



# TDV's Uranium Portfolio

Ed Bugos & Kashyap Sriram

August 31, 2019

## Recommendations

Buy **Uranium Participation Corp (TSX:U, OTC:URPTF)** for direct exposure to Uranium price  
Buy **Cameco Corp Shares (TSX:CCO, NYSE:CCJ)** for blue chip equity exposure on Uranium cycle  
Buy **UR-Energy Inc (AMEX:URG, TSX:URE)** for exposure to US junior producer, Trump reboot

## Investment Highlights

- Uranium price continues to trend up as shares take a hit on Trump rejection of 232 petition, and remain undervalued along with uranium prices due to the after effects of the Fukushima disaster
- Demand for uranium has been growing again in China, India, and Russia with some 56 plants currently under construction around the world, 111 planned, and many more proposed
- Commodity cycle has likely bottomed (in today's report I explain why a weak US dollar exchange rate has particularly bullish repercussions for commodity prices)
- Not too many quality liquid equity opportunities
- Low prices of uranium have dissuaded production and development of new mines

In the first of our series of mini port *folios*, we featured the **TDV Silver Stars** – comprising our three favourite silver stocks for a concentrated bet on the sector. In the current report, we turn to our favorite uranium stocks.

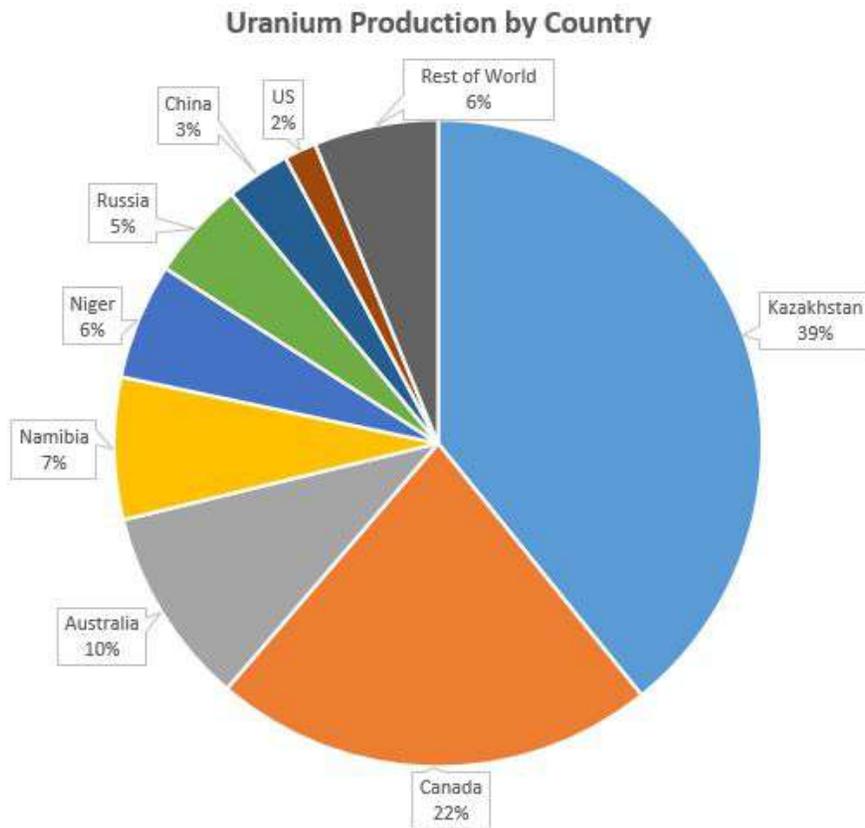
## Just What is Uranium

Uranium, specifically U<sub>3</sub>O<sub>8</sub>, is a feedstock, the raw material used to make the fuel rods in nuclear reactors.

In highly enriched form, it is also used in nuclear weapons. Colloquially referred to as yellowcake, U<sub>3</sub>O<sub>8</sub> is the end product produced by a uranium mining and processing facility. But while gold prices are quoted in dollars per troy ounce of gold, uranium is quoted in *dollars per pound of U<sub>3</sub>O<sub>8</sub>*.

## Mining Uranium

Kazakhstan is the world's biggest producer of uranium, accounting for a whopping 39% of the world's mine supply, with Canada a distant second at 22%. The only other notable producers are Australia, Namibia and Niger. Those top 5 uranium mining countries account for over 80% of global production, a far bigger concentration than in the oil market, where the top 5 oil producing countries account for less than half of global production. The (in)famous OPEC oil cartel itself has a market share of only 30%. While the US is the #1 oil producer with a 13.2% market share, it is a laggard in the uranium space with a market share of a mere 1.6%.



## Processing Uranium

Uranium is produced by miners in the form of  $U_3O_8$  (yellowcake). In that form, the uranium concentration is about 0.7%. For use in a nuclear plant, it needs to be converted into fuel rods containing 3.5-5.5% uranium.

This task is performed by enrichers, who then supply the fuel rods to the utility companies for use in their reactors. When enrichers have excess or idle capacity, the waste generated in the enrichment process can substitute for fresh  $U_3O_8$ , a process known as underfeeding. The utility companies, which own the nuclear reactors, typically want to be involved in every step. They acquire uranium from the miners and provide it to the enrichers for conversion into fuel rods as per their specifications, depending on the nature of the reactor.

