Justin Huhn: Investing in All Things Nuclear

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Erik: Joining me now is Justin Huhn, a regular MacroVoices listener and editor of The Uranium Insider newsletter. Justin, it's great to get you on the show. I want to first congratulate you. You launched your newsletter in August of 2019. I wish I had discovered it then I've only been a subscriber for a couple of months, but I'm absolutely loving it. You are up right now 359% since inception August 19, on the stocks that you've recommended in your newsletter. At one point that was 450%, the market has been down a bit, obviously with the rest of the market down. But congratulations on terrific performance and glad to have you on the show.

Justin: I'm really pleased to be here, Erik, thanks for having me. Like you mentioned, I've been a listener for many years. So I'm really excited about our conversation today.

Erik: I am too and listeners, Justin has provided a slide deck to accompany this interview, you'll find the download link in your research roundup email. If you don't have a research roundup email, just go to our homepage macrovoices.com. Click the red button above Justin's picture that says looking for the downloads. Justin, the topic is going to be investing in all things nuclear and listeners if you missed it last week. We had Mark Nelson on talking about understanding all things nuclear, especially as we get into the advanced nuclear technology investment opportunities. You want to have heard that interview first so be sure to check that out.

I want to jump right in Justin, with what I think is the most important question because let's face it, nuclear power has been a really good idea for decades. But frankly, it's been a horrible investment because for good or for bad. The public perception of nuclear is anything but good. And obviously in the wake of Fukushima, it's only gotten worse. So why would investors want to think that that's changing now? What are the important catalysts that need to happen? And how do we get from where we are today where, you know, even in an energy crisis in Europe, you've got countries like Germany that are famous for their knowledge of engineering and technology, shutting down nuclear plants. So how could this be a sensible investment trend that we want to be long?

Justin: That's a really good question. I think it's involves a pretty in depth and nuanced answer. So I'll do my best here but to your point with Germany. Germany had, I believe it was 17 reactors at the time that the Fukushima Daiichi accident happened. They shut off about half of their fleet within a couple of years, with the plan to phase everything out by the end of this year. They have three remaining reactors online. Those were just extended to April. It's possible

that they get extended beyond that, but we're not holding our breath. I guess the bright spot with the Germany situation is that it's an example for all to see of what not to do. So Germany, not only did they phase out nuclear, which they have a fantastic, very highly efficient fleet of nuclear reactors in Germany that have been shut down for purely political reasons. There's absolutely no reason to shut these plants down early. In the doing so they vastly expanded both solar and wind in addition to biomass, which by the way, biomass in Germany which qualifies for quote, unquote, green energy is literally trees being cut, clear cut in the United States and shipped across the sea and burned to boil water. And that's their green energy and biomass.

But their multiple hundreds of billions invested in solar and wind have basically resulted in a net drastic increase in carbon emissions and general air pollutants in the country as the most polluting country with an exception of Poland in the entire EU. Why is that? Well, when you shut down your baseload clean energy, nuclear, and you expand intermittent renewables with insufficient backup, in terms of, let's say, battery supply, for grid scale battery storage. When the sun isn't shining, the wind isn't blowing, the only thing they have left, especially when Russia cuts off gas to Germany is coal that is a baseload power source that can cycle up and down easily, that can make up for the lack of energy that's being contributed to the grid by other intermittent sources. So it's been this the energy vendor program. Over the past decade, they've phased out nuclear. Gone all in on wind and solar, and it's been an abject failure. They're paying the highest rates they've ever paid. GDP is in a downward spiral in the country industry is closing up shop Volkswagen is thinking of moving out of Germany. I mean, it's just been an absolute mess. So the good thing about that is it's a shining example of what not to do. And so, you know, that's just kind of this general theme of this is what will happen as countries, if countries turn away from efficient energy dense source of electricity, such as nuclear with a very, very high EROI or energy return on investment, compared to solar, especially buffered solar, that is solar with some sort of backup, whether that's natural gas or coal or batteries, with an EROI of less than two to one. In society, generally speaking, to maintain the way that we live now. We need energy sources with a minimum EROI of 7 to 10-to-1. At slide number five, there's a there's a graphic that shows the various sources of energy and their corresponding EROI. I think this is a theme that is only going to grow because the countries that will embrace high EROI energy sources are likely to grow, to be richer, to succeed, to prosper, and have lower costs of energy and can therefore attribute those lower costs to a growth in GDP, growth in industry, etc.

To answer the second part of your question, or perhaps it was the first part of your question. Nuclear has been a great idea for a long time. Why now? Well, after the Fukushima Daiichi accident in Japan, shutting down all 54 of their reactors, there was a vast oversupply of uranium, the feedstock for nuclear energy. And this took a very, very long time to work through at the same time that Japan shut down. So that was about 10% of global demand. Shut that off pretty much overnight and Germany phased out about 10 reactors and relatively fast fashion. You had the Kazakhs continuing to ramp supply. You had mines that had locked in higher price, long term contracts continued to produce, and it wasn't until 2016, 2017, 2018 that we have mines actually start to go into care & maintenance. So Cameco is rapid Lake Paladins Langer, Heinrich and Namibia. Cameco’s MacArthur river finally in 2018. And it took another couple of

years to work through that abundant above ground mobile inventory, which brings us kind of up to today where this, this vast oversupply has mostly, if not entirely been worked through, yet nuclear continues to grow. So if you look on slide two, nuclear is actually a growth sector, which flies in the face of the sentiment that seems to be relatively prominent around nuclear and that that is that tends to be dissipating right now. There certainly is a real embracing of nuclear as a clean energy, as it should be. There's bipartisan support for nuclear in the United States. Nuclear has been approved for the green EU taxonomy, low cost, quote unquote, green funding opportunities in the EU. And right now, there are 60 reactors currently under construction. That's 58 gigawatts, there's about 360 gigawatts currently globally. 112 reactors are planned, that's another 120 gigawatts. And 324 reactors are proposed, a lot of that is coming from China. 22 reactors in China alone under construction right now. And they're planning you know, China thinks in decades, they're planning to have 200 gigawatts of nuclear by 2035. And currently, they're sitting on around 52 gigawatts. So they're looking to quadruple their nuclear fleet in the next 13 years, which is obviously quite the undertaking. But there's much more nuance to the why now, but I would say, just the broad picture that shows you on slide one, this is the World Nuclear associations fuel report from 2021. They will have they do this every two years, so it'd be an updated one next September. This shows you the upper scenario. Now they put out three scenarios to model out supply and demand. And why did I share the upper scenario? The reason is because there's been a major de risking of nuclear in the United States and in the West, generally, with funding support from the inflation Reduction Act. And so we have not only a de risking of reactors in the West, but we actually have new reactor builds happening in a lot of countries in the West, as well as in the east. Just this last week, India announced they want to build 21 new Reactors by 2031. Just a major major step towards clean baseload energy. And so we have this growth sector. We have a significant disjunct between supply and demand. And we need the commodity price to rise substantially in order to incentivize those projects on the margin. That's kind of the long and short of the of the greater thesis and there's some more short term and long term nuance I can get into as we continue this discussion.

Erik: Justin with everything going on in the world. Let's talk about the bifurcation of this market specifically with regard to China, Russia, all of a sudden, we're not friends with them, we may have trade relationships cut off with them. Is that going to play an important part of this market and the bull trend that you see coming?

Justin: That's a really, really important question, especially when it comes to the short and mid term for this investment thesis. Essentially, the market is bifurcating. This is not historically new. This has happened in the past, but what we're seeing is a bifurcation between the West and Russia. Russia is a major player in both conversion and enrichment, which we can talk about the fuel cycle a bit more in depth later, but it's really really important to understand that this market has bifurcated and is likely to remain so in that has very, very large implications in the fuel cycle, and especially for uranium demand in the coming years.

