share with renewable energy sources.

Traxys also sees uranium playing a key role in a zero emissions future.

"As the world increasingly recognises the importance of nuclear power as one of the potential solutions to global climate change, we believe the Traxys-Alligator combination will be well-positioned to capitalise on this opportunity," Traxys uranium MD Kevin Smith said.


Alligator Energy MD and CEO Greg Hall

Alligator is recruiting to assist with the busy period ahead, with the scoping study at Samphire just one of its near term goals.

"Alligator is developing a new project in Samphire, we have very prospective exploration areas for future uranium, and we also can add value to shareholders through our nickel-cobalt project in Europe, which is now attracting interest," Hall said. "We've got the right team, the right assets and we're looking for more."

Alligator – at a glance

Head Office
Suite 2, 128 Bowen Street, Spring Hill, QLD 4000

Tel: +61 7 3839 3904

Email: info@alligatorenergy.com.au

Web: www.alligatorenergy.com.au

Directors
Paul Dickson, Peter McIntyre, Andrew Vigar, Greg Hall

Shares on Issue
2.36 billion

Market CAP (at March 23, 2021)
A$104.2 million

Major Shareholders
BNP Paribas Nominees (IB AU Noms Retail Client) 7.94%; Directors 7.87%; BNP Paribas Nominees (Hub 24) 4.32%; Citicorp Nominees 2.54%; CS Fourth Nominees (HSBC) 2.11%

Looming decisions for uranium miners

Lotus Energy says it is ahead of the pack in the race to mine uranium. So does Boss Energy. So does Peninsula Energy. So, who is first?

In 2015, Bannerman Resources was painting itself as the leading candidate among new uranium producers to meet the upcoming needs of nuclear power utilities.

Bannerman executives were touting the possibility of a production start as early as 2019 at their Etango property in Namibia. Even with a modest market turn, the company's "development-ready uranium project with world-class scale" would proceed, they said.

As the anticipated improvement in uranium market conditions failed to materialise, Bannerman's optimism proved misplaced. More than that, as prolonged delays ensued, Bannerman lost its standing as the most likely first cab off the development rank.

Speaking to investors this week, the chief executive of Lotus Resources outlined plans for a production start within 12 months at the company's Kayelekera project in Malawi, bought from Paladin Energy in March 2020.

The newly acquired Lotus mine had produced 11 million lbs of uranium between 2009 and 2014 after Paladin had invested US$200 million.

Another US$50 million would be needed to get the mine running again with production cash costs of around US$33/lb of U_3O_8 and all-in costs of US$40/lb. Earlier in the month, the head of Boss Energy said he, too, could be up and running within 12 months.

In a narrative similar to that of Lotus, Duncan Craib foreshadowed all-in production costs of US$30/lb from a restart of the Honeymoon mine in South Australia, acquired through a takeover of Uranium One Australia in 2015.

The revamped mine would need a US$63 million funding commitment. Like the heads of other budding uranium producers, Craib expressed great confidence about the outlook. "Prices will go ballistic", he told investors.

Directors were so confident about the market prospects, they had begun buying physical uranium to guarantee supply for still unsigned future contracts.

Peninsula Energy boss Wayne Heili has told investors that his production start could come as little as six months after a decision to recommence production at its Lance property in Wyoming. Lance is another project with a prior history.

Since suspending production in 2019, Peninsula has continued to deliver against its long-term contracts, sourcing product on the open market.

Outstanding contracts for 5.5 million lbs of uranium product enable the company to generate cash flows expected to run at US$7-9 million over the coming two years from the sale of

450,000 lbs a year. Peninsula is using the production hiatus to convert its alkaline chemistry process to the low pH chemistry used by much of the industry outside the USA. Heili says he can get the company's costs down to US$41/lb at the existing design capacity, with the prospect of US$31/lb once the operational scale has been expanded.

Vimy Resources and Deep Yellow are among other ASX-listed uranium mining aspirants on the next line of starters, also setting themselves to take advantage of a near-term re-entry of utilities into the market.

A step or two further behind are the likes of Marenica Energy and Alligator Energy. Of course, the same profiles can be found among non-ASX companies. Market-constrained existing producers are also jostling for the attention of the nuclear power industry.

All the companies, at whatever stage of development, are telling investors that power utilities will have to start signing new contracts soon as the inventories on which they had been relying for supply reach critically low levels.

At the same time, companies are being coy about their tactics, telling investors that new contracts will not be signed until the expected market tightening propels uranium prices higher. Lotus would decline new contracts until prices are consistent with a successful project re-start, according to managing director Keith Bowes.

Understandably, no chief executive wants to lock in losses. That part of any contract decision making should be straightforward enough.

In what is shaping up as a tactical game of cat and mouse, company directors will eventually have to decide what they can accept and when they should do a deal. Lower cost producers should have an important advantage. Those with a $30/lb cost base should move first. Those sitting around $40/lb will have less leeway to deal early. Unfortunately, once the market has moved past the point of profitability, executives risk being trapped by their own optimism.

Having raised expectations that prices will exceed $70/lb before long, can company executives credibly lock in $50 or $60? Directors will risk a shareholder backlash if they move too early and other companies come up with better deals afterwards. That said, the quicker deals can be consummated, the faster positive cash flows can commence. The first companies to lock in new contracts will likely receive a strongly positive investor response. Financing and potential later expansions will become so much easier for the first movers.

On the other side of the negotiating table, utilities will be angling to lock in deals at the lowest possible prices, potentially looking for and getting cheaper rates from producers seeking to kick start production. Long term contracts add commercial certainty and warrant a premium equity price. They can also lock in embarrassing misjudgements about future market conditions.

Recognising the predicament, Craib said that he plans to put in place pricing mechanisms that protect the downside while locking in the upside.

Without an especially generous or naïve counterparty, such deals are never costless. Nimble commercial manoeuvring as the uranium market moves through the beginnings of the next cycle will be required.

**John Robertson is the chief investment strategist for PortfolioDirect, an Australia-based equity research and resource stock rating group. He has worked as a policy economist, business strategist and investment professional for nearly 30 years, after starting his career as a federal treasury economist in Canberra, Australia.*

Photo: iStockphoto.com

Australian uranium edges towards growth

Green shoots can be seen across the Australian uranium industry, but they risk wilting unless the price of the nuclear fuel moves higher.'

High hopes for a uranium revival in a country that ought to be one of the world's leading suppliers of the material given its rich geological endowment have seen a mini boom in the share prices of explorers with uranium interests.

But all of the players need a price above the current spot uranium market which remains bogged at around US$31 a pound despite predictions that uranium will play a key role in energy transition and the decarbonisation of the environment.

Long-term deals offer better terms but the problem for small players in a big-company business is that customers demand proof of future supply, the first of a series of hurdles that a potential miner of Australian uranium must clear.

Boss Energy, one of the potential leaders of the next generation of uranium miners, has taken an important step in demonstrating its capacity to satisfy the terms of long-term contracts through the acquisition of 1.25 million pounds of stockpiled uranium. Companies in other countries, especially Canada, have made similar moves which have been widely interpreted as speculative position taking ahead of a sustained rise in the uranium price.

But in the case of Boss, which plans to re-develop the historic Honeymoon mine in South Australia, it's a case of demonstrating uranium reserves to support long-term sales deals at a price higher than the spot market while production from the mine is restored.

Unlike most of its Australian rivals, Boss has all required government permits to re-start production at Honeymoon, an in-situ leach extraction business that last operated over a two-year campaign, which ended in 2013. The next step for Boss is to finalise an enhanced feasibility study which should lead to the signing of sales agreements and a clear pathway for the re-start of production at a rate of 2.45m/lbs a year.

The challenge for Boss is that while it has an attractive average life-of-mine all-in cost of $32.30/lb, management assumes a base-case uranium price of $50/lb over the life of the mine which is why it needs long-term sales contracts and a stockpile in hand to satisfy contracted buyers.

Boss has been one of the best supported of the next generation of Australian uranium miners successfully raising A$80 million in fresh capital over the past year to fund both work at Honeymoon and to build its "comfort" stockpile ahead of signing long-term contracts.

Over the past six months, Boss's share price has effectively tripled from A6c to 12-month high of A21c in early May before easing to A17c, a price which values the company at

A$380 million. While Boss is seen as the most likely first mover in the re-birth of Australian uranium, a sector dominated today by BHP at its Olympic Dam copper project (with uranium as a by-product), there is a group of U-hopefuls emerging.

But a deep look at the sector shows that there are few what might be called "pure Australian" uranium companies.

Some of the most popular players in the game are Australian in name only because their best assets are in Africa or Canada which is the case with 92 Energy, the first new uranium listing on the Australian stock market in decades. The A$7 million raised by 92 Energy will be spent on three exploration projects in the Athabasca Basin of Saskatchewan, not that a foreign address has stopped Australian investors from piling into the stock which floated in April at A20c a share, rose quickly to a peak last week of A38c before easing to A36c - a gain of 80% in two months.

The thinly populated list of what might called pure-Australian U-stocks, those with a listing on the ASX and with assets in Australia, include companies such as Vimy Resources and Toro Energy.

Vimy is working on the Mulga Rock and Alligator River projects in Western Australia and the Northern Territory respectively and while Vimy has strong connections to one of Australia's richest people, the iron ore billionaire, Andrew Forrest, it too needs a higher uranium price to make its projects work financially.

Shaw and Partners, an Australian stockbroking firm, said in a note to clients in early March that Mulga Rock, while one of Australia's biggest undeveloped uranium projects, required a spot uranium price of US$53/lb to go ahead.

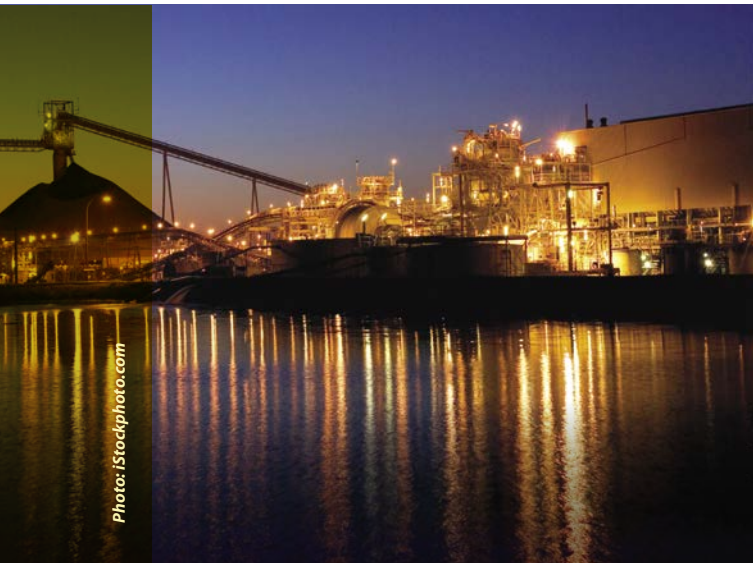
Photo: iStockphoto.com

Despite the price hurdle, Shaw believes Mulga Rock will start producing in 2026. On the market, Vimy shares have risen by more than 300% over the past 12 months, from 3c to last sales at 13c valuing the company at A$128 million.

Toro Energy is another example of a feature of the Australian uranium sector, a characteristic which might be called "everything old is new again".

Just as Boss is reworking the Honeymoon project discovered as far back as 1972 and Vimy is proposing the development of Mulga Rock (discovered in 1978) Toro is exploring the Wiluna uranium project for which it first received government environmental approvals in 2013.