## Pricing Uranium

Fuel supply being critical to their operations, the utilities typically sign long-term purchase agreements with the miners. This also benefits miners, who now have an assured market and clarity on their future revenue.

The price of uranium based off these contracts is called the *long-term price*.

There is another price for uranium, which is set in the spot market.

Typically, this is the price at which miners sell excess inventory, and utilities buy inventory to meet their needs which aren't covered by the long-term contracts. This price is referred to as the *spot price*.

## Why Uranium? The Money Relation

In sticking with our overarching theme on the US dollar's dying STRUCTURAL role as an international reserve currency and its fading CYCLICAL attraction as a risk currency or shelter for capital that has fled the EU and UK, we aren't just looking for a bull market in the precious metals, but also, in commodity prices generally.



As pointed out in the silver share report, bull and bear market cycles in commodity prices are primarily monetary, and gold tends to lead them. But they are not simply the inverse of the dollar. They occur, also, relative to all fiat currencies.

The commodity cycle is merely amplified when the US dollar falls to a cyclical bear market, which it does about every seven years, even if the Fed isn't the worst of them - although in the past decade it has been worse than most of its current

trading partners in terms of the expansion in money supply post 2008 - i.e., US has inflated its true money supply (true = Austrian school definition of money) faster than all of its largest trading partners in the G7 in this period, right behind countries like Korea, Norway and Poland. It has inflated more than the ECB, BOJ, BOC, Sweden, BOE, RBA, New Zealand; it has inflated even more than South Africa over the past decade.

Cyclical bear markets in the US dollar tend to occur after a period of inflation in US dollar denominated capital goods markets like we have seen, especially under two important circumstances: (1) after the dollar has been a capital magnet for most of the boom where dollar assets outperformed global assets because of the illusion that the growth has been better even though the metrics have only been inflated more, and (2) when the central bank reacts to the recession with further aggressive monetary loosening, which adds to the cyclical pressure.

I'm omitting the structural problems to keep it brief and simple, and focussed on the reason we get commodity price bull markets. But for those of you who have trouble understanding how the US dollar could possibly fall against less sound currencies, consider the Russian Ruble. The Ruble imploded against the US dollar in 2014-15, which probably doesn't surprise anyone. Only, it didn't happen for more than a decade of inflating at 10 times the rate of the Fed. As you saw in the graph of the USD/RUB above, from 2002-2008, when the Russians were inflating the fastest, the Ruble actually gained 50% on the US dollar (the chart is inverse so that the decline in USD/RUB means the RUB went up)! The Russian money supply grew 8-fold in this period!

The US money supply hardly doubled. How do you explain that?

The Ruble did correct in the 2008 collapse when the US dollar bounced widely. But it wasn't until almost 14 years later in 2014, when the oil price broke, that the currency really collapsed, even though it had been inflating way faster than the Fed for 14 years. That's because from a foreign investment point of view, while it

was inflating, it was fooling investors with great returns. This happens a lot. The currency fallout occurs much later, after many years of inflating, and especially as I said above when the currency has been a capital magnet.

Still, hardly anyone owns the Ruble, or the Yen, or any of the other currencies. Only the Euro has made any headway at all in terms of world wide circulation. The fundamental problem for the US dollar is that it is over owned and sprayed all over the globe so its value relies on its global demand, which is shrinking for many reasons. But cyclically its value is tied to expectations about forward relative returns in US assets.

That is, foreign demand for the dollar rises when it makes sense to put on a carry trade, not when it is perceived as a safehaven, which it hasn't been for a long time. If you are only looking back to 2008 that will only lead to error. The bounce in the USD after 2008 followed a traditional 7 year bear market in its f/x rate.

Most other currencies rarely even experience a foreign demand to begin with, let alone rely on it.