Erik: Justin, I want to talk about the timeframe that you envision for the coming market in all things nuclear energy because it was really fascinating to me to be introduced to your newsletter. I was thinking, at least in my own perception about nuclear, I tend to think about long

term trends. And it was so validating, for me to say okay, I know I'm good at long term trends. Sometimes I get excited about a long term trend without thinking about what the short term looks like. I think a lot of the arguments that I've seen in your newsletter are focused on why with everything going on, including the bifurcation that you just talked about, there's a really strong bull argument for uranium in the next year or two. I'm actually thinking about much farther out, because from my perspective, uranium and nuclear energy in general, are never really going to take off until we get through a major sea change of public sentiment. And I think it's going to take an energy crisis to do that. And unfortunately, I think that energy crisis is coming pretty soon. So I was thinking about the reason I'm excited about nuclear energy, is I think after the energy crisis, we're going to have a forcing function, where all of this political virtue signaling of new renewables are the way to go. It appeals to a certain political sector, I think the entire world is going to get pissed off and say, okay, this whole exaggerated climate policy thing has caused an energy crisis, which has put the world in a world of hurt. We need politicians that are going to have a completely different strategy. And I think that's where you're going to see a huge nuclear renaissance. It was fascinating to me to not really see that sentiment in your newsletter. Is that just because you're focused on the immediate investments? Do you see it that way, as well? And what do you think about in terms of, you know, is this a bull market for the next year or two or for the next decade or two?

Justin: That's a good question, Erik. Well, I would say definitely, I'm with you in terms of looking at investments for the long term generally speaking as a fundamental investor. We definitely are very bullish for the long term, I suppose if you've noticed us focusing on more on the short and the mid term that primarily has to do with the fact that we follow the sector on a daily basis. And so the daily ups and downs we pay attention to it, which kind of is contrary to being a long term investor, right? But it is what it is. That's part of the service that we provide to our newsletter subscribers is a maintaining a very close watch on the sector day in day out. We watch ETF flows and the flows into the Sprott physical uranium trust, look at the charts on a daily basis, etc. Though, we have both a short and midterm and a long term vision for this investment thesis. If you look into the last slide, slide number 12. I lay this out, sort of simply it with a number of bullet points here on both the short and midterm and the mid and long term investment theses. So, you know, I'll talk about the long term first, because I think that's really, really should be the focus of anybody that's kind of a new entrant into this sector, because the short term can be notoriously volatile. The stocks don't always move in the way that you think that they should, based on news flow, based on sentiment, whatever it might be. And then they just absolutely take off when it makes no sense. But if you zoom out, and you actually look at the long term trend, we're clearly in a long term bull market. And we think this is going to last for many, many years.

Justin Huhn
So what's the long term thesis? The primary thesis here is we're into year one of a long term, term contracting cycle. The way that utilities generally buy uranium is through long term contracts. It's not on the spot market. And we've had the last decade an under investment in terms of term contracts by utilities, because they've been able to source material both on the spot market and through something that's called a carry trade. And the carry trade was

essentially traders would sell shorter term contracts. 2, 3, 4 year contracts to utilities, and then they would go out and source the material, they would add in the cost of capital, a small profit margin, and they would hold that material on their books. Now that went a long way to clean up to the above ground supply, as I already previously mentioned, was there from post-Fukushima. But it's only very recent that this supply has been worked through. The carry trade is essentially dried up, the spot market has dried up, and utilities are coming back in mass to the table to sign term contracts. So this year, we're going to see we've already seen 112 million pounds in long term contracts. That's the highest level of long term contracting since 2012. And it still is not a replacement rate contracting here. What I mean by that is on an annual basis, utilities will consume globally, about 175 to 180 million pounds of uranium every single year. And to have if you look at the chart on slide number 12 you'll see for the last many years, we've had less than 100 million pounds of long term contracting year over year, for the last decade. So this year is the first year in my opinion of what is going to be a multi year long term contracting cycle. Couple of points on the long term, untenable supply deficit means a doubling of the current price is necessary to incentivize marginal cost of production. The projects that are on the margin in terms of their cost of producing, those will have to come online to fill the supply gap. If this sector grows in the way that it's projected to grow. We're going to need that uranium out of the ground, and it's going to cost more than 50 bucks a pound to make it happen. Nuclear renaissance, this has to do with gosh, there's so many points here, Japan, turning their reactors back online. They've restarted 10 reactors now. They're putting in writing this month. It hasn't yet happened yet, as of the time we're talking here, Erik. But this month, Japan is putting in writing their plan going forward. And also keep in mind Japan is the only country that has suffered the terrible outcome of nuclear attack and the nuclear meltdown at Fukushima Daiichi that's most recent, everybody's memory yet. Japan is majority in favor of nuclear. That's something that I find absolutely fascinating so Japan is coming back. South Korea did a 180. United States is extending their fleets and pushing into advanced nuclear, we can talk about that later. On and on and on. There's a full on nuclear renaissance. Starting right now, nuclear, as I mentioned, is the highest energy return on investment.

In 2 year point, I think the intelligent countries that are thinking in terms of decades are already doing this. It's not going to take an energy crisis for China to be building 150 gigawatts in the next decade plus. It's not going to take an energy crisis for South Korea to pivot. United States is not quite there. We're not seeing a total energy crisis here yet. Yet, we're starting to embrace nuclear, that's a very positive sign or re-embrace it. Then again, the potential for robust uranium super-cycle is really what we're talking about here. And I think the future is very bright. One more point I'd like to make on the long term. If you go up to let's see, back to slide number four. The IEA, the International Energy Agency, they do a report every year called The World Energy Outlook. Now the IEA is coming from a standpoint of carbon emissions and climate change, right. So whether or not you are I might be in line with that sentiment, we have to look at what they're proposing and where things are going, regardless of how we feel about this. And that the IEA is saying exactly this. They want to double nuclear, more than double nuclear to what is it 5400 terawatt hours by 2040. Let's say more than doubling in the next 17 years. Now, this is coming from the International Energy Agency. This is not from some bullish slideshow from an investor. This is the IEA saying, hey guys, this is where we need to go. Now, in my personal

opinion, whether or not this has to do with climate change, or a peaking of cheap oil production, the world is going to need to continue to move in the direction of an efficient energy source. And nuclear is the only thing that really fits that bill, if you want to move away from fossil fuels. Long term, the setup is fantastic.

The short term to the midterm, so let's say the next 12 to 18 months, the big potential for this to move and potentially move violently to the upside has to do with a spot market with very little material there. And the existence of the spot trust. So that's the Sprott physical uranium trust, affectionately known as SPUT. The way this vehicle is set up. This is a physical uranium trust, they buy and hold uranium. When they buy uranium, it goes to Uranium heaven as uranium Twitter community likes to call it. They're not sellers of uranium, and they have an ATM. And so when the trust is trading at a premium to its net asset value, they issue trust units in the open market, they raise cash, they buy physical uranium. So this is a means of investors to actually literally put a squeeze on into the physical market by buying this trust. It has happened multiple times since the inception of this vehicles ATM. That was August of last year. We saw a huge squeeze last year coming from financial flows into spot where they purchased 10 million pounds in just over a month. They set the spot price from the low 30s into the mid 50s. In the course of about two and a half months. And uranium equities doubled and tripled in that same time period. happened again a bit this last year, in March and April, before markets generally went super risk off kind of late April, early May. And it kind of stayed that way for the remainder of the year for the most part. But this vehicle exists and it isn't going to take a lot of capital flow to really really put a squeeze on that physical spot market. So the potential is there for there to be a sharp spike in price and it could happen in a relatively fast fashion. The chances of that happening are not zero. We're not necessarily betting on that happening. We'd like to take the longer term view where we think this could very easily be a three to five year bull market and potentially much, much longer if things go the way we believe that they will.

