

Erik: Joining me now is Matt Loszak, founder and CEO of [Aalo Atomic](#)s, a company that proposes to mass produce not just modular nuclear reactors, but entire modular nuclear power plants in a gigafactory for the express goal of rapid deployment at scale. Aalos initial market focus will be on data centers where rapidly deployable power solutions are most critically needed.

In the interest of full disclosure, I am personally a private equity investor in Matt's company, Aalo Atomics. Matt, it's great to have you on the show. Thanks for joining us today.

Matt: Thanks so much for having me. Great to be here.

Erik: I wanna start by playing devil's advocate and describing the most commonly held view in the conventional nuclear power industry, despite the fact that I personally disagree pretty strongly with that view.

The common wisdom says that the pressurized water reactor originally designed for the Nautilus submarine back in the early 1950s has evolved to become the gold standard of nuclear power alongside its close cousin, the boiling water reactor, most seasoned. Nuclear industry professionals share the view that the operational experience that we've gained from running these lightwater reactors as they're called for several decades now, is the most important safety consideration that we should think about.

And so they question why anybody in their right mind would even consider deviating from what's already been proven to work for nearly six decades. Thousands of reactor years of commercial service. For those reasons, they strongly advocate focusing the formative nuclear renaissance on building more of them, more lightwater reactors like the Westinghouse model, AP 1000.

And a lot of these people think that experimenting with different reactor designs, involving coolants other than water, is just asking for trouble both economically and from a supply chain perspective. Matt, you and I disagree with the consensus view. What's wrong with the narrative shared by. So many of your peers in the nuclear industry that we should just stick with what we already know, which is lightwater reactors that have been proven to work for decades.

Matt: If we had to boil it down, I'd say it's that essentially the current solution is a local maxima, but not a global maxima. So if we think about some of the problems that have happened in the past 20 years of nuclear deployment, we saw Vogel go 10 years over schedule, \$15 billion over budget. And essentially

the problem is that you have an industry where every reactor that's been built in the past.

75 years is bespoke. They've been one-off projects. And in that world, the best way to try to lower cost is just make the reactors bigger and bigger, and stick with the same design you've been doing before. But as we know, there's two ways to optimize economics. One is make things bigger, and two is make a lot more of that.

The interesting thing is the idea of making a lot more of nuclear reactors has really not been attempted properly. In other words, there's no single large factory we can point to globally that is mass producing along the lines of Henry Ford's cars nuclear reactors. The reason to switch off of water is essentially this emergent realization when you start to explore and ask yourself.

What is the best design to mass manufacture? And if you're no longer just going bigger and bigger and you want to get a better design that can be maybe transportable on everyday roads, then you start to look at these other coolants things like liquid metal, sodium molten salt, or even gas. And especially sodium and molten salt.

Allow you to make the vessel of the reactor much smaller. So in other words if the vessel was the same size for all these coolants with sodium and molten salt, you'd get around anywhere from two to 10 times more energy out of it. So you can imagine that's much better from a mass manufacturing perspective.

And so you also get other advantages, things like, more inherent safety. And something I think we might talk a bit more about later around when you can achieve higher temperatures, you can service things like industrial process, heat and so on. But those are some of the core reasons for exploring other technologies beyond just water-based gigawatt scale reactors that we have today.

Erik: Certainly the high tech boys have recognized this case, and I know that's where you're focusing a lot of your business. Help our audience understand what this advanced nuclear industry really is all about. One of the most commonly held views among institutional investors is, look, we don't want to invest in science projects.

We don't want to mess with unproven technologies. So even if you're onto some great idea, that's gonna completely change the course of human history. Eh, it probably belongs in a research lab at MIT. Not in a startup company like Oklo

or Aalo that proposes to actually be selling nuclear reactors to data centers in the next few years.

So we really only wanna invest in stuff that's already been proven to work and proven to be deployable in a commercial context. How much do we really know about all this advanced nuclear technology and to what extent is it proven to be viable and how much technology risk is involved in deviating from that accepted norm of, essentially lightwater reactors forever, which is what a lot of the industry wants to focus on.