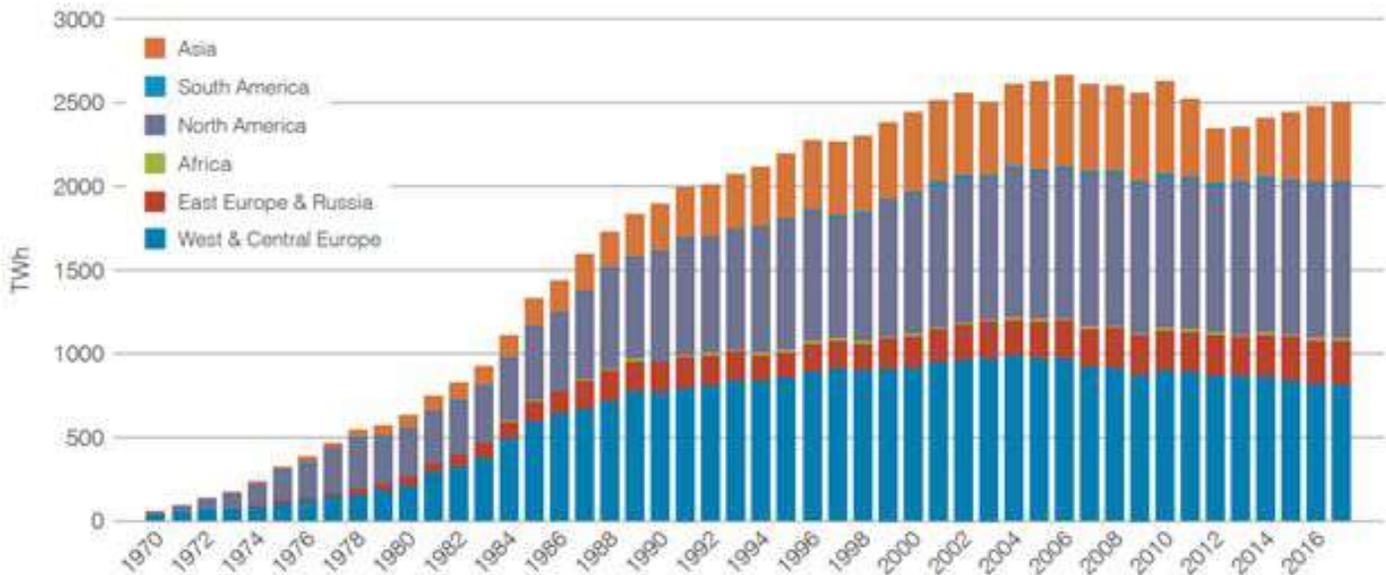
So here is the key about commodity cycles regardless of whether the dollar is falling due to cyclical or structural pressures. As the US dollar's foreign exchange rate falls, the foreign central banks who administer those weaker currencies will be forced to inflate more to support their export businesses. This is the source of a commodity bull market - and the source of the phrase, "race to the bottom" led by the US dollar. When the US dollar is stronger on the foreign exchange markets, there is less pressure for the other governments and central banks to inflate. So the money relation and the race to the bottom that we expect to drive all commodity prices when the US dollar turns down on foreign exchange markets is the underlying rationale for buying any resource miners.

## Why Uranium, Pt 2? Supply Side Improvements

The long term supply and demand fundamentals for uranium also make a compelling case.

These have been improving for years, without much fanfare, thanks to the negative publicity of Fukushima.

Presently, nuclear reactors account for something like 20% of the total annual electricity generation in the US (and 10% of consumption) after a major growth spurt in the eighties and nineties that continued into the new millennium for a while, driven by private and public incentives, and consumer wants, for a cleaner source of



energy. And, despite the Fukushima accident, it is still considered clean, especially in places like China, where air pollution is an increasing problem. What's more, unlike solar and wind energy, both of which depend on the vicissitudes of the weather, nuclear energy is reliable, is available 24/7 and provides grid stability.

The chart above shows the growth in nuclear electricity production. As you can see, it peaked during the last decade and dropped off with demand following the **Fukushima Daiichi nuclear disaster** in 2011, which occurred following an earthquake and 14 meter high tsunamis onto the coast of Japan where the power plant was built.

The linked Wiki article above provides a good explanation of the extent of the damage caused. The knock on effect was that all but 2 of 54 nuclear reactors in Japan went offline, and the remaining 2 would shut down in 2012. Although as of 2019 - 9 reactors are back online, with 12 more expected to come back online by 2025.

Still, even after the federal government okayed their restart on passing a safety inspection, the strong anti-nuclear sentiment of provincial governments and local authorities succeeded in indefinitely delaying the restart of the reactors. Before the disaster, nuclear contributed 30% of power generation in Japan, with plans to ramp up to 40%. The disaster also led to anti-nuclear protests in Germany and South Korea. In Germany, 8 of 17 reactors were permanently shut down following the incident, and the government announced that it would permanently close the remaining reactors by 2022. In South Korea, while cooler heads prevailed, the government also scaled down its nuclear ambitions. Its 2012 plan for raising the contribution from nuclear from 22% to 60% of electricity generation was instead changed to completing the 3 new reactors currently under construction, and gradually phasing out nuclear as the existing reactors reached the end of their life and shut down. This backstory is important, because it highlights at least two key takeaways for our bullish thesis.