Erik: Let's dive into the opportunities to invest in this space. We're going to break it into two sections, starting with public equities and other things that are available to everyone, including retail investors. And then we'll do a section for the investments that are only available to accredited investors and institutions such as private placements in the advanced nuclear space. Let's start with what's available to everybody. What's a quick table of contents of what we're going to talk about in that category.

Justin: The investment opportunities in the space for both nuclear and uranium consist of essentially uranium mining equities. The physical trusts are the physical funds that hold physical uranium, the ETFs that hold a basket of miners. And then there's a couple of plays that you can expose, as an investment, expose yourself as an investor to elements of the fuel cycle conversion, enrichment, etc.

Erik: And what other opportunities exist in private equity or elsewhere for accredited and institutional investors?

Justin: Well, I think there's a lot of opportunity for private equity in terms of advanced nuclear companies, there's dozens of companies right now working on designs for advanced nuclear and SMRs. Most of those are private. There's one that went public recently, that's NuScale. There's another going public next year, that's X energy. And in terms of accredited investors, there's obviously always private placements happening throughout the sector as there are at any resource and metal sector.

Erik: Justin, as an entrepreneur and technologist, I personally felt just so excited about being part early on in this whole nuclear technology trend that I see coming, particularly the small modular reactors, molten salt reactors, thorium, all of these exciting new technologies. But I had the opportunity to talk off the air with Mike Alkin, the very highly respected hedge fund manager in this space. And he just said to me, look Erik, you can try to be smarter than the rest of the market, and figure out who's going to win the bake off if you will, between SMR designs, and try to figure out who's going to get it right and bet on that. Or you can take the approach that Mike takes, which is don't try to be expert on something you're not expert on. Just to understand that no matter who wins the contest, they're going to need uranium in the end. And Mike said, I want them to buy their uranium from me. Mike Alkin. So his approach is forget about trying to understand all of what's coming in advanced technology. Just focus on the fuel and the people that make the fuel. What's your approach and your strategy? Do you think it makes more sense to invest in the fuel and the miners and so forth or in the advanced technologies?

Justin: Yeah, I would say we have a similar approach as Mike does. I'm big fan of Mike and his work. And he's been a good friend throughout this process. I think that he has a very intelligent approach here. While at the same time, I think there's incredible opportunities to be had in the coming years for advanced nuclear and SMR companies that largely are private companies right now, and will be slowly going public. That's an exciting space. We're definitely going to be watching that going forward. But as of right now, I think that it's the easiest investment case is to understand where the commodity is going and who will be profiting from mining that commodity.

Erik: I'd like to move now to slide eight in your slide deck. And what I'm going to ask you to do is explain to our listeners, this whole process of how the nuclear fuel goes from coming out of the mind conversion, enrichment... What are all these things but along the way, let's talk about where the investment opportunities in. So this starts with uranium mining, how does that work, who are the players?

Justin: So uranium mining... uranium is the is the source metal that goes through a variety of processes in the nuclear fuel cycle to result in fabricated uranium fuel that goes into the nuclear reactor. This is a fissionable material that heats up, boils water and spins a turbine. Really what we're talking about is a very complicated way to boil water. But the energy density is so incredible for uranium and for nuclear, that this whole process considering all of the energy that goes into the mining in the fuel cycle still has an unbelievably high return on energy investment. So starting off is the mined uranium. This comes out of the ground via an underground mine, open pit mine, or an ISR mine which is a series of injection and recovery wells using an acidic or

an alkaline fluid or an oxygenated fluid to interact with the ore body in the mineral extracted. A very low impact, that's how the Kazakhs mine uranium. That mined uranium. So the mined uranium and the uranium miners is the prominent way for investors to have exposure to the nuclear and the uranium investment thesis. Most of the companies are uranium miners or prospective miners, explorers, developers, and producers. There's about 65 companies publicly traded that are uranium miners across those three types of miners. And then getting into the rest of the fuel cycle. There's a few other opportunities. So that mined uranium, that's the yellowcake. It goes through mild processing to turn it into uranium oxide. That's the yellowcake, the yellow powder that everybody knows. But that material can't be enriched in the current enrichment centrifuges that we have. The gas centrifuge technology that's used all over the globe. So it has to be converted into a gas first. That goes through a conversion process where it's converted into Uranium hexafluoride or UF6, also called natural uranium. That UF6 gets sent to an enricher, which by the way, for conversion exposure in this market, there's really only one option right now, and that is Cameco. Cameco not only has the Pork Hope conversion facility in Canada. They also have 49% stake in Westinghouse and Westinghouse has a idled or shuttered conversion facility called Springfield's in the UK. That's pretty much the only way for a for a public investor to have exposure to to the conversion process.

That converted uranium or the UF6 goes to the enricher. The enrichment process is basically where this gas is placed into a centrifuge and spun at very high speeds for very long time. And the reason it does that is to separate the U235 and the U238 isotopes. I know that Mark went into this a bit, so I won't spend a lot of time here, the U235 isotope is the physical isotope. In natural uranium, it's about .7% of the total mass that needs to be enriched up to about four and a half percent in order to be utilized in most of the world's reactors. So that enrichment process, there's a few options for investors to have exposure there. One would be through a company called Silex. They own the technology for global laser enrichment. Cameco is a minority shareholder in GLE. This is sort of the next wave of enrichment technologies, it's very prospective, very exciting, could be much lower costs. And there's some concern around potentially this technology getting in the wrong hands with around proliferation. We'll have to see how that plays out. As of now, they're looking to start some production of enrichment using this laser technology. I believe it's 2026 in the United States, you know, re-enriching tails material from previously enriched uranium. You also have a company called Centris. Centris doesn't actually own their enrichment facilities, but they are an operator of these facilities. They have largely relied on Russian material. So that's a little bit of a tricky one, definitely do your due diligence. They did just get a contract awarded from the DOE to establish the first domestic HALEU circuit that's high assay, low enriched uranium. Erik, I know, you know, HALEU is largely going to be the fuel of choice for a lot of these advanced reactor designs and SMRs. And the United States is moving as quickly as they can to get the circuit established, so that we can expand nuclear here domestically, especially with advanced designs and small modular reactors. I think that's all there is in terms of enrichment. Exposure possibilities, going forward, that enriched uranium then is de-converted back into a solid form and then fabricated into fuel pellets, which are placed into fuel rods of various design. That fabricated fuel is unique to each individual reactor, and then it gets placed into the reactor and it stays in that reactor core, usually for 12 actually, each core stays in for a number of years, the reactors swap out 1/3 or

1/4 of their fuel load every 12 to 18 months. And then from there, you go into spent fuel storage and waste disposal. I know Mark got into that. So I won't go into it.

Erik: Okay Justin, terrific answer. I want to go back and ask you a few questions along the way. I didn't want to interrupt you because you were on such a roll there. But let's go back to the very beginning of the process, mining and milling. So I'm assuming that similar to the gold market, this is broken up into junior companies that are exploring for and looking for uranium, and then senior companies that are actually producing it. So in the mining space, before we even get any yellowcake uranium. What's your general approach? Is it I think you focus mostly on the juniors and juniors I think I've seen that your portfolio appear to be pretty close to reaching production. How do you think about the investment strategy for investing in miners themselves?