Matt: I think a lot of people don't realize that advanced reactors actually do have quite a bit of operational history. So water cooled reactors definitely have the most to the tune of thousands of cumulative years of operational history. But sodium still has around 400 operational years. Gas has maybe a hundred and molten salt has on the order of just a few years, it's the least one on molten salt. But the, these have been built before. And the interesting debate in nuclear is why these technology branches on the tech tree weren't fully explored. And, our argument essentially, my belief is that it was largely for political reasons.

If you look at the history that these reactors did not get further explored. And one interesting anecdote is EBR2 which is one of the reactors that we take the most inspiration from operated from essentially for 30 years at 20 megawatts of power. And it was a real success. When they decommissioned it, the sodium had bit, the look of metal had been so compatible with the stainless steel that the welder's etchings were still visible inside the pipes.

And it operated with a very high capacity factor for that time as well. And interestingly, they did a test where they basically tried to make the reactor melt down by removing all the backup power and leaving the control rods, the brakes on the reactor fully open and or the operational open level and what they found.

Is that the reactor was able to safely shut itself off inherently 'cause of the physics of the system without depending on human control. So it demonstrated good capacity factor, good safety, but you'll never guess what happened 12 days after that test occurred. Chernobyl. It's some of these different sodium reactors had different political challenges that caused them to slow down development.

But I think that, taking a step back, the thing to realize is these advanced Fision reactors are not really for example, fusion, where there's Nobel Prize winning discoveries that have to be made, or new science has to be unearthed in order to make it feasible they've already been deployed. And the kind of best analogy in my mind is.

Some of these advanced coolants, like sodium are like SpaceX with landing a rocket. Is it easy compared to water? No. There's a bit of extra engineering challenge, but if you can do it, it unlocks a holy grail of economics. And if you get a smart team together with a bunch of capital and the right environment with the right customer, in this case, AI data centers we think you can really make this work.

And so I think that's what's most exciting about this technology.

Erik: Matt, you mentioned a holy grail of economics, and that's what I wanna focus on next. Not so much what's possible in the next few years, but let's zoom out and talk about the future of nuclear energy and what it's going to take to truly change the course of human history and deliver a new source of energy that will eventually be able to replace fossil fuels and give us a cleaner, greener, better future.

The more I've learned about all this nuclear energy technology. And more that I've come to realize two things. Number one, we're never gonna really and truly change the world and be able to scale nuclear up enough to replace fossil fuels until we get to something called a breeder reactor economy.

The second thing though is that breeder reactors at least. As they've been developed and deployed to date, have generally not proven themselves to be economically viable for commercial deployment. So that's a real conundrum. Let's start with what is a breeder reactor in the first place? Why is that important?

Why do we need breeder reactors to eventually change the world completely with nuclear energy? And then what are your thoughts on how we overcome the fact that. Frankly, breeder reactors haven't proven themselves. Economic, at least not yet. And how do we get to that eventual infrastructure that we need?

How does the evolution occur and why is that important?

Matt: Currently the nuclear fuel supply chain is primarily based on uranium 235. And if we were to burn all of the known resources on U235, it would probably have a similar life span to oil and gas and lasting us another 200 years maybe. But if you can do a breeder, it unlocks different fuels still in a nuclear reactor like thorium.

And uranium 238, which are both much more abundant than U235. So essentially that enables you to expand the usable fuel lifespan of known reserves

on Earth to 4 billion years. That's what's really exciting is when you think about scaling up in the future of energy production on earth really it almost seems inevitable.

That this will become the main source of energy that replaces oil and gas on earth. And certainly inevitably within a 200 year timeframe, but we think much sooner because of the demand from AI data centers and nuclear being the best fit for powering them. That's the kind of bottom line now. So if that's the case, why are we not doing breeding right now?

The answer is it's a bit more expensive right now, and there's gonna be a crossover point in the supply chain of U235 and U238 when it makes sense to actually do the extra step of recycling and reprocessing the fuel to access the resources within spent fuel and to switch the mining supply chain to beef for thorium and U238.

So there gonna be an economic crossover point when that occurs. For the time being, the cheaper, faster, short term path is to use standard low enrichment. 5% uranium dioxide which is what we're doing at our company. But yeah, that's essentially how we see it is it's an inevitable move that'll happen in the coming probably couple decades.