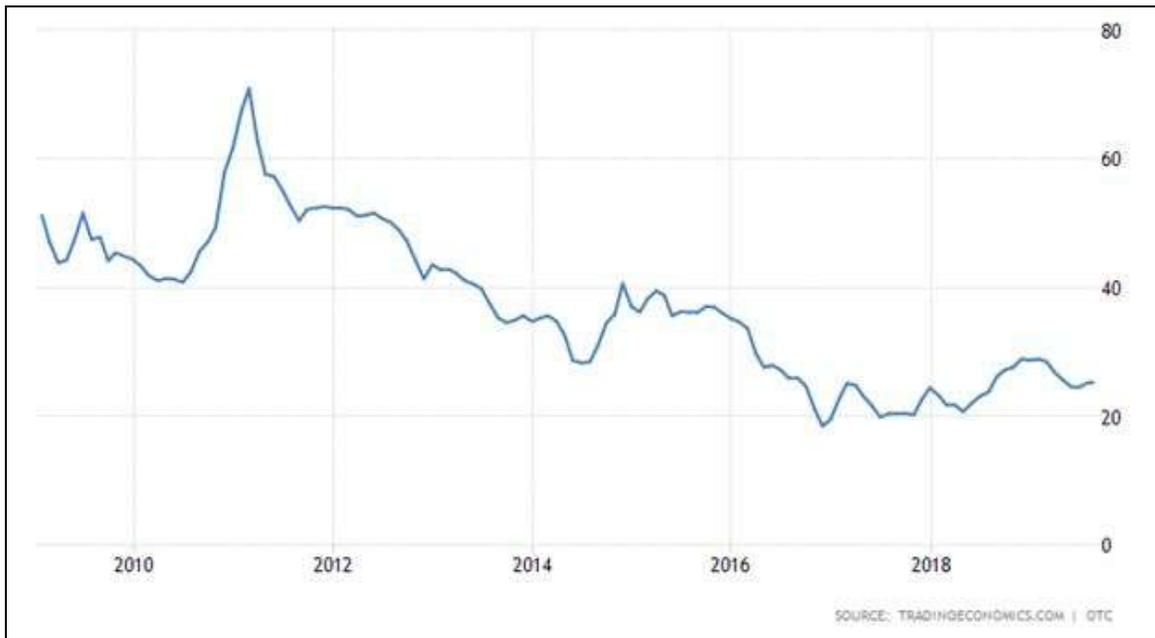
1. A lot of nuclear power plants were shut down post Fukushima (supply reduction)
2. Nuclear power became hugely unpopular both with governments and the populace (price collapse)

The implications for the first point should be pretty self evident. But as far as the second point goes, remember that for most commodities, particularly if they have an elastic supply curve, the cure for low prices is low prices.

Low prices will lead to plans to reduce supply further, which eventually sets the stage for a bottom in the price decline. And a lot of that has happened now. But we aren't just investing in uranium, the metal, per se; we are investing in the miners that produce and sell it. That's where the real opportunity lies because of the leverage they have to profits, and profits have been hard to come by for the miners. For them Fukushima hit them twice.

### **Uranium Miners Hit By Double Whammy**

Recall, post Fukushima, a lot of reactors were shuttered. However, because the utilities had signed long-term purchase agreements to buy uranium from the miners, they were forced to honour their commitments and continue acquiring inventory. As the years dragged on with prospects of reactor re-start growing dimmer and dimmer, the utilities did the only rational thing: dump their uranium inventories into the spot market to raise cash, further depressing prices well below *the long-term price*. Selling begat more selling as the supply glut intensified, with spot prices entering terminal decline. The utilities with operating reactors, on seeing this change in the market, responded by not renewing or signing new long-term agreements. After all, they could always acquire uranium in the spot market, and with each passing year it was becoming cheaper to do so.



**Chart: Spot price of uranium**

Not just the utilities. The miners that were still profitable at lower prices prices, notably state-owned mines in Kazakhstan, and the miners which needed the cash flow to service debt, such as Australian listed Paladin Energy, continued to sell into the spot market too. Every time the spot price turned up, investors cheered and bid up the uranium miners, thinking the supply glut was over and the fundamentals would re-assert itself.

Yet so far, every rally has turned out to be a bull trap.

Although, simultaneously, every year, the glut has shrunk smaller and smaller.

In 2016, Cameco, shut down its Rabbit Lake uranium mine citing low prices. That took 3.6 million pounds of annual production off the market. In 2017, the company followed up by shutting down McArthur River, taking another 12.6 million pounds offline. Kazakhstan announced a 10% production cut in 2017, raising it to 20% in 2018, representing a 7.5% reduction in annual global supply. In 2018, Paladin Energy placed its flagship Langer Heinrich mine on care and maintenance, removing another 5.2 million pounds.

Rio Tinto announced a production halt at Ranger (6 million pounds) starting 2021.

The production cuts will keep future supply in check, but the market still has to work through the excess inventory that keeps turning up in the spot market and depressing prices. There's good news on this front.

Foremost, the demand for nuclear energy has been rising again now at its fastest pace in 25 years.

And there are signs that the glut has softened.

In its 2019 Q1 results, Cameco reported that it, "...issued a request for proposal for 1 million pounds. Despite price signals to the contrary, we found there was not enough material available to meet our specifications."

***In other words, Cameco wanted to purchase a million pounds on the spot market but couldn't find sellers.*** Can we presume from this that the balance is shifting towards a tighter outlook?