Justin: Well, we tend to focus on the developing companies. We think that's really kind of where the sweet spot is, in terms of having a lower valuation higher upside potential, but not necessarily with the risks of the explorers that have yet to make a significant discovery. Obviously, the you know, the larger caps producing companies have less risk, but the developers I think are really where you can have substantial upside potential for a company that will be getting into production and actually be producing cashflow and producing uranium during a bull market. And that's primarily where we focus on. Obviously, each individual investor has to look at their own their own portfolio, their own risk tolerance, their own and goals for that investment to make that decision, but we tend to focus on the developers. With that said, a small cap explorer just like in the golden silver space can make a significant discovery. In a bull market, you can have really incredible returns in the uranium bull market for an exploration discovery company.

Erik: Now that first white arrow between mining and milling and conversion would be the actual U308 yellowcake uranium, if you want to invest in just the Mike Alkin doctrine. I want to own the uranium. Sprott physical uranium trust is one way, YCA which I don't know what that stands for. But that's another ticker symbol that I know is in that space. What do people need to know about investing in the physical yellowcake uranium? Is there anything that we need to understand there and who are the players?

Justin: So, I mean, you can actually physically own uranium. That is not against the law. I know there's regulations about it, I know it's a bit more complex, compared to owning a trust or a fund that holds the physical uranium. In fact, when Sprott took over uranium participation Corporation in July of last year. There were a number of hedge funds that were holding actual physical uranium, I mean, not It's not like it's in a can in their garage, right? They own it on paper while it sits at a conversion facility, but they ended up selling that uranium to Sprott in order in exchange for the trust units because the Sprott physical uranium trust is a highly liquid vehicle and you don't have to actually hold uranium on your books. So unless you want to hold the physical stuff yourself on paper at a conversion facility somewhere in the world, the best way is through either the spot trust. YCA, as you mentioned, is the yellowcake plc. That's a physical fund, they buy 100 million dollars worth of uranium from Kazatomprom every year and

ANU energy will be launching next year based in Kazakhstan. They'll also be buying uranium from Kazatomprom and they already raised 74 million, they're looking to do an additional 400 million in early Q2, and then another 100 million upon IPO. So that's going to be a pretty chunky amount of purchasing next year from that vehicle. And yes, owning uranium is probably the lowest risk and best risk reward in the space because the likelihood of seeing much lower uranium prices is very, very small. And the upside potential is very, very high. So a liquid vehicle that spot is an easy choice for institutions and those wanting a less risky bet and with good liquidity.

Erik: Now, there's another aspect of this that I want to ask you about because my thinking on this has been as follows. I'm really, really excited about this space. But I don't think that the broader bear market in the stock market is over yet I think we've got another big wave down. I don't think the bottom is in. It seems to me that if you want to get into this space, and you kind of feel like probably those mining companies are going to get dragged down with everything else when the bear market takes hold. Obviously, we're trying to speculate and time to market which can be a dangerous thing to do. But if you're inclined toward doing that, it seems to me that the safer thing right now, if you're going to eventually own both physical uranium and mining stocks is to buy the physical uranium first, maybe wait for a lower point in the stock market, the broader stock market before diving into the mining shares. What do you think about that strategy?

Justin: Um, that seems like a definitely a risk averse strategy. So I wouldn't argue against it. If you actually track let's say, a basket of uranium miners and chart URNM against the commodity itself against either the spot trust or the UX1. You'll see that we are in a long term outperformance of the S&P, beginning essentially at the start of the bull market, which in my opinion was December 2020. We've had obviously our cycles this past 12 months outperforming underperforming the S&P. I think that when the commodity starts moving and starts moving substantially to the upside, is when really you could have substantially more leverage with the miners in the short period. I don't think the downside potential is very large for let's say this profits of uranium trust is sitting right now at a 10% discount to NAV. The lowest it's ever traded is something like a 17% discount. It didn't stay there very long so betting on the commodity rising is a much much safer bet than the miners at this particular stage. But obviously for a mid to long term hold you'll have far more leverage at the miners.

Erik: Let's move on to conversion and enrichment because both of those processes are things that seems like all the experts agree. We've got a big problem now with the bifurcation of the global economy. All the supply of this came mostly from Russia, probably that is going to be encumbered in terms of trade relationships. It sounds like for conversion Cameco is really the only investment play in the conversion space. Is that right?

Justin: Correct.

Erik: Okay, and the next white arrow between conversion enrichment would be physical UF6. Now I'm guessing as a Gas, that's probably not practical. But could there be such a thing as a physical UF6 uranium gas trust? Would that make sense? Because it seems to me if, if you

think that conversion is going to become a bottleneck in this process, buying physical UF6 or some kind of call on physical UF6 would make a lot of sense to me. Is that a possible investment?

Justin: I'm not really no. Uranium Participation Corp before they were taken over by Sprott did hold a little bit of UF6 in addition to 308. But for whatever reason, when Sprott took it over, they decided to hold only 308. So they sold or they swapped the UF6 for uranium. And you know, it's interesting because even though the market is very, very thin for UF6 right now. It is conversion that's at all time highs in price. So the actual service itself is at all time highs, whereas UF6 is not sitting at all time new highs. It's in a very strong uptrend, and it's up substantially this year. But you know, owning a company like Cameco, that has not only the existing Port Hope conversion facility that's up and operating printing cash right now. But they have that minority share in Westinghouse with the potential for Springfield's to come online. So you can get conversion exposure through Cameco.

Erik: Let's move on to enrichment. The process of using either centrifuges or in the future, perhaps this new laser enrichment technology to separate the U235, which is the stuff you want to use in order to make fuel from the U238. Which is the stuff that you don't need in order to make fuel. You said earlier that this is really the big bottleneck that everybody's expecting with Russia providing most of the capacity for enrichment. If we don't have access to Russia, how do speculative investors benefit from that impending loss of Russian capacity?

Justin: Well, that's a really interesting question. I'm going to argue that the biggest benefit is going to come to the uranium miners. And I'll do my best to explain that if you want me to get into this bifurcated situation of what it means for the fuel cycle.

Erik: The loss of enrichment is going to benefit the miners. I would have thought you'd say the enrichment companies, whoever's doing that, or whoever has capacity to add enrichment facilities would benefit.

Justin: Yes, I do believe that the uranium miners will be the biggest beneficiary and I'll tell you why. The current enrichers which in the West are Urenco and Orano. The current enrichment capacity for Western enrichers is approximately 27 million SWU. Okay, that's separative work unit, that's the actual capacity to do the work of enrichment. It cost about a billion and a half US dollars to expand 1 million SWU and let me tell you, neither of these entities are going to be expanding their capacity, unless they have the enrichment contracts in hand, to justify that capital risk and the work to expand. They can expand, it's going to take years, this is going to take three to five years. This is about the timeframe that we will potentially see laser enrichment come on the scene which is Silex and Cameco's co-ownership of Global Laser Enrichment. That's an exciting technology, but it's still years away. So what does that mean for right now? Well, conversion is really the pinch point, because you can't artificially increase capacity through any sort of mechanical or chemical means other than actually building out more conversion facilities. In Richmond, you can artificially expand capacity by altering the process and essentially raising what's called the tails' assays of the enrichment process. So the

tails are essentially the material that's leftover after the enrichment, right? Like you mentioned, you're trying to separate U235, U238 to enrich the percentage of U235. Well, you end up as U238 rich tails material after that process. That material can be re-enriched and that has been in the past. But really, what we're talking about here is for the enrichers, to pump out more material faster with the same capacity that they currently have, what they can do is utilize less SWU so that they spin it faster, but they have a higher tails assay. So there's more of the good stuff more U235 left over in the quote unquote waste material of this process.