But for now, the cheaper, faster approach for the customer of the day data centers is to use the existing supply chain and the existing reactor technology.

Erik: I think there's a point here that a lot of people don't fully appreciate, which is they've heard about these breeder reactors being able to use this fuel.

The, only less than 1% of uranium that's mined out of the ground is U235. The kind of fuel that's actually used today, the other 99.3%. U238, and when people think about it, they hear, okay we're wasting all of that U238. We're not putting it to use, but hey, the cost of the uranium's not really that big of a deal to run a nuclear power plant.

Let's not worry about it. What I don't think people really understand is we're not just wasting it in the sense of not putting it to good use. We're literally creating so-called nuclear waste spent. Fuel waste is mostly all of that. U238 that. People think is just this horrible, awful, toxic stuff that stays around forever really.

It's perfectly good nuclear fuel that we could have used to make energy. We just didn't do that because we didn't build the style of reactor that we've known

about. Since before I was born that can use that U238 fuel. So I want to talk about this nuclear waste. Now a lot of experts say, don't worry so much about it.

It's a public perception problem, but technologically speaking they shouldn't worry 'cause it's not as big of a deal as they think it is. And I think that those technical experts are missing the point because the public perception that this nuclear waste is horribly dangerous is really I think the biggest thing that's holding back the growth of nuclear energy.

So talk to us a little bit about, and we've been hearing these stories that some companies are coming up with technology. They can actually take the stuff we call nuclear waste that's been sitting around for decades, burn it up and use it as fuel in order to make more energy, which covers.

Two, kills two birds with one stone. One is we're making energy that we don't have to mine new uranium for. But the other thing is we're getting rid of all that nuclear waste that everybody's so concerned about. Are we back to science projects here? Is this brand new unproven technology or is there really a way that's available today that we could get rid of those 250,000 metric tons of spent nuclear fuel waste that's sitting around in dry cask storage all around the world and get rid of it by actually making power from it.

Matt: So there, there definitely is a way. And again, coming back to EBR two, the reactor we spoke about earlier that was actually the first time we demonstrated what's called closing the fuel cycle. Essentially the way to think of this is as follows. First of all, nuclear waste. The fears of nuclear waste were somewhat propaganda driven by, in large part the oil and gas lobbyists in the seventies and eighties.

That created fear around something that really hasn't ever harmed anyone. Is pretty easy to store and there's tiny amounts of it. I have to be empathetic to. Fears of nuclear meltdowns and radiation, causing relocations. And that's something we also can avoid through technology.

But the nuclear waste issue, I think is almost entirely propaganda and not really at all technological, technologically, it's a solved issue from a safety perspective. But to your point, it's not just about keeping it stored safely.

It's also about the fact that when you have nuclear waste, it's actually a very useful substance. There's still 95% of the energy still in there what's happening around the world today is France is currently recycling most of their fuel and

they're extracting. So once fuel is burned, some of the, what's called Fissile isotopes, like U235 and plutonium are still in there.

You can make what's called mixed oxide fuels by recycling the fuel and just extracting those leftover fissile isotopes. But, With the approach of using breeder reactors, we can then tap into the other 95% of the energy that's still in there, which is the U238. And in doing so, you can really get a lot more energy out of the fuel and also reduce the volume of waste that you have to even store to begin with.

So to give you an anecdote the entire history of nuclear power production in America. So 70 years for 20% of on average, 300 million people has produced only a football field of waste stacked around 10 yards tall. And if you were to do waste burning and use the useful stuff in that leftover fuel, then.

The height of the true waste would only be six inches on that whole football field. It goes to show you, a waste is not really this existential problem for nuclear. It's actually one of the main selling points because everything produces waste. Oil and gas puts waste into the air we breathe.

Solar panels have an end of life and must be, put under the earth or expensively, recycled. Same with wind turbine blades. So everything produces waste when it reaches end of life. But nuclear's, main selling point, or one of them is that there's such a small amount of waste and it's so easy to maintain.

And what we conceive of as waste today is actually, like you said, a very useful substance. It's a very valuable substance that we actually want to use in future reactors.