The low uranium price of the past eight years consigned Wiluna to the pending file as Toro switched focus to gold exploration. But earlier this year there was a shift back to uranium which led to a capital raising of A$15 million, debt retirement, and a return to Wiluna. To put the Wiluna area of central Western Australia into perspective it is home to one of Australia's earliest uranium discoveries on a sheep station called Yeelirrie by Western Mining Corporation in 1971.

WMC eventually took its Yeelirrie discovery all the way to trial production of yellowcake (part processed metal) before a low uranium price, government intransigence and environmental protests stopped work on the project which was later sold. Africa, ironically, has produced more successful mid-tier Australian uranium miners than Australia, though the low price for the material has always been a problem.

Paladin Energy, which is working towards re-opening its flagship Langer Heinrich mine in Namibia, has enjoyed a significant share price bounce over the last 12-months, up more than 350% from A11c to A51c. Other Australian companies with advanced uranium projects in Africa include Lotus Resources plans to restart to Kayelekera mine in Malawi which is acquired from Paladin, and Bannerman Resources is working on the Etango project in Namibia.

Perhaps the best personal example of Australian miners in the African uranium industry is a move by Chris Salisbury, former head of Rio Tinto Iron Ore in Australia, to the chairman's role at Deep Yellow which owns the Tumas project in Namibia. Salisbury's shift, after being caught up in Rio Tinto's embarrassing Juukan Gorge iron ore misadventure, returns him to familiar territory having worked for Rio Tinto at its Rossing mine in Namibia up to 2013.

Australian uranium, which shone brightly in the 1950s, has been a graveyard for investors for the past 40 years. With a higher price for the metal there might be a sustainable revival if nuclear power is accepted as part of the energy transition to a zero-carbon world.

Fission poised for uranium upturn

Fission Uranium's Patterson Lake South project

Timing counts for a lot in the mining space and Ross McElroy, president and CEO of Fission Uranium, has seen the stars rapidly align in the months since he took the helm in September 2020.

As the uranium market positions for another up-cycle and money is flowing into the space, McElroy has steered Fission from an explorer to a development company, poised to advance the Triple R deposit at its Patterson Lake South (PLS) project in the southwestern Athabasca Basin in Canada. McElroy has built a team capable of permitting and building Triple R, including Mark Wittrup to head the regulatory and environmental permitting and Gary Haywood as VP project development.

Wittrup brings over 40 years of experience in the uranium sector and environmental and regulatory work, including playing a key role in the permitting process of Cameco's McArthur River mine across the other side of the Basin.

Haywood is a professional mining engineer with over 35 years' experience, including senior positions at underground uranium-mining operations with Cameco at its Eagle Point and McArthur River operations.

"My first goal after becoming CEO in September 2020 was to build a team that can take the project through the next phases of development and we have successfully done that. We have the core team in place, and we have the funds to deliver on the plan we've outlined," said McElroy.

Fission raised C$34.5 million via a bought deal financing in May. This brings the total raised in less than a year to almost $60 million, which means the company is funded for the next two years. These funds will allow it to advance through the feasibility study and the EIS.

"The market likes what we are doing. Our successful financings over the last eight months are a direct response to Fission becoming a developer, to our change of leadership and to the high-calibre development team we've built. The next raise will be for funds to build the project," said McElroy.

Fission is commencing the feasibility study field work beginning in June on its path to becoming one of world's lowest cost uranium producers. The 2019 pre-feasibility study stated a bottom quartile production cost of $7.18 per pound, a three-year construction time and 25% post-tax internal rate of return from a resource of 2.2 million tonnes grading 2.10% U3O8 for 102.4 million pounds and an inferred resource of 1.2Mt grading 1.22% for 32.8Mlb following an initial capital cost of C$1.2 billion. The construction start is pencilled in for 2026.

The near-surface location of the deposit, starting just 50m below the surface, means Fission could enjoy significant

technical and operating cost advantages over the established producers in the Basin, and therefore have a lower incentive price to trigger a construction decision. Cameco's Cigar Lake mine is at depths of more than 400m, for example, and its McArthur River deposit is 500-600m deep. The next tranche of work will focus on field data collection for the feasibility study, including pilot holes along the decline access to the orebody to understand the rock conditions this will be developed in, and geotechnical drilling to understand the ground characteristics to optimise the location of site infrastructure.

The goal is to complete the feasibility in 2022.

"Commencement the Feasibility Study is a major milestone for Fission, as well as for the emerging uranium district on the western side of the Basin and the local communities.

We also have several important advantages going into this important phase of development." said McElroy.

Shallow ore bodies tend to present lower technical risk than deeper orebodies. In addition, unlike many other existing uranium mines in the Athabasca Basin, Triple R has the advantage of being basement hosted rather than unconformity deposits, which can be tricky to develop.

"Basement rock is much more competent and stable rock compared with unconformity deposits," said McElroy.

The basic operational parameters are likely to remain the same as in the PFS, with a target production profile of up to 13 million pounds per year, although the feasibility work will seek ways to reduce the capital cost and make other enhancements, including expanding the deposits, infrastructure cost savings and potentially taking advantage of other developments on the horizon.

> "Sharing of major items could have a significant impact on reducing capex … by eliminating duplication."– Ross McElroy President and CEO

Recent work on the resource has included infill drilling to update inferred resources to indicated so that they can be classified as reserves in the feasibility study.

Drilling later this year will also include substantial expansion drilling as the company seeks to extend the current seven-year mine life.

"The bulk of the PFS resource is at the R780E zone and we drilled an additional 20 holes there this past winter, with the

Night drilling at Fission Uranium's Patterson Lake South

goal of moving inferred areas to indicated. But we also have three high-grade zones along trend not included in the current mine plan. The next prong is to drill at the largest of these, the R840W zone, in June with 25 holes to upgrade it from inferred to indicated.

"As this zone currently sits outside the PFS resource, we expect these holes will convert almost all the inferred resources to indicated, which would allow the zone to be brought into the feasibility. We are targeting getting the mine life up to 10 years and upwards," said McElroy.

With the transition to developer complete, the company has also increased its level of engagement with rights holders and stakeholders, recently signing an engagement and capacity agreement with the region's largest First Nations group, the Clearwater River Dene Nation.

"Our team has connections with the local community going back as far as 30 years in some cases. Successfully developing a mine is a collaborative process built on transparency and trust, which, done properly, helps to ensure that the community and the company both benefit from the end result," said McElroy.

A couple of other possibilities that could positively impact the development have the Fission team excited through their potential to generate efficiencies and save on capex.

"One of the unknowns is the possibility of having infrastructure synergies with neighbouring NexGen Energy, which has a development-stage project located just 3km from ours," said McElroy.

"There is the potential to share the development of roads, power and a mill. Sharing of major items could have a significant impact on reducing capex for both companies by eliminating duplication.

"Although in the feasibility we have to show ourselves as a viable standalone operation with economics that are not dependent on others, I think the local communities and First Nation groups, as well as the government, would prefer to see one mill and not two."

Fission expects to enter into the environmental-assessment phase this summer, with the submission of a project description and terms of reference.

Once the feasibility is completed, then the project will undergo the EIS process, expected to start in 2023, which is a two- to three-year process. That puts Fission on a path to potentially start building the mine in 2026 and producing ore three years later. There is also the possibility that, by this time, small modular reactors (SMRs) could be commercially available and provide a power alternative for Triple R rather than using LNG to generate power on site.

"This would be an incredible advance and would be a closing of the loop in terms of using nuclear power to produce uranium to provide fuel for producing nuclear power. Deposits in the Athabasca Basin are already extremely environmentally friendly because they are high grade and have a lot of uranium contained in a very small surface footprint," said McElroy.

Fission Uranium – at a glance

Head Office
700 – 1620 Dickson Avenue, Kelowna, British Columbia, Canada, V1Y 9Y2

Tel: +1 250 868 8140

Email: ir@fissionuranium.com

Web: www.fissionuranium.com

Directors
Darian Yip, Ross McElroy, William Marsh, Frank Estergaard, Rob Chang, Jun Zhou, Felix Wang

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C$412 million

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644,432,450

Uranium market starts to fizz

The North American uranium scene is fizzing with reactivation as the global move towards energy decarbonisation seems set to bring nuclear power generation in from the cold as a key option to replace coal as a source of baseload power.

Nuclear has spent much of the past decade as a pariah following a 2011 accident at the Fukushima nuclear reactor in Japan, but the push to reduce carbon dioxide emissions has seen coal and oil supplant nuclear as the energy bogeyman.

"There is a basket of good news," said Grant Isaac, senior vice president and chief financial officer with Canadian producer Cameco. We have the possibility of a readily durable demand story in nuclear. In the past, we really needed government and public policy to take the lead on nuclear, but governments are shy of public acceptance. The difference this time is net zero, which is driving electron accountability. Questions are being asked by the biggest companies in the world about where their electrons come from.

"The global invisible enemy we all have to worry about isn't radiation anymore; it's carbon loading," Isaac said during a webinar briefing.

Nuclear power provides 20% of electricity in the USA and the change in administration in the White House earlier this year typifies the shift in energy rhetoric.

The administration of president Joe Biden supports taxpayer subsidies to keep nuclear power plants from closing as a step towards the US electricity sector becoming emissions free by 2035.

"I spoke with energy secretary Jennifer Granholm last week and she is very supportive of nuclear power," said Energy Fuels president and CEO Mark Chalmers in May.

Production tax credits may be included in Biden's multi-trillion-dollar infrastructure and jobs stimulus package to subsidise the nation's 90 nuclear reactors in a similar way as wind and solar power plants have obtained tax rebates.

"[Federal authorities] are stepping in to help struggling reactors. If they let reactors retire early, it would offset all the gains made by wind and solar," said Isaac.

Ross McElvoy, president and CEO of Fission Uranium, told Mining Journal: "The results of [the US presidential] election were very favourable for the industry, which has had some effect on price. But it has a long way to go."

Fission is working to complete a feasibility study on its near surface Triple R project in the Athabasca Basin in Saskatchewan, Canada.

For Curtis Moore, VP marketing and corporate development at Energy Fuels, the logic is infallible. "There is a recognition that we will need to generate more electricity and nuclear is the best way to generate carbon free electricity. As nations around the world take climate change and carbon reduction more seriously, they can't deny nuclear is the best technology to do that," he told Mining Journal.

Amir Adnani, president and CEO at Uranium Energy, believes the US government has now advanced a clear clean energy mandate.

"US leadership in a clean energy mandate is so important as it means nuclear is welcome. There is a pivot taking place in attitudes towards nuclear power," he told Mining Journal.

"For first time in 48 years the government demonstrated bipartisan support for nuclear power. One of biggest themes in Washington and Ottawa is supply chain vulnerability." Cameco was very bullish during its March quarter conference call in May, despite its McArthur River/Key Lake and Cigar Lake operations being curtailed due to low prices and COVID-19 outbreaks, respectively.

"Globally, we see demand for both traditional and non-traditional uses of nuclear power growing as the increasing focus on electrification while phasing out carbon intensive sources of energy continues to take hold," said president and CEO, Tim Gitzel.

"In Europe, we have seen nuclear move another step closer to being included in the EU sustainable finance taxonomy following a rigorous scientific assessment that concluded there are no scientific arguments supporting its exclusion."

The outlook for uranium in the US was already looking sunnier under the Trump administration, albeit framed within a trade protectionism paradigm rather than climate change and decarbonisation (which it largely denied).

Russia and Kazakhstan are suppliers to the US, which some view as a vulnerability for both power generation and military aspects given US aircraft carriers and submarines are powered by nuclear reactors.