So when a they sign an enrichment contract, they're actually specifying the tails assay in that contract. And typically, in the past that has been somewhere around 0.2 tails. Now, if your listeners go to slide number 10. This kind of shows the demand for natural uranium relative to the tails assay within an enrichment centrifuges process. So what the Western enrichers are already doing are not only both increasing the operational tails assay, which means they're utilizing more uranium on the front end. They actually have to push more uranium into the centrifuge than was provided to them as feedstock by the utility that signed that contract. That is overfeeding and the enrichers have to actually go out into the market and buy UF6 to cover that which they are. They make up for that in rising SWU prices. So the actual cost of SWU, the cost of enrichment rises, which it has been. In fact spot SWU made a 30% jump last month. So we know that this is happening right now. But what they also do, and this is really the secret sauce of why this is going to benefit the miners more than anyone. The western enrichers are, like I said, prior, there are only 40% of global enrichment capacity similar to Russia in all of the West. But there's 70% of demand in the West. Okay so what they're doing is new contracts that the Western enrichers are signing with Western utilities for future delivery. We're talking 2027 through 2032 and possibly even beyond that and utilities are acting on that timeframe currently for contracts for all elements of the fuel cycle.

These contracts later in the decade are being signed at much higher tails assays that have just previously been signed and operational. So we've been in the 0.18 to 0.2 range for quite a few years. They're signing these contracts at the high 0.2s in to .3 and beyond. So what that really means is, when a utility signs this contract, and they say we need this much KGU of enriched uranium product, this level of enrichment, and we sign it at 0.3 tails, that equals an amount of UF6 they have to provide. Well guess what, there's no UF6 to buy right now. So what does that mean, they have to contract with the uranium producers, buy uranium to feed into this fuel cycle. And a .3 tails assay contract is a 20% plus increase in feed demand over a 0.2 tails contract. So that jump from 0.2 to 0.3 is a 20% increase in uranium demand. We're talking very, very big numbers of uranium demand, starting essentially now. So we could be seeing within a year or two. You know, right now we're talking about 180 million pounds of uranium demand this year for 2022. We could be seeing 2024-2025, 200, 210, 220 million pounds of demand because of this higher tails assay in these western enrichers. That's a big, big jump in uranium demand, and the miners that can produce into this market will be massive beneficiaries of this.

Erik: Now fortunately Justin, I am an avid reader of your newsletter, and I knew that this whole discussion of underfeeding and overfeeding would probably confuse some of our listeners. So I've been working hard on my simplification summary of what you just said. If I am

running a hand cut french fry shack on the beach, and it's a beach so therefore it has an offseason and an on season. In the offseason, when demand is low, I'm going to tell my employees look, really put some effort into cutting up those potatoes and don't waste any of the potato meat because business is slow. And I want to keep my employees on board. So we really need to conserve here. But when we get to high season, and there's a line of people waiting to buy french fries, I'm going to change my business process what I'm going to tell my employees as look, chop the potatoes as quick as you can, because we need french fries, and we need them now and we don't have a lot of fry later capacity, we need to keep the process going. If that means that there's a lot of extra leftover potato meat in the scrap pile, so be it we can afford it. In the analogy, the high tails assay is that extra meat in the potato pile. And what we can do with that potato pile is walk across the street to the breakfast restaurant next door and say hey you guys, I've got a whole bunch of extra potato meat in my scrap pile. You could use it to make home fries for breakfast tomorrow morning. Why don't you buy it from me. And what they're actually doing is they're enriching uranium through a process, which leaves a lot more waste, which is the hightails assay. But instead of selling it to someone else across the street, they're actually kind of recycling it themselves and using it in their next cycle is my french fry interpretation of this reasonably close to correct.

Justin: I think that was a really, really good analogy. Most of the time, people will talk about, like pressing oranges and making orange juice, but I like the French fry analogy better. Yeah, that's really good. Um, the only edit I would make is that they're not actually ending up with more tails material, it's just that the tails material has more U235 in it at a higher tails assay. And eventually, when the when the cycle turns as all cycles do in commodity sectors, right? There'll be a point where Western enrichment expands and maybe demand will pull back a little bit at some point in time. And they'll be able to utilize that extra capacity to re-enrich that material. So they'll take the tails material that's out of point three, and they'll put it back in the centrifuge and enrich it up to 4.5 and sell it as up and that's something that has been happening is tails re-enrichment. One more point on this, if I can make, Erik really quick is that underfeeding has been a major source of secondary supply. And that's been about 25 billion pounds a year globally with 40% of capacity being in the West. We're talking about 10 million pounds of underfeeding that's not coming into the market as UF6 into the spot market. That's because there's no extra capacity with Western enrichers right now. And they're having to overfeed the centrifuges, whereas when they had extra capacity, they could actually run a lower tails assay than what was in the contracts. The utilities provide that UF6, they use less of it than they need, because they're at a lower tails assay, that's underfeeding. So 10 million pounds of underfeeding gone, plus overfeeding, plus these higher transactional tails, that mean way more uranium buying by the utilities to fulfill those contracts.

Erik: And I want to pull this together Justin by going back to your original point about the uranium miners being the beneficiary of reduced Russian enrichment capacity, and tie it back into my French fry analogy, which is if you're the potato farmer, which is to say, the guy who owns the Sprott physical uranium trust. What happens is when demand picks up for French fries, demand for your product doesn't pick up proportionally it's actually exaggerated exponentially, because the business process is changing so that not only is there more demand

for French fries, but that results in much more waste in the French fry preparation process. and it's not really wasteful long term. But at least in terms of immediate flow of demand, it means that when the French fry demand picks up by 50%, the potato demand is going to pick up by 80%. And that's essentially what you're predicting, with a shift from underfeeding to overfeeding in the uranium enrichment process. Is that correct?

Justin: That's correct. And really, you know, the overfeeding is part of it. And that's a smaller part of it. Because there's limited UF6 availability, because of that conversion bottleneck currently, that gets alleviated a bit next year. But it's the higher tails assays in these contracts, that really means the uranium demand, because your utility, you're signing that contract for 2025-6-7 delivery, you're signing the conversion contract, and then you're going to buy the uranium. So you're not needing to buy that UF6 in this moment to feed that enrichment contract. You have a few years to figure it out. So you go to the miners and you buy that uranium. That's the big demand that's coming from miners. And it's going to have a very accretive move on the price of uranium in my opinion.

Erik: But the signal to investors that's available right here right now is they're signing contracts at higher tail assay values. What that means is, they're signing contracts that says when we buy our next batch of potatoes, we're not going to use all of the potato meat to make french fries, we're going to essentially waste a whole bunch of it because it's more efficient for us to consume more potatoes than it is to be stingy about how we cut up those potatoes in order to use them. So there's a really good signal there that says for uranium demand, it's about to pick up and pick up substantially. And to whatever extent this bifurcation of the economy between Russia and services of Russia being available to the west continues beyond just the Ukraine conflict, the longer it's going to last.

Justin: That's correct, unless and until we have significantly expanded capacity for actual enrichment in the West, which will happen eventually, not only with laser enrichment, but assuming that the Western enrichers do get sufficient contracts and the demand is currently there for them to invest in expanding those centrifuge cascades, they'll do so. But we're looking at you know, probably a three to five year timeframe of much higher transactional tails. And that perfectly aligns coincidentally with the beginning and the continuation of the term contracting cycle for uranium. So for the utilities that acted early over the past couple of years in signed contracts with Cameco, or Kazatomprom, or Orano and the signed enrichment contracts and locked in 0.2, 0.19, 0.21 they're sitting pretty. For the utilities that have to sign enrichment contracts right now at 0.3, they've got to buy 20 to 25% more uranium than they would have if they signed that contract 12 months ago.

Erik: Let's talk a little bit more about what's on the horizon in terms of enrichment technology. Sometimes industries get leapfrogged and people get put out of business. You look at travel agents with the advent of the internet, you just didn't need them anymore. Tell me about this laser enrichment thing. Is it really something where maybe everybody who's in the centrifuge business is just going to be put out of business one day or is it more of something that's kind of further out in the horizon and we're not even sure what to make of it yet?