Erik: Matt, you and I share a vision that the way we get from where we are today to the point where nuclear energy finally becomes cost competitive with energy from oil and gas, is that we need to mass produce.

Not just components to build modular reactors, but we need to do factory assembly line mass production of entire nuclear power plants in Gigafactories, so the whole power plant just gets set up and configured on site like IKEA furniture as opposed to having to be custom built on site the way we've built all of the nuclear plants that exist today.

I'll save my own reasons for thinking that's important for another podcast. What are yours?

Matt: At a high level what we're trying to do. I think what the ideal solution here is to turn nuclear from being a project into a product. And I'll give you a few examples of that. But the key advantage, if we're asking why does it make sense to do this for the current customer of the day data centers, it's all about speed.

And if you can mass produce your nuclear power plant, again, not just the reactor, but the whole plant in the factory, you can do a lot more in parallel and essentially deploy hundreds of megawatts in under a year. Whereas normally it would take five or 10 years eventually. The goal is to be deploying 10, 20, 30 gigawatts per year by doing a lot of sites, a lot of reactors, a lot of nuclear product in parallel.

But that's essentially what's the key unlock for AI data centers who will pay a real premium in return for speed. Clean is nice and base load is important, but speed is really one of the most important things there. In our view, the key to achieving this is extreme vertical integration.

And maybe we can talk a bit more about this later, but that's a really key part to achieving that scale and speed and essentially cost reduction will follow from that scale and speed. And nuclear, a big part of the cost today is actually interest. 'cause it takes so long to build all this major hardware.

So if you can build it much faster in a more predictable, repeatable way, costs come down. And then that unlocks a whole bunch of other markets for whom a gigawatt scale nuclear plant would've been just too big and too expensive and too slow. But when you get faster and below a certain cost threshold, let's call it seven to 10 cents a kilowatt hour, then it opens up all these other markets like large industrial onsite loads.

For example, desalination, industrial process, heat, small utility, even large utility, and then microgrids for powering EVs hydrogen production, ammonia, et cetera. So those are some of the biggest reasons to mass produce a slightly smaller nuclear product that. C major cost reduction and then unlock entirely new markets that were not previously available to nuclear.

Erik: I wanna stay on this topic of scale 'cause I think it's the single most important thing we have to think about. It's been a lot of hype in the industry about, Hey, we're gonna triple nuclear by 2050. Sounds great. A lot of people are skeptical that's even possible because that's a lot of old school nuclear power plants to build.

If you build them the old way, the thing is what you'd need to replace fossil fuels is not tripling nuclear. It's literally 25 times the amount of nuclear that we have in operation today. So my view is the most important thing is get the cost down to the cost of energy from coal and gas. Because when you do that, it unlocks what I call the nuclear Henry Ford moment.

And you alluded to Henry Ford and his automobiles a little bit earlier. I think this is really what the game is all about because there's 10. Terawatts of nuclear generation capacity 25 more than we have today that could be deployed if we could somehow get the cost down to where nuclear costs the same as coal and gas.

I, I don't think it's at all an exaggeration to say we could change the the course of human history in a way that it is more impactful than the industrial revolution. If we could figure out how to get the cost down and really scale this up so that we could actually build 25 times more nuclear than we have today.

But we're struggling right now just to get back in the business of, building nuclear power plants. So I wanna talk about the future. Do you think that vision can ever be realized? And is it mass production that gets us from there, from here to there? And if not, what else do we need to worry about in order to achieve that vision?

Matt: It's gonna be really hard. But I think it's possible. If you think about the pathway in going from 10 reactors per year to a hundred to a thousand to 10,000 and in doing so, you go from, at our reactor output, a hundred megawatts per year to a hundred gigawatts per year. You can imagine a lot of different things in the supply chain will break along the way.

And I think this is all very doable, but it requires a very ambitious effort from a company really thinking about the future and how to break down those barriers in the supply chain at every step along the way. So if you think about what it takes to deploy 10,000 reactors a year, for example. In the short term, you can deploy a bunch of reactors let's call it 10 per year with the existing fuel supply chain, pump, supply chain, turbine, supply chain, heat exchanger, supply chain.