This rhetoric made an impact even though the US gets most of its uranium from North America, according to Energy Fuels, which says that since 2006, 85% of the US uranium supply has come from itself and Cameco.

The change in outlook for nuclear energy is not just in the USA. Gitzel said both Russia and China were developing new nuclear reactors and nuclear was coming back into vogue in Japan. This added to the bullish global context.

"The issue remains that, due to current oversupply and associated low market prices, very few participants are able or willing to begin investing to convert resources into reserves and ultimately into mines to keep the market in balance."

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The World Nuclear Association (WNA) says 54 new reactors are under construction around the world, 102 are planned, 325 proposed and 442 are in operation. In all, an estimated 160-180Mlb/y of uranium are required.

But,the WNA observes there has been underinvestment in uranium exploration and mine development with expenditures falling 69% from $2.12 billion in 2014 to $663.7 million in 2016. Its upper demand scenario sees a doubling of uranium requirements within 15 years with a compound annual growth rate of 3.4% at a time when several mines are expected to close before the end of the decade due to resource depletion.

"The issue remains that, due to current oversupply and associated low market prices, very few participants are able or willing to begin investing to convert resources into reserves and ultimately into mines to keep the market in balance," the WNA said in a report on global supply and demand scenarios between 2019 and 2040.

"There continues to be a lack of long-term fixed-price contracts, which are needed to underpin new projects controlled by market-based companies."

Strategic reserve

During the Trump administration, the uranium industry sought to obtain support for the domestic uranium industry through tariffs and quotas under a section 262 petition filed in 2018 by Ur-Energy and Energy Fuels Resources, which contended that imports pushed US uranium production to the brink of collapse.

They requested a quota requiring 25% of domestic uranium consumption to be met by US producers. Trump rejected this but backed the creation of a strategic uranium reserve.

"We made a good case to at least preserve a piece of the market for domestic producers," Energy Fuels' Curtis Moore told Mining Journal.

"Instead of implementing tariffs and quotas Trump created the inter-agency nuclear fuel working group to restore US leadership in nuclear fuel. The main takeaway was to create a strategic uranium reserve to supply utilities in the event of supply disruption."

The strategic reserve initiative was passed by Congress in December 2020 and signed by the president with $1.5 billion of funding to be appropriated over 10 years to buy uranium, with $75 million earmarked for 2021. Energy Fuels is looking to be one of the companies to benefit from this as the biggest uranium producer in the US.

"We are ready to expand production in Utah, Wyoming and Texas. We have a number of projects on standby, idled capacity that we can start quicker and at a lower cost than others," said Moore. Anfield Energy believes the reserve will benefit those companies able to bring production to market quickly.

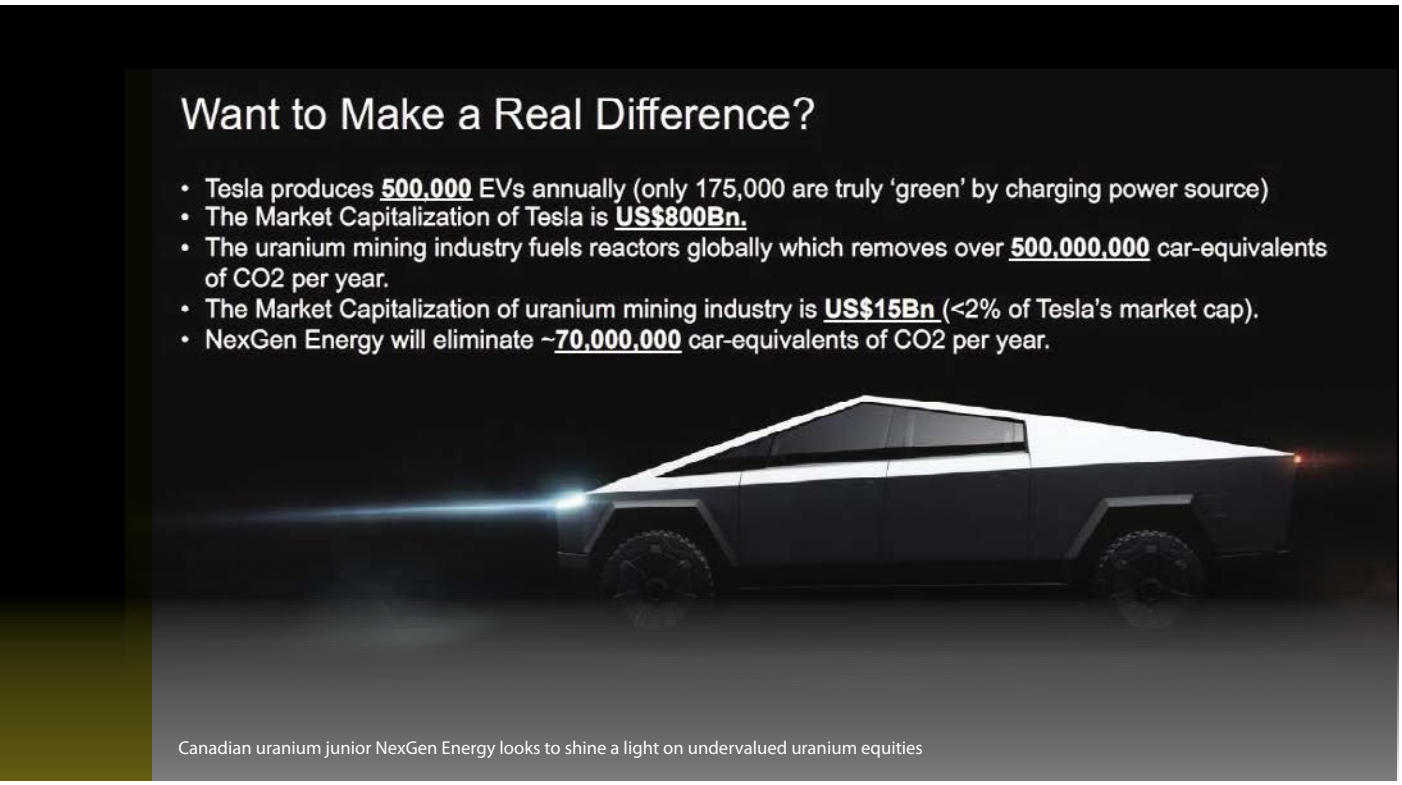
"The uranium reserve is a catalyst for us as only those projects with a realistic short-term path to production, like Anfield, will be considered for a long-term sales contract with the government," said Anfield CEO Corey Dias.

Anfield aims to bring its Charlie ISR [in-situ recovery] project in Wyoming into production within 24 months. Cameco's Isaac Grant believes a focus on the creation of an uranium reserve could be misplaced, however.

"The money allotted for uranium may be better spent keeping nuclear reactors alive. Once their demand is there, the [uranium] market will be shored up," he said.

Investors tend to agree.

"Make no mistake, nuclear is anticipated to be a shrinking industry in the US," said Adam Rodman, founder and chief investment officer at Segra Capital Management. Partner and portfolio manager at the firm, Arthur Hyde said utilities with reactors due to close were not thinking about uranium contracting.



Canadian uranium junior NexGen Energy looks to shine a light on undervalued uranium equities

"If they can extend the reactor life to 20 years, they suddenly have to think about contracting," Hyde said.

Incentive price

While the share prices of uranium companies have been rising as investors and management look forward to better days ahead, uranium prices are providing a reality check as they continue to languish around $30/lb, well below the incentive price many deem necessary to bring new production on stream.

Current pricing is about half what most industry participants believe the minimum incentive price is. Indeed, Cameco mothballed its McArthur River/Key Lake operation in Saskatchewan in July 2018, due to low pricing.

"Mining operations are not making money at the moment," said Fission's McElvoy.

"Activity in public markets is a leading indicator on where the price is going because the demand is certainly there and supply is going to continue to be constrained by low prices.

The spot price has increased but it has a long way to go to get meaningful production online."

The global average incentive price is given as $60/lb with regional variation such as $40-50/lb for projects in Canada's Athabasca Basin, $60-70/lb in the US and $80/lb in Africa. Low prices have seen companies mothball operations.

"For anyone in the free world who is not state-owned, the free-market incentive price we all need is north of $50/lb to turn on idled capacity [which applies to Cameco and Energy Fuels] and north of $60/lb to build new capacity," said Energy Fuels' Moore.

In its corporate presentation, Fission Uranium reports estimated operating costs for several mines in the Athabasca Basin ranging from $7.58/lb to $18.75/lb at McArthur River, where production is currently on hold.

The company estimates its Triple R project in the Athabasca Basin will have a bottom quartile production cost of $7.18/lb.

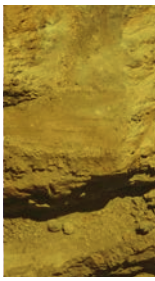
Thinning secondary market

Higher prices are expected to be just around the corner. With global uranium demand estimated at 160-180Mlb and production estimated at about 130Mlb, the secondary market has been filling the gap.

"We are in a surplus disposal market which is about who happens to show up with material in a given week.

Uranium tends to be incredibly range bound so US$31/lb is as rational as $25/lb," said Segra's Hyde.

> "At $30/lb, when big mines are shut, what supplier will commit to pricing at sub-incentive levels?"



Rodman said: "We haven't seen normalised run-rate demand from industry. 2020 was the lowest amount of contracted uranium in the post-Fukushima years. We haven't had the demand to test the price sensitivity of the market."

The uranium market has been weak since Fukushima and weakness has persisted due to doubts about how long the secondary market can fill the supply gap.

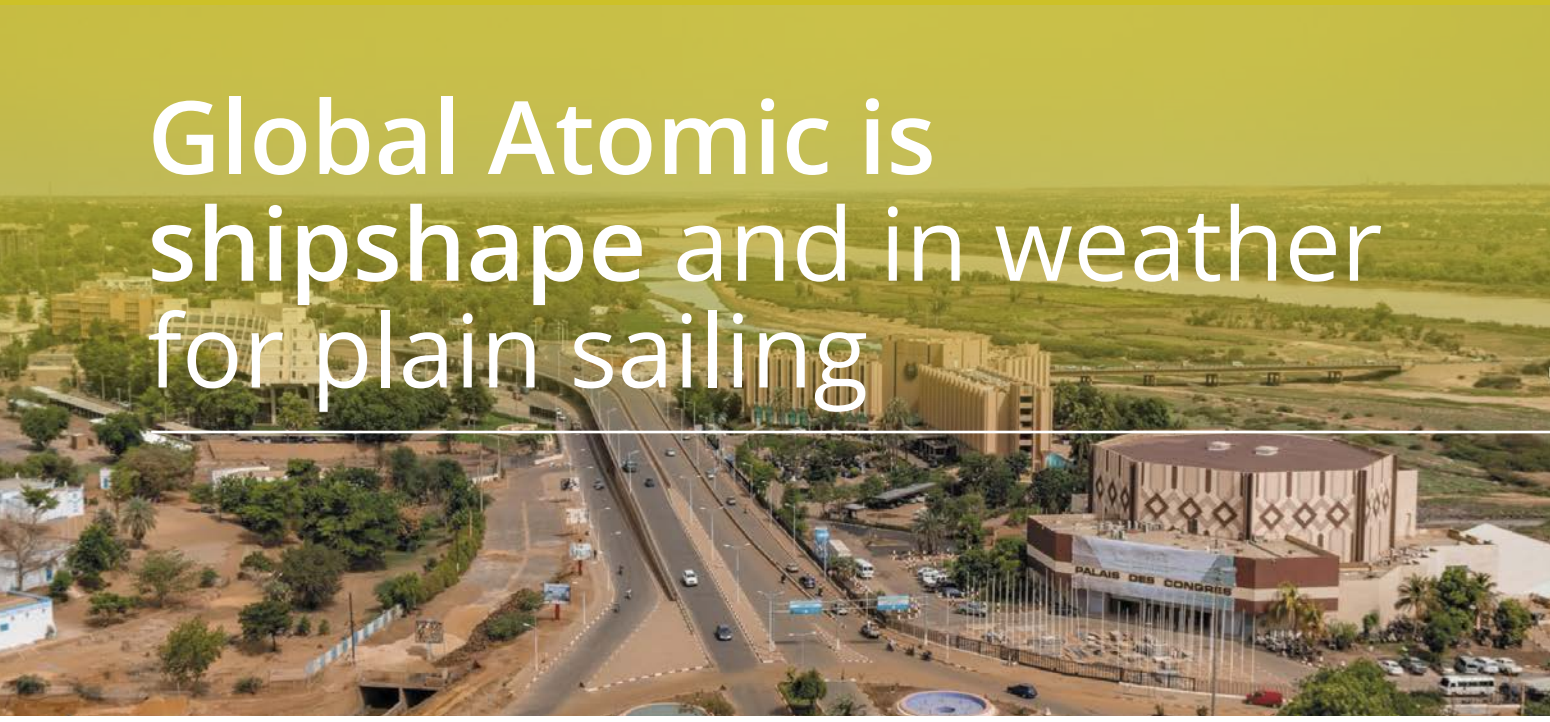
The question uranium companies are asking is how long inventories will last before utilities need to plunge back into the market?