Justin: It's definitely real. It definitely holds a lot of promise. But it is further out on the horizon. I think first commercial availability of laser enriched EUP or enriched uranium product coming from global laser enrichment is still something like five plus years away and minimal capacity. So it's going to take a long time for this to ramp up commercially. And still, the writing's on the wall if that's exactly where the world is going in terms of uranium enrichment. I don't think that gas centrifuges will be entirely obsolete, at least not in the let's say the next decade, or a decade or two. But eventually this could be the way that the world enriches uranium if it pans out in the way that it looks like it could. It's definitely very promising.

Erik: Moving on to the next white arrow between the enrichment circle and the fuel fabrication circle, we've got enriched uranium. Now, I'm guessing that that's not something that you're allowed to own in keeping your basement. Is there an investment play Justin to either own physical enriched uranium or to participate in the fuel fabrication process. Who makes money in that space?

Justin: There's only really one fuel fabricator that's publicly traded, that's Lightbridge. And they deal with an accident tolerant fuel. It's a little bit of a black box. It looks like relatively promising technology. But that's pretty much the only option in terms of actual fuel fabrication that you can invest in.

Erik: In terms of this overall process. Is there a strong correlation between the price of uranium and the price of fossil fuels? If I think there's going to be a crash in oil prices or if I think there's going to be a dramatic oil bull market? Should that change my view on what uranium prices are likely to be in the future?

Justin: They're not really all that correlated. The uranium commodity tends to sort of act on its own in terms of price movement, because it's driven by its own internal fundamentals. And you know, interestingly enough, in a recessionary environment where you see, oftentimes oil and gas have big downdraft in the pricing during a recession. Uranium is a baseload energy. And the nuclear reactors typically don't cycle down that much even when there's reduced demand in a recession. So typically, recessionary environments don't necessarily have a direct implication on the price of uranium, nor does any correlation to oil and gas or anything else for that matter. With that said, rising fossil fuel prices do make uranium and nuclear look more attractive. That's certainly been one element that is pushing the Japanese to restart there absolutely fantastic idled fleet that's just sitting there collecting dust, when they're paying through the nose for natural gas and coal, and polluting their people at the same time. So it has an effect, but it doesn't actually correlate, you know, one to one in terms of the commodity pricing.

Erik: Justin, when I read the November issue of your newsletter, uranium insider, something I found fascinating was this quote, you say finally, in terms of energy density, one uranium fuel pellet, which is about the size of you know, a marble or something has as much energy as one tonne of coal, 149 gallons of oil, or 17,000 cubic feet of natural gas. These are astonishing

figures. There's just no other way to put it. Now, I agree with you. They are astonishing figures. But I don't think that's actually the energy density of that pellet. I think that's just the energy density of what we know how to get out of that pellet using the existing light water reactor technology. The outcome of using that existing reactor technology is that pellet ends up becoming nuclear waste, while it still has 99% of the energy in it. So I think those numbers that you're quoting 149 gallons of oil, that's actually just the energy contained in 1% of that pellet. And, you know, on one hand, there's not a whole lot of reason to try to get more out of it, since it's already so many times more dense and more powerful than any other form of energy. But hang on, since we're thinking about how to invest in this space in terms of investing in the fuel. You and I both know that there are things going on in the advanced nuclear space much farther out, where they're looking at new processes to either recycled the nuclear waste or get much more efficient. If we're only using 1% of the fuel. What happens if we have some breakthrough and all of a sudden we learn to use 10% of the fuel? Does that mean that we lose 90% of the demand for fuel and is that a risk?

Justin: Well so far, that hasn't been the case for the most part, but with that said, as even existing reactors with existing designs, lightwater reactors etc, have improved efficiencies that has had a nominal effect on actual uranium demand. So certainly improved efficiencies do reduce demand from the front end. That definitely is the case. When it comes to advanced reactors and some of the small modular reactor designs that might be more efficient in terms of actual utilization of the potential energy held within that fabricated fuel. A lot of times these are running on higher enriched uranium. And so even though they can get more efficiency out of it and run for longer periods of time, they'll still have a higher enriched uranium coming in the front end, which actually requires more feedstock to get to that higher enrichment level. So it's a little bit offset. But I mean, to your point as as efficiencies can improve for existing or new designs, they will have a net reduced effect on the actual demand for the feedstock, which is uranium. You know, in our opinion, we will see the sector grow significantly that will far greatly outpace whatever efficiencies might reduce that demand but to your point there's there is a lot of energy leftover in the in the nuclear waste for sure.

Erik: Justin, we've spent quite a bit of time on the fuel cycle because that's where a lot of the investment opportunity is. But I want to move on now to nuclear power technology. Other things beyond the fuel cycle, so please give our listeners a quick history lesson on the recent history of Westinghouse. The dominant market player which built most of the existing nuclear reactor fleet, what led up to Westinghouse's bankruptcy in 2017? What is the backstory on the recent acquisition and bailout by Cameco and Brookfield? And what else do they need to know about Westinghouse. Obviously, one of the most important players in this space.

Justin: Sure Westinghouse has been a prominent player in nuclear in the United States and globally, essentially, since commercialized nuclear power has incepted. Westinghouse is involved in some way or another, whether it's through the actual construction of a reactor or the manufacturing of elements that go into a reactor providing elements for reactors operations with half of the world's fleet. They have upwards of 20,000 employees, they are an absolute major player. They did get in trouble in the last decade, ended up filing for bankruptcy and got bailed

out by Brookfield. A lot of that had to do with the massive cost overruns at the Vogtle plant that's been constructed in Georgia. That is set to come online, I believe next year finally. That's been a major major headache for nuclear in the United States, which is one reason why the United States is pushing so hard towards advanced nuclear and SMRs.

But this recent deal with Cameco, I think, I find to be a really, really intriguing deal. I think that Cameco is making a big bet on the future of nuclear, and they're diversifying, obviously beyond just mining uranium and converting uranium. So it's a very, very exciting space. Westinghouse importantly, one of their business elements is they are able to make the unique fuel rod design for the Russian designed VDR reactors. And I believe there's something like 35 of these reactors in Eastern Europe, that are all looking for all elements of the fuel cycle, but in particular, the fabricated fuel away from Russia. These are reactors in Eastern Europe. They don't want to deal with Russia any longer, but they have these Russian design reactors that take this special type of fuel rod. Now Westinghouse has been able to make this for quite some time. But obviously Russia produces it probably faster and definitely cheaper. Well, now that we have these geopolitical realignments happening, this is a really big market for Westinghouse to step into in a big way. And Cameco stands to benefit from that.

It's also just kind of a, you know, kind of taking a zoomed out viewpoint. Seeing a company like Cameco, that's known as a uranium miner makes such a big bet on this very innovative, very highly valuable in terms of human capital and intellectual capital company making a bet on the future of nuclear itself, I find to just be very encouraging. And a very interesting play. I don't think the market quite gets it yet. And until the deal is fully signed, sealed and delivered, we're not going to really fully understand the profit margin potential from their operations. Definitely looking forward to hearing that coming out of Cameco in the coming quarters as the deal is signed.

Erik: Okay, so Westinghouse is not a directly investable entity. It is a subsidiary, which is owned 49% by Cameco and 51% by Brookfield, which is a private equity fund. I'll come back to Brookfield in a minute, but since Cameco, is the public equity that you can invest in. Tell us a little bit more about Cameco. Is it a company that you own? Why or why not? Is that something is that a major company that people should be thinking about as an investment play here?

Justin: I think Cameco is a very, very interesting investment. I think it's obviously a darling of the institutional investors not only just because of its size and liquidity, but it's really in the catbird seat here in terms of being a prominent, large producer of uranium in the West. Trustworthy, consistent, reliable. They really are sitting in a very great position here as this market bifurcates. So I think it's an absolute must, in terms of investors taking a look at the company for exposure for the coming bull market. Definitely.