### **Growing Uranium Demand**

<b>Reactors by Country</b>	<b>Under Construction</b>	<b>Planned</b>	<b>Proposed</b>	<b>Total</b>
China	13	43	170	226
India	7	14	28	49
Russia	6	24	22	52
USA	4	3	18	25
Canada	-	-	2	2
Japan	2	1	8	11
Saudi Arabia	-	-	16	16
South Korea	4	-	2	6
UAE	4	-	-	4
Ukraine	-	2	2	4
Others	16	24	60	100
<b>Total</b>	<b>56</b>	<b>111</b>	<b>328</b>	<b>495</b>

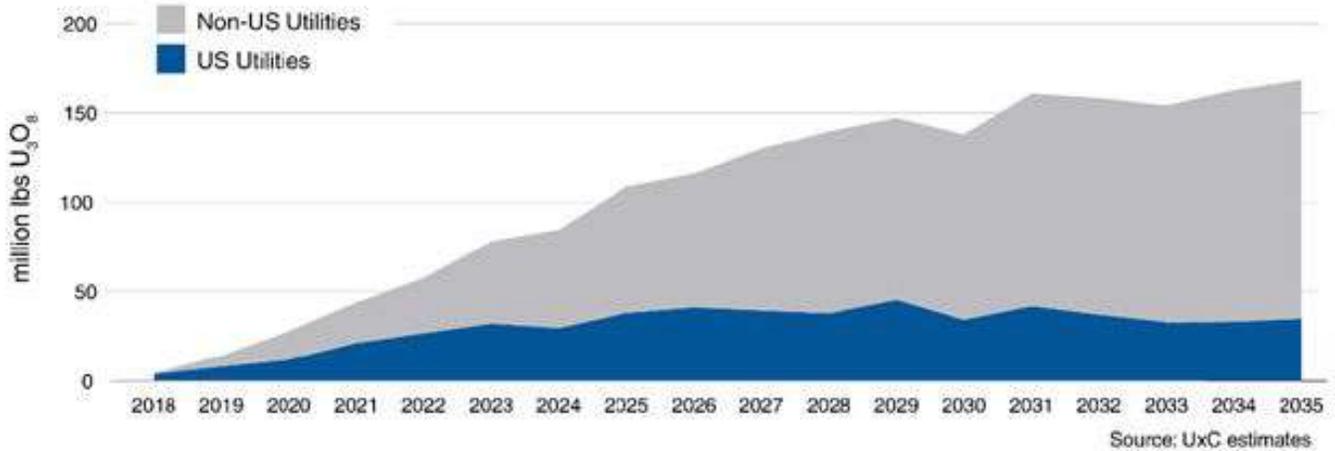
The demand picture couldn't be brighter. With 445 reactors currently operating, if the reactors under construction were to go online, that would increase the count of reactors by 13%. China, the fastest growing nuclear energy market in the world, expects to build six to eight new reactors *each year*.

### **The Section 232 Petition**

One of the most talked about so-called catalysts for higher uranium prices was a petition by two uranium miners to the Trump administration to impose protectionist measures favouring US based uranium miners.

The petition proposed that the US government force utilities to buy a minimum of 25% of their uranium requirements from mines in the US. This obviously protectionist measure, no doubt borrowed from the corn lobby which created the biofuel mandate, was couched in alarmist language calling the decline in US uranium mining a national security issue. Anyone against the proposal was supposedly in favour of handing over the US electricity grid to the Russians and their friends. The added uncertainty led US utilities to delay long-term contracting until the Trump administration announced its decision. Fortunately, the administration quashed the petition, causing investors to sour on the whole uranium space, leading to a sell-off in everything uranium.

### UTILITY UNCOVERED REQUIREMENTS (2018 - 2035)



Thanks to Trump’s blunder, however, this presents a rare opportunity, particularly as investors sold all of them off, not just the US producers. Meanwhile, uranium prices have been trending up. US utilities have begun talks on contracting -unencumbered by the Section 232 petition. The production cuts are having their effect in balancing the spot market. And yet, uranium shares remain depressed at 10, 15, even 20 year lows for some.



**Chart: Uranium prices starting to recover**

Below, we present our top 3 picks to take advantage of this disconnect.

## Option #1: Uranium Participation Corp. (URPTF, TSX:U)



Uranium Participation Corp. OTC:URPTF, TSX:U	
Website	<a href="http://www.uraniumparticipation.com/s/Home.asp">http://www.uraniumparticipation.com/s/Home.asp</a>
Inventory	U3O8 - 14.1 million pounds UF6 - 1.1 million kgU
Shares Outstanding	138,060,713
Market Capitalization	C\$589.56 Million
NAV (July 31, 2019)	C\$600.3 Million
NAV5, \$80	C\$1.9 Billion
NAV5, \$100	C\$2.3 Billion

The company buys and stores uranium in the form of yellowcake (U<sub>3</sub>O<sub>8</sub>) and uranium hexa-fluoride (UF<sub>6</sub>) with the primary objective of growing Net Asset Value through an appreciation in the uranium price. It is not an ETF and the underlying product cannot be redeemed or delivered against the shares like the GLD ETF. It is a traditional closed end fund that trades at a premium or discount to its net asset value. The company releases the NAV of its uranium holdings at the market price every month end. Using end July figures, the company had a per share NAV of C\$4.37. For reference, the shares closed at C\$4.33 in July, more or less in line with the NAV. This is the lowest risk way of playing the uranium cycle.