"There is a big [supply] gap and it has been there for the several years. The size of inventories is the million-dollar question that no-one really knows the answer to," said Moore. Cameco said uncovered requirements of power utilities were increasing That is, the amount of their demand not covered by long-term contracts.

Photo: iStockphoto.com

Continued on page 26

Global Atomic is shipshape and in weather for plain sailing



TSX-listed Global Atomic's tier-one Dasa uranium project in Niger has been pushing ahead at a rate of knots in the past couple of years, while the company's share price has blasted some 1,100% to heights of more than $3/share – but the junior is showing no signs of slowing down.

And with as many – if not more – major milestones on the horizon as there are in its wake, investors hoping for a price pullback so they can jump onboard may be left waiting and wanting.

Boasting the largest and highest-grade uranium deposit in Africa, Global Atomic breezed the project through the permitting process in just three months – it had all necessary government approvals by January. Phase one is set to see Dasa producing 44 million pounds of U3O8 over 12 years.

"That's something really unheard of in places like Canada and Australia – where it can take 10, or 15, or 20 years, to get a mining permit for a new uranium project," CEO Stephen G Roman said.

Now Roman is steering Dasa towards production in 2024 just as, he says, dawn is breaking on a nuclear renaissance across the globe – as the electric revolution carves a new swath in the energy mix for yellow cake. It's also just as a drawdown on global uranium inventories is expected to begin to reveal a massive supply shortfall – and bring with it better prices.

Dasa's voyage to production is also happening at "what is basically a situation right at the right time," Roman says, with the Orano Cominak uranium mine closing down after almost 50 years of production – leaving behind a seasoned crew, infrastructure, and materials for Global Atomic to salvage.

Fortuitous tailwinds may certainly be welcomed and aid in Dasa's current progress – but this hasn't been a rushed, opportunistic, endeavour. Roman's is a safe and old hand in the uranium game.

Learning the ropes

The CEO's father, Stephen B Roman, founded the world's largest uranium deposit in the 1950s, started Denison Mines, and built Ontario, Canada's Elliot Lake – which was once known as the uranium capital of the world.

"I started going up there when the mine was being constructed and first went underground when I was five years old. By 19, I was working there as a miner, received my Ontario hard rock miners certificated, and ended up taking geology in school," Roman said.

Keeping an even keel

It's the company's robustness that helps it lead the fleet of uranium juniors with a market capitalisation of $406 million. And it's the resilience and prescient decision making shown during headwinds that has Global so prepared for the current climate.

For example, Dasa was first discovered just as the Fukushima nuclear disaster hit, and Global Atomic's other business, the Turkish Befesa Silvermet zinc operations, has been making money since 2009 thanks to some fancy footwork during the exploration funding drought of the 2008 financial crisis. Two pretty fierce headwinds for the businesses to be born into.

And, that robustness is displayed by the market conditions Dasa can weather while others sink.

"Everyone out there is using $50 or $60/lb to do their economics, but that's unrealistic with the uranium price around $30/lb – maybe a little bit more. So, we did our economics at $35/lb and the market really liked that because it was way more realistic," Roman said.

At that $35/lb price base case, Dasa's NPV8 is $210.7 million and IRR is 26.6%. And the economics improve significantly with higher prices.

> "We did our economics at $35/lb and the market really liked that because it was way more realistic"– Stephen G Roman CEO

A $40/lb price takes Dasa's NPV8 to $294 million and IRR of 32.6%; $45/lb sees NPV8 of $391 million, IRR of 39.7%; and $50/lb achieves NPV8 of $485 million and IRR of 46.3%.

"We can make money at current uranium prices, of course, and everybody thinks prices are going to be moving substantially higher over the coming years, so that's just going to benefit our shareholders tremendously," Roman said.

Buried treasure

"And with 250 million pounds in the ground – with a fully permitted project that's now completing feasibility study,

Global Atomic's Dasa uranium project

we're only trading at about a dollar a pound in the ground," Roman said.

"If you look at other peers – a lot are nowhere near as far along as we are, they're trading at $7 or $8 a pound in the ground. So even if we went up to $2 or $3 a pound in the ground, which is still a huge discount – you're looking at a doubling or tripling of our market cap.

"This is a very significant asset," he said.

Roman's numbers there are based on the Turkish operations having a market cap of $200 million – roughly half of Global Atomic's.

Tip of the iceberg

Some of those milestones appearing on the horizon for Dasa include offtake agreements, a feasibility study scheduled for September, as well as a drill programme starting that same month.

"We need to show the market that we've got 80% of the deposit that's not included in our economics. That's another upside on our stock. Once we move from indicated and inferred to measured and indicated and upgrade that resource we can put a feasibility around that.

"The NPV and IRR as currently shown are strictly for the Flank zone area," he said.

Seasoned crew

Dasa's stated capital expenditure and AISC of $203 million and $18.39/lb, respectively, also look conservative as they don't currently take into account the benefits that can be gained from Cominak's closure.

"I think it will have a significant impact because our PEA envisioned all contractors, and now I think we can source all of our people locally," Roman said.

"They're very skilled. They've been mining there now probably two or three generations, so we will inherit effectively a completely trained workforce. We use basically the same flowsheet as they did at Cominak, so everyone should be totally familiar with the process.

"And the government is 100% behind this because they need a new project that will employ a lot of these people," Roman said.

Galvanised engine room

While it's Dasa that's currently making waves among investors, the company's Turkish joint-venture operation has been a reliable engine room and continues to add significant value to the company.

Global Atomic CEO Stephen G Roman

In August 2019, Global Atomic expanded its Turkish zinc facility from 65,000 tonnes to 110,000 tonnes of electric arc furnace dust and improved zinc recovery rates from 80% to 90%.

"Our zinc operation is running very smoothly and zinc prices remain strong, so that new plant project we spent $26 million on will be paid out this year – that's less than a two-year payout.

"It's state of the art, very clean, and efficient," Roman said.

Global Atomic – at a glance

Head Office
8 King St E, Suite 1700, Toronto, ON M5C 1B5, Canada

Tel: +1 (416) 368-3949 or +1 (416) 203-8336

Email: info@globalatomiccorp.com

Web: www.globalatomiccorp.com

Directors
Stephen G Roman, chairman, president and CEO; George Flach, vice chairman, VP exploration; Richard Faucher, non-executive director; Derek Rance, non-executive director; Asier Zarraonandia Ayo, non-executive director; Trace Arlaud, non-executive director; Dean Chambers, non-executive director

Shares on Issue
161.93 million

Market CAP (at March 23, 2021)
C$464.736 million (at press time)

Major Shareholders
Stephen Roman, APAC, Arlington, Befesa Zinc SA, CQS, Global X ETF, Horizons ETF, Segra Capital, Sachem Cove, Tribeca Investments

Sprott's uranium ETF aims to provide liquidity

Uranium appears to be starting to emerge from a 10-year bear market and is about to be shaken-up by the arrival of Sprott Asset Management, one of the world's biggest physical commodity managers, which, in addition to bringing new demand and new capital inflows, looks set to bring greater transparency with a new physical uranium trust.

Sprott currently manages four different commodity stockpiling funds, with more than $12 billion in assets, including: the Sprott Physical Gold Trust (PHYS), one of the world's largest physical gold vehicles; and the Sprott Physical Silver Trust (PSLV), the fastest-growing silver bullion fund. These physical-metal strategies are listed on both the Toronto and New York stock exchanges and boast a global client base of more than 200,000 investors. Now, Sprott is creating the Sprott Physical Uranium Trust (SPUT), an entity that has agreed to a transaction with Uranium Participation Corporation (UPC), the world's first and largest publicly-traded physical uranium investment vehicle. UPC has a diverse shareholder base ranging from individual investors to institutions, hedge funds and family offices.

The company holds its uranium at licensed storage locations in Canada, the US and Europe, and at the end of May 2021 held 19.3 million pounds of U_3O_8 and other products with a net asset value of more than C$730 million.

"We were watching the multi-year bear market in uranium and felt something had to give, that the market needed to reset itself. A couple of years ago uranium producers couldn't make any money at US$20 per pound for U_3O_8, yet we saw the fundamentals looking very good for uranium," Sprott Asset Management CEO John Ciampaglia told Mining Journal.

"There is a growing narrative that nuclear power has to be part of the overall strategy to reduce greenhouse gas (GHG) emissions, while providing reliable baseload electricity to an increasingly electrified world. We see more and more governments committing to climate targets and acknowledge that solar and renewable alone won't help them meet those objectives."

Sprott's proposed transaction with UPC will reorganise UPC into an investment-fund listed on the Toronto Stock Exchange and includes a post-transaction requirement to pursue a listing on the New York Stock Exchange's ARCA exchange. If successful, the new Sprott Trust would be the first physical uranium fund listed in the US, which would provide access to an extremely large capital pool.

"Exchange-traded investment fund structures have become one of the most popular in the world, with over $5 trillion in assets" said Ciampaglia.

Sprott is working with WMC Energy as technical advisor to support management of the SPUT. WMC, which includes former employees from Canadian uranium producer Cameco, who will be a key source of advice as the market expects to enter a new cycle of long-term contracting by nuclear utilities. Industry commentators have suggested that Sprott's market participation has the potential to transform uranium from a sleepy commodity whose consumers dip into an opaque spot market to supplement their long-term contracts, to a more liquid, transparent and easily investable sector for investors who want exposure to a commodity expected to face increasing demand.

Recent months have seen uranium juniors raise funds to purchase physical uranium at low market prices for varied motives. Sprott's SPUT is expected to provide a more constant source of buying demand and, with its aim to provide daily reporting rather than the monthly reporting UPC maintained, it hopes to provide greater price transparency to the uranium market. Ciampaglia believes this step is necessary for U3O8 to become of greater interest to the investment community.

"We hope to enhance price discovery in the uranium market and this vehicle has the potential to act as a de-facto pricing reference for industry participants and investors. This is absolutely critical as a market will not develop and attract new participants unless the participants understand the marketplace and pricing," said Ciampaglia.