Erik: Before we move on to small modular reactors and other advanced nuclear plays, what are the other public equity players in the conventional Light Water nuclear space and where are the best opportunities that you see aside from Cameco and Westinghouse to invest outside of the fuel cycle itself?

Justin: Well honestly, there aren't that many. And there's not a lot of credit that the companies that you can invest in will get for their role in nuclear. So for example, you can invest in GE, which in GE Hitachi are a prominent player in the nuclear reactor build sector. But the stock is basically giving zero credit for that part of their business. So it's not really a leveraged play on the building. You also have a company like Rolls Royce, for example, that is designing and set to build SMR. The first ones are set to be built in the UK, that company also is going to, at least as of now have essentially no credit whatsoever from the market for that element of their business going forward. You have a company called Nuscale, which has recently IPO this year. They have a small modular reactor that actually is a light water reactor technology. And they're the only company that has NRC approval for an SMR design. They're working on developing a six module unit in the state of Utah. That's in the works currently. But as far as exposure to the actual build outs, you know, the builders of the nuclear plants, not a lot of options in the public space.

Erik: And let's move on and talk about SMR, small modular reactors. I think you and I are in agreement that if you look at what's wrong with this industry, it really is the cost overruns in large bespoke public works projects, like the Vogtle power plant in Georgia, which literally bankrupt Westinghouse in 2017. I think the way of the future is to build nuclear reactors in factories with incredibly high quality standards and ship them to where they're needed. The only pure play that I'm aware of is NuScale, which is ticker symbol SMR. That is I understand it is not doing anything advanced nuclear, they're basically just building old school Light Water Reactors, but they're doing it in a form factor that can be built in a factory and shipped to where it's used. Tell us a little bit more about NuScale and whether that's the best investment. What else we should be thinking about in terms of small modular reactors.

Justin: Sure yeah. And I'm right there with you. I think building these things smaller and faster and getting them into fleet mode is really the way forward. NuScale as of now is is still the only SMR play that is publicly investable. There is another one that will be IPOing next year, the SPAC that is XE-nergy. X-Energy is a high temperature gas cooled reactor that has a lot of industrial applications. X-Energy along with Terra powers, nature and reactor were the two reactor designs that were awarded the funding from the DOE for the demonstration project that was I believe, 1.2 billion in funding that went to these two projects. TerraPower is private. It's owned by Microsoft and Bill Gates. Warren Buffett's an investor in the company. And their first nature and reactor is set to be constructed in State of Wyoming. They actually just announced yesterday that there will be potentially up to a two year delay having basically to do with the fuel and they will be running on HALEU. And as we both know, there is not yet the HALEU circuit in the United States, they were initially relying on getting that initial core of HALEU fuel coming from Russia and US DoE is saying we probably won't have that fuel until 2030. Hopefully they can get their act together prior to that, but it is what it is.

Either way, the construction for that nature reactor is set to start in 2025 in the state of Wyoming to replace a former coal plant. It's you know, it's just a really, really exciting space. There's so many innovative designs out there. GE Hitachi is BWRX 300, that's a boiling water reactor. 300

megawatt reactor that's being built, the first one's being built in Ontario, Canada at the Darlington site. That broke ground a couple of weeks back. There's a lot of enthusiasm around these designs. But as far as investable right now that is public, it's literally just NuScale. That is going to change. I think we are likely to see one to two of these companies that go public on a year over year basis. Going out for the next five plus years. There's just that much interest in this space.

Erik: Justin, let's move on now to private equity and other investments restricted to accredited investors and qualified institutional purchasers. I appreciate this is not your primary area of focus, and not really what your newsletter is about. But you're still the guy that knows as much as anyone else I know about this. So hopefully you can fill in a few blanks for our accredited and institutional audience. Let's start with Brookfield Business Partners, which is a Canadian Private Equity Fund. They are the controlling interest partner alongside public company Cameco, which we discussed earlier in the bailout and acquisition of Westinghouse. So for qualified investors, does it make more sense to invest in Cameco or Brookfield and maybe we should start with who are these Brookfield guys and what is their role? And how come they're the 51% player next to Cameco in this Westinghouse acquisition, and why don't we start with that and then move on to you know, which one does it make sense if you're able to invest in either. Should you be looking at an investment through Brookfield or through Cameco if you're interested in Westinghouse.

Justin: I would go with Cameco although I think the Brookfield is a very interesting play. I think that this acquisition of Westinghouse coming from an entity that's been entirely focused on renewable energy, up to this point is a very, very interesting sign for the sector. I really appreciate that. Those that are focused on clean energy going forward are embracing nuclear and I think that was a big sign coming from Brookfield.

Erik: Justin, Mark Nelson told me off the air after last week's interview, that most of the advanced Molten Salt Reactors thorium fuel design initiatives and so forth, tend to be self funded pet projects of billionaires who seldom offer equity to outside investors on favorable terms. One example of that is Bill Gates project on the Natrium reactor which as far as I know, is not investable by anybody other than then Bill Gates. For non-billionaire listeners who can't afford to just launch their own Molten Salt Reactor research company. Are you aware of any other advanced nuclear private equity players that are worth considering?

Justin: There definitely are some out there. I don't want to speak specific names, but they do exist, I would definitely say if private equity investors look for conferences that are focused on SMRs and advanced nuclear. They're going to come across a lot of opportunity in the private space.

Erik: I definitely agree. I'm actually in the process of due diligence right now on an investment in this space, I'm not going to talk specifically about the company because frankly, their current capital raise round will have closed by the time this episode airs. But there are people doing really, really exciting things. I'm looking at a company that's building reactors that will consume a combination of thorium and existing nuclear waste. So they're actually going to recycle

nuclear waste that already exists, burn that plus thorium as their fuel, and not create any more nuclear waste, but reduce the amount of nuclear waste in storage. So there's some really exciting things going on. I really should caution our listeners, though, of what I'm calling the Mike Alkin doctrine, which is the reason to invest in something like that the reason I'm looking at a small investment in something like that is because I'm so excited about the future of what some of this advanced nuclear technology is going to mean for the planet. Frankly, it's probably not a very smart investment right now. These things are so early stage, there is no regulatory framework, you know, the company that I'm looking at is literally working incredibly passionately to build a machine that is literally not legal to operate in any country on the world, on speculation that the bureaucrats will eventually come around and recognize that it could save the world. That's frankly, not a sound investment play. It's a way to participate, if you can afford to, and trying to make the world a better place. So I think we have to keep in context, that some of those more advanced nuclear plays are probably not ready for primetime investment quite yet. Anything else that you would like to add to this conversation Justin?

Justin: No I don't think so. I mean, I think really to sort of sum up sort of the long term vision that I'm starting to, or not starting to, but really kind of formulating in my mind, for the future of nuclear is has to do with the benefit of the future of humanity really. I think it's unbelievably important that we continue to move forward in terms of seeking energy sources with a higher return on investment, not a lower, and I think it's only going to play out and become more obvious as situations like Germany and Belgium are in the public eye, relative to the the countries that are that are kind of first movers in this. In this reimbursing of nuclear, they're going to be sort of winners on the world stage due to that abundant, cheap, baseload clean energy that nuclear can provide. So I honestly think we're kind of in very, very early stages of what feels to me like a full on nuclear renaissance. And we also on top of that, just have kind of that short of the midterm potential for this to be a really shockingly fast and robust bull market for uranium that could happen at any time based on capital flows. So it's a super exciting space, it's a feel good investment. And I just don't get tired of talking about it writing about it. So I thank you so much for having me on.