Cameco Corp NYSE:CCJ, TSX:CCO	
Website	<a href="https://www.cameco.com/">https://www.cameco.com/</a>
No. Producing Mines	2
Mining Interests	Canada, US, Kazakhstan, Australia
P&P, contained pounds	467.1 million pounds
M&I, contained pounds	422.8 million pounds
Expected Mine Life	>15 years
Uranium Production 2019 est.	9 million pounds
Working Capital	C\$1.3 Billion
Shares Outstanding	395,797,732
Market Capitalization	US\$3.47 Billion
All-In Cost (C\$/lb)	C\$41.5/pound
NAV5, \$80	US\$10 Billion
NAV5, \$100	US\$14 Billion



## Option #2: Cameco Corp (CCJ, TSX:CCO)

Cameco is the largest non-state owned public listed uranium miner, with uranium interests in Kazakhstan, US, Australia, and Canada. In Canada, the company operates the Cigar Lake mine in the Athabasca Basin in Saskatchewan, currently the world's highest grade mine. In Kazakhstan, the company is in a Joint Venture with Kazatomprom, the state-owned (and now publicly listed) uranium miner which operates the Inkai mine.

The company has several other mines under care and maintenance, notably the McArthur River/Key Lake mine, also in Saskatchewan, erstwhile the world's highest-grade mine.

And Cameco has made the right moves through the uranium bear market, shutting down its higher-cost mines, shelving development projects, and cutting its dividend to conserve cash.

However, with uranium spot prices lower than the cost of production of even its Tier 1 mines, the company is aggressively purchasing uranium in the spot market to meet its contract obligations.

This will preserve the value of its pounds in the ground as it waits out the bear market, and may also become a hidden balance sheet item in the way that Goldcorp used to accumulate bullion in its earlier days of existence.

Cameco's long term price contracts provide a hedge too. From the table (below), based on the contracts it had in place as of Q2, the company would receive \$40 per pound if the spot price was \$40 per pound in 2020, \$53 at a \$60 spot price, and so on. If the company purchases uranium at the current spot price (\$25.3/lb) and sells it at \$30+ under its long-term contract, as per the schedule below it makes a riskless profit, which is precisely what management has been doing and the reason why they are in no hurry to re-start their shuttered mines.

If spot prices were to jump to \$60/lb, we can see from the table that Cameco will receive \$53/lb. Using their current all-in costs, that would translate to a 64% gross margin, netting \$480 million in *net income*, based on our back of the envelope calculations. Cameco trades at 7.2x the forecast PE.

For a conservative investor, Cameco is the safest bet among the primary uranium producers.

#### Expected realized uranium price sensitivity under various spot price assumptions

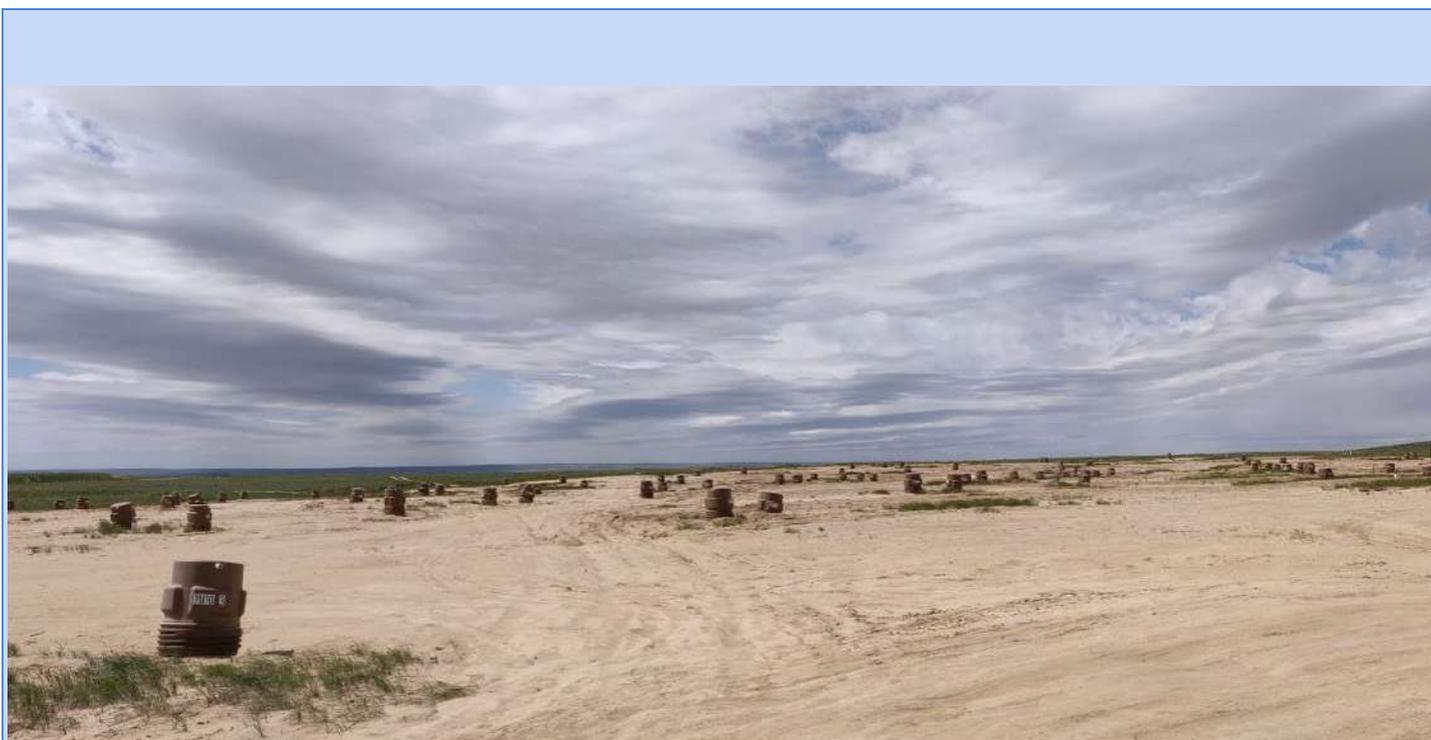
(rounded to the nearest \$1.00)