Ciampaglia is loathe to pronounce on what the impact the entrance of SPUT will have on uranium pricing, although he notes that it has increased about $2/lb since the company announced the UPC deal earlier this year, with the caveat that uranium companies have also been buying in the spot market. Sprott has successfully harnessed the at-the-market (ATM) financing mechanism in its other currently listed commodity ETFs as a cost effective way to raise capital to meet demand in marketplace in real time.

"We have been able to raise over $4 billion in our precious metals funds with ATM offerings over the past 18 months. I am not suggesting uranium is the same size market, but it illustrates the power of using ATM's when an investment theme comes into favour," said Ciampaglia.

"We find investors in precious metals are often interested in uranium and so we hope to similarly bring this new uranium trust to our global client base."

An ATM mechanism would allow SPUT to continuously raise funds without telegraphing a future uranium purchase, as has happened with some of the bought deal financings undertaken by uranium juniors.

"We think an ATM would be a cost effective way to raise capital on a smaller, yet more frequent basis. This isn't about us buying all the material and crowding out the market, but having a more liquid vehicle that fosters a more active spot market to provide fresher pricing to the marketplace," said Ciampaglia.

Sprott actively and continuously markets its physical commodities ETFs, which is likely to generate a continual level of demand for uranium, which may result in the price nudging up. With 200,000 active investors in its products, the market knows what it will be getting with a Sprott vehicle and a certain level of trust in how its investments will be managed.

"We undertake a steady cadence of marketing. We market all the time in both bull and bear markets, constantly producing content and educating the marketplace. We stay focused and engaged with our investor base," said Ciampaglia.

Important information and disclosures about the Sprott Physical Uranium Trust and Sprott Physical Bullion Trusts can be found at www.Sprott.com

Sprott – at a glance

Contact
Glen Williams, Investor and Institutional Client Relations;
Royal Bank Plaza, South Tower, 200 Bay Street, Suite 2600,
Toronto, Ontario M5J 2J1, Canada

Tel: +1 416 943 4394

Email: gwilliams@sprott.com

Web: www.sprott.com

Skyharbour ready to capitalise on uranium upturn

Uranium exploration and mining suffered during the long bear-market years since 2011, and in typical contrarian style, Skyharbour Resources took advantage of that to piece together a portfolio of six assets totalling 240,000 hectares in Canada's Athabasca Basin in Saskatchewan.

The company hopes these assets will increasingly generate value for its shareholders as the market heats up.

Skyhabour has successfully deployed a prospect generator model under which it has farmed out three assets to earn-in partners, while focusing its own exploration efforts on its flagship Maverick target on the 100%-owned Moore Lake property.

"We started acquiring projects during the early years of the rout following Fukushima.

"The sentiment at the time was at all-time lows and we set out to build a project portfolio for pennies on the dollar," president and CEO Jordan Trimble told Mining Journal.

Its portfolio cost just over C$5 million to assemble, with most of that being in share payments rather than cash, before doing a landmark deal with uranium developer Denison Mines to bring in Moore Lake. This transaction had elements of completing a circle, given the previous history with the asset by head geologist Richard (Rick) Kusmirski.

Kusmirski was an Exploration Manager at producer Cameco for many years and subsequently ran an exploration junior called JNR Resources.

JNR discovered the high-grade Maverick Zone at Moore Lake, advanced the project through drilling and went on to sell it to Denison Mines.

Denison's focus on the development of its flagship Wheeler River project gave Kusmirski and the team that made the initial discovery the opportunity to reconnect with the asset and bring it into Skyharbour to continue advancing it.

The Moore Lake Project is on the east side of the basin, near roads and power infrastructure, and is just 15km east of Denison's Wheeler River project. As a result of the transaction, Denison became Skyharbour's largest shareholder and it now owns a 7-8% interest in the company.

Denison's president and CEO, David Cates, is also a director of Skyharbour and so the larger company is keeping an eye on how the project develops.

"We believe there is the geological potential at Moore to host larger uranium deposits, and we are using new

exploration techniques and methodologies to find these deposits, as well as looking in the relatively untested basement rocks," said Trimble.

"Ultimately our end game is to build the company up and sell it while the uranium price continues to increase, as there has been underinvestment in the sector for an extended period of time and mining companies will need to replenish their resources and resources."

The Maverick corridor at the Moore Lake project extends over 4.7km, of which just over half has been systematically drilled. At Maverick, Skyharbour recently started a 3,500m drilling programme, which was just expanded to 5,000 metres after encountering encouraging mineralization so far.

The programme is focused on testing basement hosted targets and looking for new zones to expand the known high-grade zone at Maverick and Maverick East Zone, possibly leading to a maiden resource estimate in early 2022.

The company drilled 2,560m in seven holes in 2020, with highlights including 17.5m grading 0.72% U3O8.

"Our focus is on expanding known zones of mineralisation as well as making new discoveries around these existing zones, and as well as at new targets elsewhere on the project," said Trimble.

> "Ultimately our end game is to build the company up and sell it while the uranium price continues to increase." – Jordan Trimble CEO

The focus for this drill programme is on basement hosted targets. Typically, the highest grade uranium mineralisation is hosted in these underlying feeder zones, and more recent major discoveries like those made by Nexgen and Fission are basement-hosted deposits.

Although they do not have big alteration halos such as sandstone-hosted deposits tend to have, Skyharbour has been using more modern techniques and geophysical

Skyhabour's Moore Lake project exploration camp

surveys to target them, thereby increasing the chances of discovery success.

Furthermore, two new mining methods are being proposed to bring existing Athabasca Basin deposits into production: ISR (In Situ Recovery) and SABRE (Surface Access Borehole Resource Extraction).

Both of these mining methods have the potential to bring mining costs down, decrease timelines to production, and offer more environmentally favourable extraction methods without having to build conventional mines.

In addition to offering high-grade discovery potential at its Moore Lake project, Skyharbour employs the prospect generator model, meaning the company does not have all its eggs in one basket.

Skyharbour has exposure to the exploration success of others through ownership stakes it retains in the projects it has farmed out, in addition to the equity holdings it has acquired through its deal making.

Skyharbour has struck deals with three other companies so far. Industry-leader and France's largest uranium mining company, Orano, has earned a 51% interest in the Preston Project in the western part of the Athabasca Basin, having spent $4.8 million on the project. Skyharbour also owns 15% of the adjacent East Preston project, where Azincourt Energy has contributed $3.5 million in cash and exploration expenditures to earn a 70% interest. The third deal could soon bear fruit as new partner Valor Resources undertakes geophysics and field work to define drilling targets for later in the year at Skyharbour's Hook Lake Project, where a previous surface grab sample returned 68% U3O8.

"If they can find the source for this high-grade mineralisation, it will likely be a major discovery," said Trimble.

Valor can earn an 80% interest by contributing just under $4 million in exploration and cash over a three-year period and having issued over 233 million shares to Skyharbour.

"The farm-out process allows us to hand the reins over and bring in new sets of eyeballs to the projects, with partner companies funding the exploration at them.

We maintain exposure to potential new discoveries and value creation events without having to continuously dilute our shareholders to raise money for these exploration programmes. Our minority project interests can be worth a lot of money as the targets are typically high-grade and high-value deposits," said Trimble.

Finally, worth noting is that in the previous uranium bull market of 2006/07, the market capitalisation of JNR Resources, a company that held some of the same assets

Skyharbour has now, reached over $300 million, so a new discovery at these projects in a rising uranium market could have a profoundly positive impact on the company's valuation.

Skyharbour – at a glance

Head Office
777 Dunsmuir Street - Suite 1610, Vancouver, BC, Canada, V7Y 1K4

Tel: +1 604 558 5947

Email: info@skyharbourltd.com

Web: www.skyharbourltd.com

Directors
Jordan Trimble, Rick Kusmirski, James Pettit, David Cates, Joseph Gallucci, Donald Huston, Amanda Chow

Shares on Issue
118 million

Market CAP (at April 29, 2021/A24c)
C$53 million (July 23)

Major Shareholders
Management, insider and close business associates, 15%; Denison Mines Ltd, 7%; North Shore Global Uranium Mining ETF, 4%; Extract Capital; Sachem Cover Partners

Continued from page 17

The company said 1.4Blb needs to be procured between 2021 and 2035 and by 2035 the annual outlook for uncovered requirements was forecast to be 166Mlb.

"I have optimism for the future," said Gitzel.

"Demand is becoming more certain due to the electrification mega-trend while the uranium supply is becoming less certain due to a lack of investment, shrinking secondary supply and trade policy issues.

"Demand for uranium is rising at the same time that supply is becoming less certain. Utilities are not replacing under long term contracts what they consume annually."

Fission's McElvoy agrees. "Stockpiles are very limited so eventually we will see more pressure to get primary supply back online," he said.

"Demand is probably 65-70% met by primary supply and 30% by secondary supply [inventories].

Fukushima disrupted the overall system and the contract basis for how utilities buy uranium fell out of kilter. They are working on historical contracts and not forming new ones.

That is starting to change and there are pressures around the corner for a significant increase in the price of uranium."

Adnani also sees inventories shrinking and believes the Fukushima market disruption was compounded more recently by the potential for trade remedies under Trump.

"We definitely consume more uranium than we mine and inventories are not enough to meet demand," he said.

"We are looking at a 330Mlb deficit towards the end of the decade as you cannot build new mines at the flick of a switch. The section 232 process began within a year of the Trump presidency and the balance of his term was about whether the US would introduce trade sanctions or quotas.

"The US represents 25% of global demand and so this created uncertainty and kept utilities at bay from developing long-term contracts."

Nuclear power utilities tend to buy uranium on long-term contracts of around 10 years duration.

With inventories tightening, uranium juniors anticipate the moment when utilities enter the market again and create a demand surge.

"At $30/lb, when big mines are shut, what supplier will commit to pricing at sub-incentive levels?"

"The uranium market has a sufficient supply deficit that we are close to the beginning of a new contracting cycle which will start to drive the price higher," said Adnani. "At $30/lb, when big mines are shut, what supplier will commit to pricing at sub-incentive levels? When buyers start looking for higher volumes they will drive prices and commit to prices which allow miners to get the returns that meet their objectives."

Canadian uranium junior NexGen Energy looks to shine a light on undervalued uranium equities

Isaac at Cameco believes the delay is because utilities don't see the supply situation as critical yet.

"There is a critical mass of utilities who still don't see the urgency because they get several responses when they seek material," he said.

"Utilities, as fuel buyers, are on the wrong side of the trade and they are willing to take the bet that supply will front-run demand. They can take that bet because there is zero consequence if they are wrong. If they are wrong, they buy under a security of supply mandate. In the 2000s, this meant they ended up buying uranium at $50/lb rather than in the teens."

While the market price languishes under incentive levels, investment in new capacity is not happening, and could lag any eventual price rise to incentive levels. Large investments and long-lead times have induced investment caution under the banner of capital discipline in other mining markets forecasting supply shortfalls and uranium may prove to be no different. The $60/lb incentive price may be a notional value that does not stimulate new investment.

Copper producers, for example, talk of a $3.50/lb incentive price to stimulate new development or merger activity yet the market has sailed about 35% past that and producers are still sitting on their hands. Will the uranium spot price have to spike to $100/lb before new capacity is built? This last happened in 2007 and brought the long-term uranium price to $95/lb for several months in 2007-2008. Canadian companies with projects in the Athabasca Basin believe they are well-positioned to benefit from future price increases due to their higher grade and production cost advantage over projects to the south.

"The US cannot ramp-up to meet anything like what they consume annually which is where countries such as Canada with huge uranium resources come into play. Canada is a favoured trading nation for the US with greater quantities of uranium and operations able to make a profit at lower cost," said Fission's McElvoy.