Erik: Well, I'm really excited about it too Justin and I agree completely. This is potentially the salvation for the energy policy future of humanity because we're headed into an energy crisis that's going to be really ugly. And unfortunately, what scares me and I do want to ask you to comment on this is it's so easy to for you and I to say, okay, we can see the answer. The answer is nuclear. We've been ignoring it for decades. We need to wake up and recognize that it's been staring us in the face for, you know, 30 years now. But hang on a second, Justin. You and I both know that there's one thing that is more true of nuclear than any other form of energy which is it takes a long time, from deciding that you're going to do it until the production capacity actually comes online.

Now, if we think about the energy crisis that I'm convinced is coming in the next few years, it's going to create a forcing function that I think will change public sentiment, because all of a sudden, we're going to desperately need to find alternatives to fossil fuels that are more affordable, because I think fossil fuel prices are going to go through the roof after we recover

from the coming recession. Thing is, if everybody says, okay, nuclear is the answer, we finally get it, let's do it. How long does it take before all of that capacity actually comes online, what does that mean, in terms of the investment play, and is there something to invest in that accelerates that pace?

Justin: Great questions. I mean, honestly, the timeframes for construction of new nuclear really has a lot to do with who is building it and where it's being built. And so using Vogtle or Flam Anvil in France as examples, huge cost overruns, huge delays, those are examples on one side of the spectrum, then you have the Japanese building a boiling water reactor in Japan in 36 months, that's on the other side of the spectrum. And then somewhere in the middle would be, you know, the South Koreans building reactors in the UAE, and doing them on time and on budget over about six or seven years. So starting out with new builds now. It depends on where they're being built, and depends on who's doing the building but that capacity could be online in, you know, a 5 to 10 year timeframe. But again, remember, there's 60 reactors under construction right now. You know, there's 20 to 24 that are going to hit the grid in the next 24 months. Add to that the fact that the energy crisis that Europe is currently in and a number of other places in the world are currently in are highlighting the benefit of nuclear, when you don't have political ideologues shutting them down in Belgium and Germany. But there's exceptions to that, obviously, where we're seeing life extensions happen for existing nuclear. So the life extensions, and the Japanese restarts are almost instant demand. So if you have a reactor that's set to come offline like Diablo Canyon in 2024-2025. They get that five year extension, well guess what? PGE is already in the market buying uranium. That's just how it works.

So anytime there's a life extension, that's immediate demand. Anytime there's a restart of a reactor, Japan still has 23 reactors that are idle, that could be operable. That would be immediate demand. In some cases, there's some inventory still left in Japan, but in many cases, they would be signing contracts with producers. But yes, how to invest on that accelerant? Honestly, the SMRs have the most potential to be a fix for that. And I think that while you have, in some cases, large scale reactors taking a very long time, and actually influencing the cost of electricity due to the payback period, once they actually get up and running. If you can build something smaller and faster, even though you're not getting that economies of scale, that you would get by building a larger version of the same thing, just getting it done faster in this interest rate environment means significantly lower cost of electricity. And obviously that will help with the embracing of that technology going forward as well. So just keep an eye on the SMR space. I think it's extremely exciting, we're going to see more and more opportunities to invest in there as the years go by during this market. But, you know, the life extensions, and the reactors already under construction, the demand for the next, you know, 5 to 10 years has already kind of been the writing's on the wall for that.

Erik: I couldn't possibly agree more Justin and you know, I think of the analogy of World War Two, when were to broke out, they said, okay, we've got to take what we've learned about manufacturing automobiles on assembly lines, and apply it to building tanks and military airplanes and so forth. And there was a government led, you know, massive national effort to just scale up to build things quickly in factories on assembly lines. And the company that I'm in

due diligence now with as a private placement in the SMR space. You know, you talk about the problems with a project like Vogtle in the years and years of cost overruns and scheduled delays. Although these small modular reactors are much lower capacity, they're only 100 megawatts of capacity or so as opposed to 10 times that in a full scale nuclear power plant. The thing is, even the fast build nuclear power plants take five or six years to build. The company I'm talking to has a vision of building 100 megawatt small modular reactor per day on an assembly line. 365 reactors per year if they get to running seven days a week. That I think is going to be the solution but it's not 365 I think it's 3000 or some larger number and the architecture that they're working on is one where you build that large plant by putting 20 or 30 of the small modular reactors all in one building, hooking them up together in order to produce enough power to do the equivalent of what we do with large nuclear power plants today.

So I think that's the direction of the future, it's going to take us a while to get there. Unfortunately, I think it's going to take a sea change of public sentiment. The energy crisis that's coming in the next few years will probably provide that public sentiment sea change. And it's going to be really interesting to see where this all goes. Before I let you go Justin, I want to talk about uranium insider, this is really an exciting product. I have really enjoyed my personal subscription so far. I've only been a subscriber for a few months. But you've got what 359% inception-to-date return to your subscribers in terms of the stocks that you've recommended. So your performance has been terrific. So please tell us what people can expect to find in the newsletter? How much does it cost? How did they get it? Is it possible to get a sample issue? How does this work?

Justin: Yes definitely, you can get a sample issue, I'm sure you can provide a link in the show notes there, Erik. I'll send that over to you. So we do a monthly newsletter that's very in depth, it's largely focused on the macro fundamentals. A lot of what we've talked about today, goes into these newsletters in terms of really digging into the fuel cycle and understanding what's going on in the fuel cycle. Because we feel it's paramount in order to be able to have this conviction that's sufficient to hang on in such a volatile market and uranium is up there. Perhaps not as volatile as something like cryptocurrency but it's almost there. When it moves, it moves really, really hard. And so that volatility can really shake out a lot of speculators that don't understand the fundamentals and don't see what we believe. We see that's coming for this market for the short, mid, and long term. So we go really in depth, that's usually 35-40 pages. We do one newsletter every month, I do almost every day an update video that goes into anything we're sharing in terms of fundamental developments and news flow, and any developments on the charts. And of course, we focus also on the funds flow into the ETFs, the share issuances of redemptions and what's going on with the Sprott physical uranium trust, because it has such an impact on the spot market. We cover all of that in the daily update video.

We do trade alerts that go out via email, if we're trading in and out of any of our positions. For the most part, we generally buy and hold for the long term. But we do have a trade here and there. We just made a trade over the last couple of weeks. And then we do members only webinars. We do one of these a month, I really think these have been one of the biggest value adds for our service. These are members only in attendance, we do two hour long video live

webinars, and we typically have a guest on that's either you know somebody from the nuclear industry that's an expert on their particular field in the industry, or a member of management from one of the companies that we own and recommend. And these have been really fantastic experiences for us and for our members. The newsletter service is $597 for the year and $197 for a three month period, and that whatever price you pay to join, now you lock that in for as long as you want to renew.

And like I said, you know, we just we live, eat, and breathe this stuff on a daily basis. And I think that when the sector moves, it's going to move in a pretty wild fashion and I think that the fundamentals will eventually play out. It's obviously been a difficult year for most markets with few exceptions, you know, oil being one of those. Even with that had a pretty good pullback here. But, you know, I think we're down about 15% on the year but we were up 127% last year. So you know, that's how the markets work. You have up years and down years and hopefully you're up here is vastly outpaced the down year so far that's been the case. And I think we're on the cusp of another really, really big move for the sector in the coming months and years. So, really looking forward to that and thank you again for having me on Erik.

Erik: And listeners, you'll find a link in your research roundup email to a simple issue of Justin's newsletter, the uranium insider. If you want to subscribe, just go to Uraniuminsider.com. We're going to leave it there for this week and for this year. That's a wrap on 2022! We'll see you next week on January 5 when Patrick Ceresena, Nick Galarnyk, and I will be back right here at macrovoices.com.