SPOT PRICES (\$US/lb U <sub>3</sub> O <sub>8</sub> )	\$20	\$40	\$60	\$80	\$100	\$120	\$140
2020	30	40	53	63	72	79	86
2021	27	40	53	61	66	70	74
2022	28	40	54	62	67	70	73
2023	29	41	54	63	68	72	75

Ur-Energy	AMEX:URG, TSX:URE
Website	<a href="http://www.ur-energy.com/">http://www.ur-energy.com/</a>
No. Producing Mines	1
Mining Interests	US (Wyoming)
M&I, contained pounds	34.3 million pounds
Inferred, contained pounds	8.2 million pounds
Expected Mine Life	>15 years
Uranium Production 2019 est.	75,000 pounds
Working Capital	US\$7M
Shares Outstanding	159,935,563
Market Capitalization	US\$96.14 Million
All-In Cost (US\$/lb)	US\$37/pound
NAV5, \$80	US\$600 Million
NAV5, \$100	US\$900 Million



**Option #3: Ur-Energy Inc (URG, TSX:URE)** is a US based uranium producer operating the Lost Creek *in-situ recovery (ISR) mine*\* and processing facility in Wyoming, expected to produce 50-75,000 pounds in 2019. The company also owns the nearby Shirley Basin development project containing 8.8 million pounds and the Lost Soldier exploration project containing 14 million pounds.



*Photo taken at Ur-Energy's Lost Creek Mine, Wyoming. The well field blends in with the surrounding environment, with the disturbance barely noticeable.*

**The Ugly:** The company was one of the co-signers of the Section 232 petition mentioned above. The move cost the company a lot of goodwill with its customers and the unfavourable outcome has caused investors to sour on the stock. It doesn't help that the company lost \$6.3 million in the last 2 quarters.

**The Bad:** The average cost of production is over \$37/lb, which is 50% higher than the spot price. Luckily, the company doesn't sell into the spot market. It has long-term contracts in place to deliver 915,000 pounds until 2021, at an average price of \$48.15/lb.

**The Good:** The company has processing capacity of *two million pounds* per annum. ISR mines are unlike conventional mines in that they can ramp up production rapidly. If uranium prices recover, the company can very quickly drill wells, install new header houses, and commence production before the uranium explorers even finish submitting their permitting application. The Lost Creek mine is currently producing from 3 mine units, with potential for adding another 10 mine units. If uranium prices leapt up tomorrow, the company could move