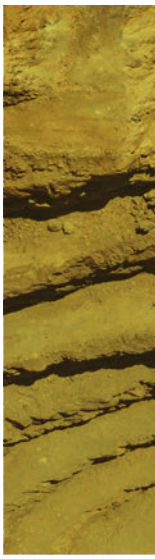
Uranium companies become buyers

Facing the prospect of prices having to double to reach the minimum incentive price to invest in new capacity, some uranium companies are benefiting from current prices and the expected future price run-up by buying uranium.

Uranium Energy initiated a physical uranium programme buying 2.1Mlb at $30/lb to add flexibility to its intention to eventually restart production in the US, where it stopped production in 2013.

"We recognised 15 years ago the shortage of US supply and focused on acquiring and developing US-based uranium projects. If it weren't for Fukushima we would be on our way as a growing producer," said Adnani. "With those setbacks we put production on hold and committed to growing our resource and asset base to be ahead of the curve in Texas and Wyoming when the market comes back.

"There is a disconnect in the market with very limited downside and significant upside. They can use that uranium as collateral when they go to finance their projects."



"We have acquired uranium and are storing it which has created a pure play US uranium platform with permitted projects and warehoused uranium which can be utilised for marketing to US utilities and generating cash flow." Investors see this as a positive albeit unprecedented development.

"It is a good investment for juniors," said Sachem Cover Partners chief investment officer, Michael Alkin. "There is a disconnect in the market with very limited downside and significant upside. They can use that uranium as collateral when they go to finance their projects."

Segra's Rodman agrees. "We are thrilled to have juniors use uranium as a cash alternative on their balance sheets with uranium at below the incentive price," he said.

Cameco has a different view and has voiced some concerns about juniors buying uranium during its March quarter results conference call. The company has bought uranium in the spot market to meet its contractual requirements following unforeseen production curtailments at its Cigar Lake operation due to COVID-19.

"I can understand how advanced exploration companies took advantage of financings and were willing to buy forward, which took pressure off the spot curve," Gitzel said. "If [their buying] had of been focused on the front end it would have proved how thin the spot market is. Their buying supports the forward price of uranium as there won't be material coming in that doesn't have a home and

so it creates a stronger floor in the future. But will those pounds come back into the market? That is a worry. It would be disappointing if [their purchases] simply came back into the market. They should dispose to an end user where it is never going to come back rather than to a trader who is just going to churn it."

Cameco is looking to maximise its exposure to a new price cycle and changed its sales model. In April, it added contracts for 9Mlb to its portfolio, pursuing a strategy with a 60:40 split between long-term contracts and short-term price exposure. As the uranium market positions for another up-cycle money is flowing into the uranium space, with market observers commenting that more than C$1 billion has been raised so far in 2021.

"The market can go through fairly significant price transitions fairly rapidly so it is important to have exposure to the movements where you see a rapid transition in the price," said Isaac. "The price is insufficient at the moment so we are not anxious to lock in today's price [in long-term contracts]. The price mechanism is central right now, to get the pricing mechanism right to get exposure to an improving market."

As the uranium market positions for another up-cycle money is flowing into the uranium space, with market observers commenting that more than C$1 billion has been raised so far in 2021. Fission Uranium announced a C$30 million bought deal financing in May to fund the further development of its Triple R deposit in Saskatchewan and repay a credit facility. Fission aims to embark on a feasibility study this year on its Triple R project, with a view to commencing production of 13Mlb/y at the end of the decade. "There is a great increase in the sentiment in the sector which is allowing us to go forward," said McElvoy.

Other recent raises include Denison Mines raising US$86.3 million to buy up to 2.5Mlb of uranium, Nexgen Energy raised C$150 million to advance its Rook I project in the Athabasca Basin, enCore Energy raised C$15 million to refurbish its Rosita plant in Texas, and Uranium Energy raised C$12 million. Denison Mines made a hostile bid to acquire the 10% of its Wheeler River project it doesn't own for C$41 million via the purchase of JCU from Overseas Uranium Resources Development. JCU holds interests in early-stage uranium assets in the Athabasca Basin including Wheeler River and a 31% interest in Cameco's Millennium project. Dennison tabled a bid after UEX offered C$12.5 million in April.

Photo: Unsplash.com

Market evolution

Uranium has also drawn interest from one of the most important financial firms in the precious metals space, Sprott. The Sprott group owns one of the most important physical gold exchange traded funds, provides debt financing and equity investments. Now, Sprott Asset Management has created the Sprott Physical Uranium Trust, an entity which is taking over Uranium Participation Corporation (UPC), the world's largest publicly traded investment vehicle providing investors exposure to physical uranium. At the end of March, UPC held 16.3Mlb U_3O_8 and other products with a market value of about C$665 million.

"Sprott taking over UPC management has tremendous potential upside. Bringing in an experienced professional manager in the physical metals space will bring access to a broad base of investors," said Cameco's Gitzel.

Isaac said: "Very active management from a fund could result in a situation where the spot market isn't five traders offering with one person with a bid to buy. We could see some balance which would create transparency in the spot price and remove the ability of intermediaries to move the market without making a transaction."

Investors see the entrance of Sprott as heralding a new age of price transparency, while the deployment of investment capital will put the cat among the utility pigeons.

"Sprott coming in means there is an actor with a view on daily price discovery," said Sachem's Alkin. "The utilities don't have a birthright to pounds of uranium anymore and you have competition for pounds."

Segra Capital's Rodman foresees large amounts of capital potentially entering the physical market.

"Sprott is taking over UPC and converting it into to a unit trust structure dual-listed in Canada and the US," he said.

"It will be the only game in town so how much capital will flow into it? There is enough institutional capital that has done the basic algebra to say that uranium prices won't stay here for the next several years, and now it has a direct market vehicle. This is an evolution in physical uranium purchasing and price discovery as it will buy uranium every time people invest in the trust."

Argentina: The future of Uranium

The uranium industry has definitely been on a rollercoaster ride for the past 20 years, but sentiment continues to rise as the role of nuclear power gains momentum in today's climate.

While Australia, Kazakhstan and Canada have led the way for production in recent years, Blue Sky Uranium believes they hold the key to the future of uranium in the Americas: Argentina.

The TSX Venture, FSE and OTC-listed Blue Sky Uranium Corp has staked its claim on Argentina's nuclear ambitions, with 100% control of more than 450,000 hectares of mining tenures, after discovering a 145-kilometre uranium trend more than 15 years ago.

The Amarillo Grande Uranium-Vanadium project in the central Rio Negro province includes the country's largest NI 43-101 resource estimate for uranium, as well as a significant vanadium credit.

Blue Sky's President and CEO Nikolaos Cacos said the company is already drilling two of its targets within the deposit while awaiting permitting for an additional two but expects many more to follow.

"There are targets still within this entire trend," Mr Cacos said. "We've examined this trend over the past 15 years and this has got potential to be like what we see in Kazakhstan."

"It's simply a matter of time and money."

The Amarillo Grande project is located in the Patagonia region of southern Argentina, in the central Rio Negro province, and includes the Ivana deposit which is open for exploration.

This area was initially discovered with the assistance of local geologist Dr Jorge Berizzo who believed there was uranium in Argentina. Using his extensive experience and knowledge, Dr Berizzo travelled the country with a scintillometer strapped to the car.

With the properties all road accessible from nearby provincial centres such as Viedma or Neuquen, further exploration of the deposit could be a game changer for the entire uranium industry.

"This is not just another uranium deposit discovery, this has got the potential of discovering a new Kazakhstan so to speak," Mr Cacos said, adding that currently there are limited opportunities for uranium exploration.

"The company is right now at a real inflection point as we start to make more uranium discoveries, and we are going to see the valuation of the company change substantially".

"I'm very privileged to be in this position of leading such an exceptional team of various talents, as well as bringing the

company to this point," Mr Cacos said. " From the guy driving with a scintillometer on nothing but a gravel road, to where we've uncovered a tremendous value that's been buried under there, this is not just going to benefit the shareholders of Blue Sky Uranium it's also going to benefit all the citizens of Argentina."

With an emphasis on sustainability and environmental awareness, Mr Cacos believes there is great potential within Amarillo Grande to produce Argentina's first low-cost, near-term uranium with additional potential vanadium credits.

This coincides with the recent shift in public perception towards nuclear energy. 10 years on from the Fukushima incident in Japan, nuclear power is yet again being recognised as a reliable and low-cost source of power generation with low emissions.

"Today's reactors are built different and protocols are much safer," Mr Cacos said. "Driving this change is the climate change agenda. It's the main new driver that wasn't there 20 years ago".

The company has already established just under 23 million pounds of uranium and 11.5 million pounds of vanadium at the Ivana deposit, but Mr Cacos said the company has the potential of doubling or even tripling those numbers.

> "What our preliminary economic assessment (PEA) envisioned was to have a portable plant built, and then we can truck in ore from all these different sites."

"What our preliminary economic assessment (PEA) envisioned was to have a portable plant built, and then we can truck in ore from all these different sites," Mr Cacos said.

"Then we would decide whether we use some of the profits to see if we can expand into production, or maybe we invite

Amarillo Grande Project

other partners," he said, adding that "these are decisions to be made in the future, set against circumstances that exist at that time".

While the market remains competitive, the number of exploration companies have dwindled in recent years as public perception and interest in nuclear power has waned and waxed over the past 20 years.

The renewed interest in nuclear power generation amid dwindling supply has had a bullish impact on the price of uranium, as well as the prospect of securing supply from a small number of producers.

For a country like Argentina, Mr Cacos said, security of supply is more important than the cost of the product itself, which is why the desire to move the Amarillo Grande project into production is so important.

With three nuclear reactors, Argentina would benefit greatly from local uranium production, reducing the risk of buying and importing from other countries such as Kazakhstan and Australia.

"Production in Argentina will be a game changer, not just for Argentina but the whole southern hemisphere and the United States," Mr Cacos said, adding that he is looking forward to seeing Amarillo Grande move to production.

"It has the ability to move fairly quickly, and as Argentina is a nuclear country all the regulatory framework is already there," he said.

"We have the support of both the federal government of Argentina, and the provincial government which owns a crown corporation called INVAP that manufactures and exports small modular reactors".

The Argentine Federal Government has been public in its support for the development of domestic uranium supply which would enable the country to expand its nuclear energy capacity and create new opportunities for the country on the global uranium market.

According to data from the World Nuclear Association, more than 53,000 tonnes of uranium was produced in 2019 alone with Kazakhstan, Canada, and Australia accounting for nearly 70% of world production.

While Argentina may be a small player on the global field, this could change when the Amarillo Grande project moves into production.

It could also lead to additional opportunities for production companies interested in the Americas with Blue Sky Uranium open to working with a partner or handing the project over at the right price in order to move the project forward.

With more than 145km of uranium trend still to explore, it seems there is nothing but blue skies ahead for the future of uranium mining in Argentina

Blue Sky – at a glance

Head Office
Suite 312, 837 West Hastings Street
Vancouver, British Columbia, V6C 3N6

Tel: +1 604 687 1828

Email: info@blueskyuranium.com

Web: www.blueskyuranium.com

Directors
Joseph Grosso, Nikolaos Cacos, David Terry

Shares on Issue
162,110,30

Market CAP (at April 29, 2021/A24c)
C$37.45 million

Major Shareholders
Directors and management (9%)

EMEA-focused uranium juniors wait for price spike

Investors have piled into uranium in recent months in anticipation of a run on prices, but after a decade of bullish forecasts from uranium zealots, why are generalists only now starting to buy into the hype?

While a general thawing on the part of certain Western policymakers towards nuclear has provided some support, market participants point to an impending spike in demand from nuclear utilities - poised to re-enter the market in the coming months as their long-term contracts expire - as the key trigger for a step-change in prices.

"What is going to get this price moving higher is contracting," one London-based investment bank analyst, who wished to remain anonymous, told Mining Journal.

"Contracting volume over the last five years have been very low: a quarter or a fifth of what they were five years before that. So, it's really the question is, when will the nuclear industry step in and say, I want your supply now for the next five-plus years, and we'll give you higher prices.

"All the stars are aligning," the analyst said.

"Supply looks good for prices, demand looks good for prices, the lack of contracting is good for prices, the duopoly of the suppliers holding back supply and saying, unless we get higher prices, we're not bringing supply back, is good for prices. And there's been no investment [in new supply].

"It is definitely a very bullish market, it's just a question of when and how fast."

This bullish sentiment is unsurprisingly echoed by the two leading producers, Kazatomprom and Cameco.

Speaking on a conference call this week, Cameco's president and CEO Tim Gitzel said demand for nuclear energy was becoming "more certain as the mega trend of increasing electrification while phasing out carbon-intensive sources of energy continues to take hold around the globe".

Kazatomprom's chief executive Galymzhan Pirmatov said in March nuclear was becoming "more recognised as part of the green economy".

Pirmatov said the company was "confident that uranium demand will continue to grow, and as the market transitions to a more sustainable price for the fuel the industry needs in the medium-to-long-term".

Since listing in London in November 2018, Kazatomprom has represented the most straightforward way for UK investors to gain exposure to the uranium price.

It is the world's largest producer, providing over 40% of global primary uranium supply.

The company's share price has roughly doubled over the past 12 months, with the majority of gains coming since January.

But for those investors looking for earlier-stage options, a number of developers boast projects which - given the right pricing environment - could add to the supply picture in years to come. Here we focus on developments in Europe and Africa; elsewhere in this uranium focus edition of Mining Journal we look more closely at developments in the Americas and Australia.

Closest to home is Berkeley Energia's Salamanca project, which lies about three hours west of Madrid in Spain.

Salamanca has a resource of around 91 million pounds. A definitive feasibility study published in 2016 indicated the operation could produce 4.4Mlb per annum at cash costs of US$13.30 for an initial 10 years, making it one of the lowest cost would-be uranium mines in the world. The project was featured in Mining Journal Intelligence's Project Pipeline Handbook 2020, which presents a cross-section of the most promising assets across the metals spectrum.

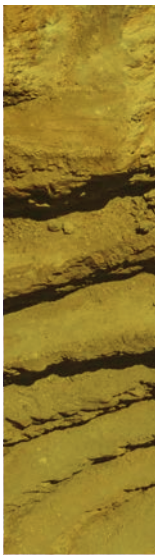
It received a high score in economics and above average scores in both financeability and geology, giving it a total rating of 73/100 - making it the second highest ranked uranium project in MJI's list, behind only Nexgen Energy's Arrow project in Canada. However, Salamanca performed less well in the confidence rating, largely due to the commodity price assumption (US$53.5/lb) versus the actual price (just north of US$30/lb).

But while the project looks promising on paper, there are a few factors that may prevent Berkeley from delivering on its plans. Unsurprisingly for a mining project in western Europe, there have been significant protests against the development, the majority of which were organised by the Iberian Antinuclear movement and held in Salamanca.

There were also concerns that Spain's parliament might tweak the country's draft climate change bill to effectively veto the project. However, those fears appeared to dissipate this month when parliament approved an amendment to the bill which said companies which had already applied to mine radioactive materials - including Berkeley - would be allowed to proceed as normal. But as analysts from UK investment firm SP Angel noted, while the delayed project might legally be able to proceed, "influential lobbying factions may not wish to give up their opposition to the project without continuing to voice their objections".

London and ASX-listed Berkeley points to the positive strides it has made on permitting. It claims to have secured more than 120 permits and favourable reports by the relevant authorities at local, regional, federal and European Union levels, and says it only needs one more approval, for construction of a uranium concentrate plant as a radioactive facility. However, a more granular look at the mine plan where permitting is concerned raises questions: Berkeley has secure approval from local authorities to begin construction work at Retortillo - one of the three major deposits which makes up its resource base, but it has yet to receive sign-off for the higher grade Zona 7 deposit, which according to the DFS accounts for 63% of measured reserves at Salamanca.

"Even if you can build the plant, your high-grade deposit doesn't have a mining permit," noted a second London-based analyst, who also wished to remain anonymous."



"Even if you can build the plant, your high-grade deposit doesn't have a mining permit," noted a second London-based analyst, who also wished to remain anonymous.

The analyst said he thought the project would get built if it was located in a more remote location in a more mining-friendly jurisdiction, but that opposition - either from central or local government - might prove insurmountable.

"It feels like [the authorities] are saying the answer is no, but we're just gathering all our supporting evidence," said the analyst.

Namibia projects

Shifting to the southern hemisphere and a project with a proven track record, Paladin Energy, hopes to bring its Langer Heinrich mine back online three years after low uranium prices saw the asset placed on care and maintenance.

The company has enjoyed a sparkling run this year, with its share price doubling from the beginning of January to A48c

on May 14. It completed an equity raise of north of A$200 million in the March quarter, wiping out debt and leaving it with US$30 million in cash - a figure the company believes will be enough to see it through to a re-start decision.

Cost estimates for the re-start have been put at $81 million, of which $47 million is seen as "discretionary capital … to maximise plant reliability and run time".

Paladin has outlined a 17-year production period for Langer Heinrich, with peak output of 5.9 million pounds per annum for seven years.

Cash costs over the 17 years are expected to average $27/lb - putting it at the higher cost end of the spectrum.

Justin Chan, an equity research analyst at Sprott, said there were no real technical concerns around the project but that ultimately it all came down to price.

"There are no real operational questions, it's just the price definitely needs to be north of US$50/lb and ideally north of US$60/lb. But it was built and produced to spec, so there's not much risk in that respect," he said. Analysts at Canaccord Genuity said in a note Langer Heinrich "will be one of the first re-starts off the rank as the market tightens".

"Langer Heinrich's proven historical performance should provide a competitive advantage vs some of its re-start or greenfield competitors," said Canaccord.

Former Paladin chief John Borshoff is also behind the final project on our list: Deep Yellow's Tumas development, 30km from Langer Heinrich in Namibia.

Deep Yellow completed a pre-feasibility study on Tumas in the March quarter and decided to immediately proceed with a definitive feasibility study.

Using TradeTech's forecast US$65 per pound uranium price, the PFS outlined the potential for a Langer Heinrich-style openpit mine and 3Mlb per annum processing plant, targeting an expected supply shortfall mid-decade.

The study, based on just half the existing 110Mlb Tumas resources, outlines an 11.5-year operation that will cost

Photo: iStockphoto.com

$357 million to develop, including pre-production, sustaining and closure costs, producing 2.5Mlba at C1 cash costs of $27.3/lb after vanadium credits. All-in sustaining costs are estimated at $30.70/lb.

The PFS suggests the operation will deliver a post-tax net present value of US$207 million, with an internal rate of return of 21.1%, for gross revenue of US$1.89 billion.

Project payback is estimated at under four years. The DFS will involve refining and optimising the PFS, and funding drilling to ensure sufficient reserves are proved up at Tumas, which sits within the wider Reptile project.

Reserves stand at 31Mlb today. Borshoff said the PFS had delivered "impressive economic numbers" that were better than the 2020 scoping study.

"Tumas is an exciting development opportunity and one of very few globally over the last four years that has progressed from brownfields exploration to completion of a PFS, now moving on to a DFS," he said.

However, the project's high price assumption (US$65/lb) meant it fared relatively poorly in Mining Journal Intelligence's Project Pipeline Handbook 2020, with a total score of 55/100 putting it above only Blue Sky Uranium's Amarillo Grande project as the second-to-bottom ranked project on MJI's list of uranium developments.

"There are no real operational questions, it's just the price definitely needs to be north of US$50/lb and ideally north of US$60/lb. But it was built and produced to spec, so there's not much risk in that respect"

Photo: iStockphotos.com

Denison aims for 2022 live ISR field test at Phoenix

Denison Mines has made several strategic moves in 2021 as it aims to become the next new uranium producer in Canada with the nation's first in-situ recovery (ISR) uranium mine at Wheeler River in the Athabasca Basin.

The seriousness of its development intent can be seen by the recent appointment of Ron Hochstein as chair of its board of directors.

Hochstein is president and CEO of Lundin Gold and steered that company through the permitting, construction and commencement of operations of the Fruta del Norte gold mine in Ecuador, and will provide invaluable support to president and CEO David Cates as Denison advances towards development.

ISR currently accounts for over half of the world's uranium production, but none so far in Canada's Athabasca Basin.

"ISR mining requires a certain geologic setting. It requires permeability, the ability to move solution through the host rock. It requires leachability to dissolve the uranium, and it requires containment to control the solution you put into the ground," said Cates.

"Typically, you have a confining layer, like clay, above and below the deposit with the sandstone, which hosts the uranium being the meat in the sandwich."

Uranium deposits in the Athabasca Basin typically don't have all of those conditions.

At Wheeler River's high-grade Phoenix deposit, Denison has highly leachable uranium ore in permeable sandstone, plus impermeable basement rocks below the deposit, and has turned to technology to offer containment in the absence of an aquitard above.

"We studied the concept of using ground-freezing technology and directional drilling to create an in-ground 'dome' over the top and sides of the deposit as part of our 2018 PFS," said Cates.

"Ground freezing technology uses a chilling brine that is circulated through cased drill holes, which reduces the ground temperature below zero to gradually freeze the water-saturated sandstone surrounding the deposit – effectively creating a physical 'ice wall' to contain the ISR mining activity. This was the breakthrough concept that made the idea of ISR mining in the Athabasca feasible."

Subsequent testwork showed that solutions injected into the ISR wellfield at the ore-zone depth (~400m) do not travel upwards and so Phoenix is not expected to require a containment layer above the deposit.

"We recently changed our design to a staged fence/wall layout, rather than the previously designed 'dome', using the same ground freezing approach, but lower-cost and lower-

risk vertical diamond drill holes to create a series of phased cylindrical perimeter walls that extends from the surface down to the basement rock – which creates contained zones akin to a very large in-ground leach vessel similar in concept to those used on surface in a conventional mill," said Cates.

The road towards development will see Denison undertake a commercial-scale test pattern of five test wells (and multiple monitoring wells) at Phoenix this year. The test will usetracer elements to map out the solution flow and identify how it permeates within and outside the pattern.

The deposit hosts very high grades that average over 19% U3O8, including a high-grade core that is estimated to average over 40% U3O8. Denison will use the results from the 2021 test to refine its modelling and support the permitting process to run a live leach test in 2022.

"If we can recover uranium-bearing solution from a commercial well field test in 2022, we will have truly de-risked the project to the maximum extent possible prior to commercial operation," said Cates.

Success could have a dramatic impact on future project developments in the Athabasca Basin, given the ISR method's low initial capital and operating costs compared with traditionally used extraction and processing techniques. A 2018 prefeasibility study (PFS) on the Phoenix deposit estimated all-in costs of US$8.90 per pound of U3O8, which would mean the operation is quite profitable using the Denison's base-case price assumption, which has first production sold in the range of $29/lb U3O8. This is just below current market prices, whereas several world-class operations, such as Cameco's McArthur River, are currently mothballed at these price levels.