**\* In-Situ Recovery (ISR) Mining 101**

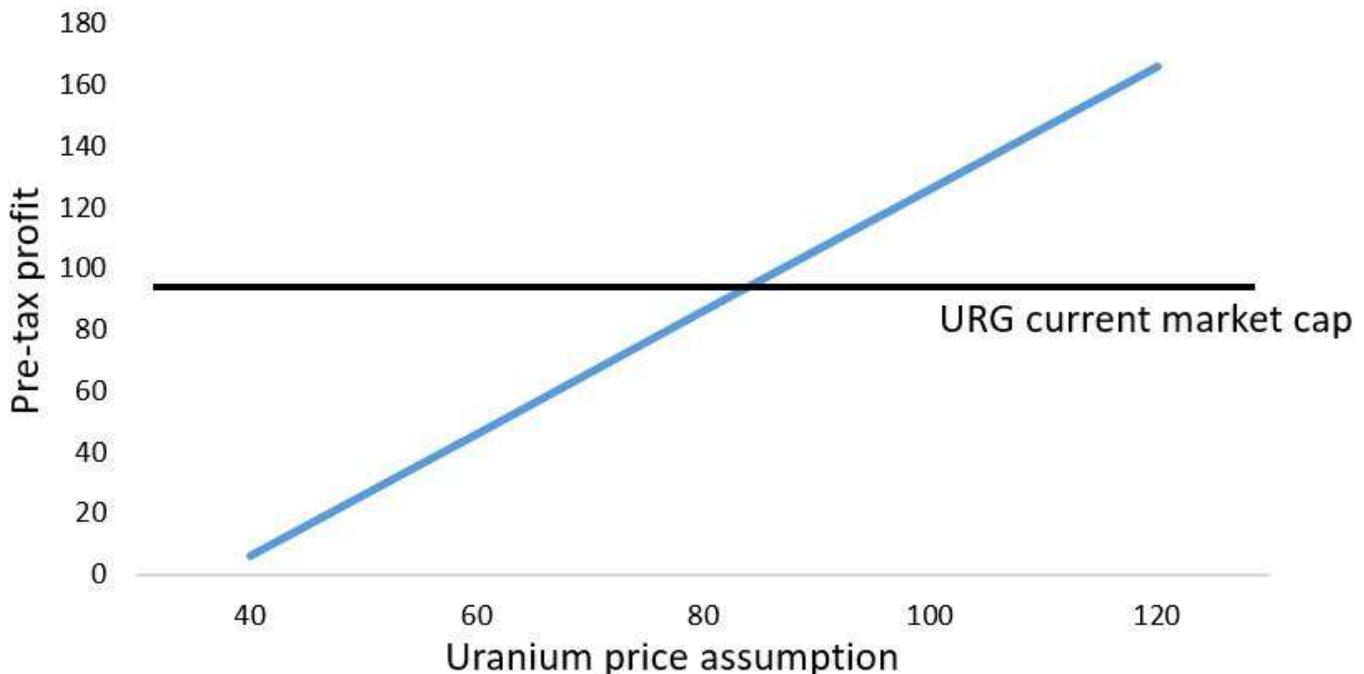
ISR mines are similar to oil wells. Injector wells pump a mining solution into the ground, which leaches the uranium from the host rock to form a concentrated solution. The recovery rate depends on time spent in contact with the rock, the concentration of the reagent used, etc. By making use of pressure differences, the solution is moved through the rock and toward the recovery wells, from where it is pumped up and sent to the processing facility. The well conditions are monitored from header houses, from which the operator can switch wells from injector to recovery, or vice-versa, in order to maximize uranium recovery. The whole setup is called a Mine Unit (MU), and several such MUs can operate in parallel across the land package provided they are designed to minimize well interference. ISR operations don't resemble mine sites; there is very minimal ground disturbance and no displacement of nearby animals.

fast enough to produce a million pounds in 2020, and double that to 2 million by 2021 by bringing on Shirley Basin. In fact, the company was prepared to do this should the Section 232 outcome come out in their favour.

**The Wild Card:** While rejecting the demands of the Section 232 petition, President Trump established a Nuclear Fuel Working Group to develop recommendations for reviving and expanding US uranium production. Trump recently met with Canadian President Justin Trudeau to develop a joint action plan between the US and Canada to collaborate on critical mineral issues, with uranium being one of the 35 critical minerals. There have been reports that Trump wants to purchase Greenland, a Danish protectorate, to access its mineral wealth. Being a protectionist at heart, he just might find a way to help US uranium producers.

Ur Energy is not without its risks, but it offers great optionality. At production of 2 million pounds at \$37/lb, the company's pre-tax profit would exceed the current market cap at a uranium price of \$85/lb. If that appears to be an unreasonably high price, recall that in the last uranium bull market, prices went as high as \$140/lb.

### Pre-tax profit at various uranium prices



For investors with a higher risk appetite, Ur-Energy offers explosive upside, a potential 10-bagger.

*Ed Bugos & Kashyap Sriram*

---

**Legal Disclaimer:** This information is for information purposes only and is not intended to be an offer or solicitation for the sale of any financial product or service or a recommendation or determination by TDV that any investment strategy is suitable for a specific investor. Investors should seek financial advice regarding the suitability of any investment strategy based on the objectives of the investor, financial situation, investment horizon, and their particular needs. This information is not intended to provide financial, tax, legal, accounting or other professional advice since such advice always requires consideration of individual circumstances. The products discussed herein are not insured by any governmental agency, are subject to risks, including a possible loss of the principal amount invested. Generally, the investments in this blog may be more volatile on a daily basis and have higher headline risk than other sectors as they tend to be more sensitive to political and regulatory events. Because of significant volatility, large spreads and very limited market liquidity, typically you will not be able to sell a low priced security immediately at the same price you purchased the stock. In some cases, the stock may fall quickly in value. Investing in foreign markets may entail greater risks than those normally associated with domestic markets, such as political, currency, economic and market risks. You should carefully consider whether trading in low priced and international securities is suitable for you in light of your circumstances and financial resources. This blog does not constitute an offer to sell or solicitation of an offer to sell any securities in the United States. The securities have not been and will not be registered under the United States Securities Act of 1933, as amended (the "U.S. Securities Act") or any state securities laws and may not be offered or sold within the United States or to U.S. Persons unless registered under the U.S. Securities Act and applicable state securities laws or an exemption from such registration is available. Past performance is no guarantee of future returns. TDV, entities that it controls, family, friends, employees, associates, and others may hold positions in the securities it recommends to clients, and may sell the same at any time. This document was prepared by Jeff Berwick and Ed Bugos exclusively for TDV Premium subscribers. The information contained in this document was taken directly from the company's presentation or from reliable sources; however we cannot ensure the accuracy of the information contained in this report. The author may be compensated for any introductions of accredited investors as it relates to this offering. Investing does come with some risk, however we will not be liable for any financial losses which might occur as a result of your participation in this financing. Please contact the company directly to verify any of the facts and figures.