"Advancement of Phoenix is not reliant on an improving uranium market"– David Cates President and CEO

"Advancement of Phoenix is not reliant on an improving uranium market, as our base case for Phoenix features a US$29/lb U3O8 selling price, which is lower than today's spot price," said Cates. "In the long-run, we could be looking at a new wave of mining in the Athabasca Basin that competes with the cost profile of ISR mining operations in Kazakhstan, rather than massive operations that are reliant on scale and susceptible to the market ups and downs."

The ISR approach also promises to deliver environmental and social benefits that are likely to be of increasing importance for permitting and financing the development of Phoenix.

The project would not generate any conventional tailings or waste-rock stockpiles, removing community concerns over

Denison Mines' Wheeler River project, where commercial-scale well coring and well development activities are running simultaneously as part of 2021 Phoenix ISR field test

the possibility of future contamination. Not having an open pit or shaft also means the operation would not rely on heavy equipment and could have very low carbon dioxide emissions.

"Wheeler River is situated close to the provincial power grid, which is energised in the north by hydro-power, so we have the potential to generate a very low CO2 footprint. We are looking at electrifying as much as possible on site, potentially even the drills," said Cates.

With investors rapidly warming to the promise of a reinvigorated uranium market, on the back of a resurgence of nuclear power as part of the global clean energy transition, Denison took the strategic decision to spend US$74 million in April to buy 2.5Mlb of U3O8 to bolster its balance sheet and provide a future source of collateral to be used when financing the estimated C$322.5 million initial capital cost of Phoenix.

This acquisition followed a series of equity financings that have positioned Denison to fund the advancement of Phoenix.

"Through February, we raised all the money we need to get through permitting and feasibility and into early project procurement, but we didn't think it would be wise to raise an additional C$100M and just put it on our balance sheet earning little to no return as cash," said Cates.

"With our subsequent financing in April, our strategy was to take advantage of the deep institutional investor interest in Denison and the sector by issuing additional equity and parking that capital in physical uranium holdings, instead of cash, which will share a similar leverage to rising uranium prices as our existing mining assets."

"Rather than simply sell it down the road, potentially at a higher price, to generate cash to fund a portion of project construction, we will first look to borrow against our uranium holdings, to lower our overall cost of capital and reduce the extent of future equity dilution.

"Once the project debts are repaid, we would then sell the uranium holdings to our customers alongside future uranium production from Phoenix. Our research analysts loved this approach and increased their target prices for Denison."

Another strategic decision the company made recently was an unsolicited bid for the 10% of Wheeler River it doesn't already own, among other uranium strategic assets in Canada, for C$41 million via the purchase of JCU (Canada) Exploration Company Ltd (JCU), from Overseas Uranium Resources Development (OURD). In addition to Wheeler River, JCU holds interests in various early-stage uranium assets in the Athabasca Basin plus a 31% interest in

Denison President and CEO David Cates

Cameco's Millennium project, and a 33.8% interest in Orano's Kiggavik project in the Nunavut.

Dennison's bid came after UEX Corporation announced an agreement to acquire JCU for C$12.5 million in April. In late June, Denison and UEX decided to team-up and announced that UEX amended its agreement with OURD to increase the purchase price for JCU to C$41 million, while also agreeing to sell 50% of JCU to Denison, immediately on closing of the purchase of JCU from OURD, for C$20.5 million. As a result, Denison and UEX will co-own JCU, meaning that Denison will effectively own 95% of its flagship Wheeler River project.

With uranium prices starting to tick higher on the back of a growing supply deficit, the timing for Denison Mines to enter production in the coming years could not be better.

Denison – at a glance

Head Office
1100 - 40 University Avenue, Toronto, ON, Canada, M5J 1T1

Tel: +1 416 979 1991

Email: info@denisonmines.com

Web: www.denisonmines.com

Directors
Ron Hochstein, David Cates, Robert Dengler, Brian Edgar, Jun Gon Kim, David Neuburger, Jennifer Traub and Patricia Volker

Shares on Issue
805 million

Market CAP (at March 23, 2021)
C$1,300 million (as of June 29)

With two permitted projects, GoviEx is a rarity in uranium

Timing counts for a lot in the mining space and Ross McElroy, president and CEO of Fission Uranium, has seen the stars rapidly align in the months since he took the helm in September 2020.

The projects – Madaouela, in Niger, and Mutanga, in Zambia – have, subject to a favourable uranium market price, the potential to be developed to production in 2024 and 2026, respectively. That scheduling is good news for nuclear utilities and GoviEx shareholders alike.

"In the last month, I've probably spoken to 15 different utilities worldwide and our timeframe fits very nicely with them because they've been drawing down on their contracts, drawing down on their inventories," GoviEx CEO, Daniel Major, said.

"This is particularly the case in the US, where, from 2025, a lot of them are uncovered and they need commitments to go beyond that – so the timing works perfectly for us," he said.

GoviEx spotted the looming supply crunch early on, while the price slump seen through the 2010s saw a lack of interest in uranium projects.

In recent years, uranium inventories have shrunk, and suffered supply shortages, which are expected to further expand with declining secondary supplies – just as GoviEx anticipates to be prepared to cut the ribbon on Madaouela.

To put the supply shortages into context, Australia's chief economist expects global production in 2024, when GoviEx expects Madaouela to be commissioning, to fall below projected consumption of 85.7 million tonnes or 26%.

"We have a large resource, and the difference between us and most of our peers is that two of our projects are already fully permitted. And therein lies another difference – most of our peers have one project, whereas we have three projects and two of them are well positioned, fully permitted and ready to go," Major said.

The third project, the CEO of the Canada-based company mentions, is Falea in Mali – a uranium, gold, copper and silver exploration play. Falea has indicated and inferred resources of 63 million lb of copper and 21 million ounces of silver.

Madaouela's probable mineral reserves are 54.7Mlb U_3O_8, while Mutanga's mineral resource is 15.2Mlb U_3O_8 measured and indicated, and 44.9Mlb U_3O_8 in the inferred category. The Nigerien project has a forecast steady-state production of 2.48Mlb and the Zambian project is targeted at 2.60Mlb.

Madaouela's NPV at a long-term uranium price of $55/lb U_3O_8 is $117 million at an 8% discount rate with an IRR of 13.7%. The recent published update PFS on the project

highlighted potential to acquire up to $180m in project debt to fund capital development.

"GoviEx is trading at about 30% of its NPV. A lot of companies out there are already up at their NPV. There's a lot of upside for a company like GoviEx on our projects still to come through. We haven't even priced in the market yet.

"The projects also have massive exploration upside. We've decided to go for a rate at Madaouela that, we feel, is doable in the initial stages and from a financial perspective, but once we get going, the capacity is there to go much bigger and at a greater speed.

"We've already got over 20 years of production in existing resources, so the ability to expand that is very easy – and that's just on the one licence, let alone the other exploration licences we've got around us," he said.

With supply deficits also come better prices, and given GoviEx's low capital and operational expenditures for the uranium projects – they look very profitable.

Madaouela – with a mine life of 20 years – has a total life of mine cost, including operational and capital expenditure, of $35.2/lb U_3O_8. Mutanga's is $37.9/lb.

Australia's chief economist tips uranium spot prices in 2024 will average $42.5/lb, $47.7/lb in 2025, and $52.4/lb in 2026.

"We've already got over 20 years of production in existing resources, so the ability to expand that is very easy"– Daniel Major CEO

"The Nigerian Madaouela project is coming up first."

"We already have our agreement structured with the government. We've created the mining company that will do the work. We're already well into the final feasibility study – that's probably got a 12-month timeline on it."

"We have appointed a chief of uranium marketing, so we're already starting to deal with the utilities on an initial phase to understand their requirements going forward. Moreover, we anticipate looking to secure project financing by the end of next year – with two years for construction.

GoviEx's ability to position itself as well as it is, has come in part from the company's decision to set up its projects in

Drilling at GoviEx's Falea project in Mali

Africa. Madaouela took six months to permit. A comparable project in countries like Canada, the US, or Australia would likely take closer to six years.

"Africa has substantial uranium resources across it, and governments there are predominantly resource driven and have very solid mining codes and permitting rules.

"Since 2009, we have operated with a 100% local employment strategy, so everybody in the Niger operation is Nigerien. The same is true with our operations in Zambia and Mali. That's the benefit of picking countries in Africa that have existing mining cultures."

Rider 1

See technical report entitled 'An updated integrated development plan for the Madaouela project, Niger' having an effective date of August 11, 2015, and revision date of August 20, 2015, and prepared for GoviEx by SRK Consulting (the "report") in accordance with National Instrument 43-101 – Standards of Disclosure for Mineral Projects ('NI 43-101'). Please refer to the full text of the report, which is available for review under GoviEx's profile on SEDAR at www.sedar.com. Scientific and technical information relating to the Mutanga and Falea properties contained in this presentation is derived or extracted from the technical report entitled, 'NI 43-101 technical report on a preliminary economic assessment of the Mutanga uranium project in Zambia', dated November 30, 2017, prepared by SRK Consulting (UK) Ltd for GoviEx Uranium Inc, and the technical report titled, 'Technical report on the Falea uranium, silver and copper deposit, Mali West Africa', dated October 26, 2015, prepared by Roscoe Postle Associates Inc for Denison Mines Corp, respectively. Both these technical reports are available for review on GoviEx's website at www.goviex.com.

Rider 2

The PEA is considered preliminary in nature and includes inferred mineral resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorised as mineral reserves. Mineral resources that are not mineral reserves have not yet demonstrated economic viability. Due to the uncertainty that may be attached to inferred mineral resources, it cannot be assumed that all, or any part of an inferred mineral resource, will be upgraded to an indicated or measured mineral resource as a result of continued exploration or mineral reserves once economic considerations are applied; therefore, there is no certainty that the production profile concluded in the PEA will be realised.

"Niger has been producing uranium since the early 1970s and Zambia has been renowned for its copper industry for decades. Mali has gone from being nowhere in gold to now the 4th largest gold producing nation in Africa," he said.

On the backburner, while GoviEx focuses on the Nigerien and Zambian operations, the multi-commodity Mali project also offers significant value to the company.

Major has extensive experience to draw upon in navigating GoviEx's African projects into successful businesses. With over 30 years in the mining industry, he worked with Rio Tinto at the Namibian Rossing Uranium Mine and South African Amplats – and has also worked as a mining analyst with HSBC and JP Morgan, in London.

Bolstering his own experience is GoviEx's executive chairman, Govind Friedland, a geological engineer.

"We get the pedigree that comes with having Govind as a founder and the real benefits and ability to synergise with the whole Ivanhoe Group – as our much bigger brother. These are real advantages for us.

"We've also have Benoit La Salle, as a director, who was the founder of SEMAFO and basically opened up West Africa for gold mining. We're a practical group. We get on and do the job that needs to be done. We've built our company up steadily. And we've got a really good board of directors," Major said.

GoviEx – at a glance

Head Office
GoviEx Uranium Inc. 999 Canada Place, Suite 606, Vancouver, BC, Canada, V6C 3E1

Tel: +1 604-681-5529

Email: info@goviex.com

Web: www.goviex.com

Directors
Govind Friedland, executive chairman; Daniel Major, chief executive officer; Christopher Wallace, director; Benoit La Salle, director; David Cates, director; Samla Seetaroo, director, Eric Krafft

Market CAP (at March 23, 2021)
C$148.656 million

Quoted Shares on Issue
530.92 million

Major Shareholders
Denison Mines, 12.27%; Insiders, 10.28%; Robert Friedland, 3.2%; Cameco, 2.36%