But different parts of that supply chain will break as we go in that journey. For example, in a hundred reactors per year. Vertical integration on the heat exchangers becomes important. At a thousand, the company will have to make its own turbines and at 10,000 a company using sodium might have to create its own sort of industrial conglomerate that does things like sets up a reactor at Salt

Lake City to separate sodium from chlorine and the salt that's there and manufacture its own sodium at scale.

So none of this is really impossible from a first principles perspective, it's all very doable. It just takes the right team, the right effort.

What this unlocks, if you look at some of the technical economic models, is you can very rapidly get below 10 cents per kilowatt hour. Let's call it n equals 20 reactors. By then, you could probably get below 10. And then to get to, for example, maybe 3 cents one day, which would really unlock a whole bunch of new markets and really beat oil and gas across the board.

Call it two to 3 cents, might require a different kind of learning. For example, to get down below 10 might involve just construction learnings turning it more into a product versus a project. Building most of the modules in the factory and keeping onset construction to basically a very simple concrete slab with no excavation and really productizing nuclear.

But then to get it down to 3 cents might require, much more of a, I just referenced with the extreme vertical integration in the supply chain to achieve way faster greater scale, faster deployment, lower costs. But I think that is the core way to. Allow nuclear to really do stand a chance of replacing oil and gas almost wholesale in the next century or so.

Erik: Back in Henry Ford's day, automobiles were like, private jets are today. Everybody knew what it was. Everybody wanted one, but nobody except the super rich could afford to actually have one. And I've contended that the same thing is true of nuclear energy. It's the safest, cleanest, greenest form of energy that's known to man, but it frankly just costs too darned much.

It seems to me, if you think about Henry Ford's challenge, he wanted to bring the cost way down, but he needed at least a small number of rich guys that could afford the bespoke automobiles in order to get his business going before he could really build his assembly line and bring the cost down to the point that the common man could afford one.

It seems to me, if we take this analogy forward to the 21st century, the hyperscalers. And their AI data centers are the rich kids who can afford to buy private jets. They're the guys who could afford. If you said, look, we can deliver your data center energy from an auto atomics nuclear plant that we can roll out in a period of months rather than years, they can afford to pay extra for that, is

that the strategy is to use the budget of the data centers to get this started and then eventually scale it up to mass, really big mass production from there.

Matt: Our kind of top secret master plan is to start by servicing data centers because they have a high willingness to pay with a lot of urgency. So they'll pay a premium for speed. And as we come down the cost curve, we can go after all these other markets that we talked about. Industrial process, heat desalination, large utility, small utility.

For whom, if you go and talk to them today. They would say, come back and talk to us when you're below 10 cents per kilowatt hour. But once you get down below 10 cents, it really opens up this whole other set of markets. And like we were referencing earlier, eventually you can imagine going after the developing world with around 3 cent per kilowatt hour electricity to bring the world out of energy poverty.

So in the long term, that would be our goal. I think that's a good goal. But, I think it's important to realize, like we talked about earlier, there are two main ways to make nuclear cheap. You go bigger or you go more numerous, and the beautiful thing is the hyperscalers have a huge amount of demand.

We're talking a hundred gigawatts in the next five years. In the US alone for a it's a huge amount of demand for a very consistent product, and they want a reactor that's a bit smaller because then you can deploy a fleet of smaller reactors and have a higher availability. Meaning if you have a single gigawatt scale reactor, it has to go offline for refueling for a month, every two years.

So you lose the whole gigawatt, which puts a big strain on the grid. And then you see data centers being bad Samaritans with their local communities, putting a strain on the grid. So if you have a fleet of these smaller reactors, you can refuel one by one and essentially always have power available at a high availability.

So it's cool how these customers, they want exactly this product, which almost is inventing this new nuclear product that can then, once it comes down the cost curve, go after all those other markets we talked about. Essentially allows you to go from large bespoke reactors to small, repeatable mass manufacturable ones.

And the fact that it's clean is essentially a nice to have right now, but frankly will benefit everyone in the long term. That's the last kind of, benefit of doing

this approach. But yes, I think the hyperscalers are arguably the core unlock to this new model in nuclear that we haven't really seen done before.

Erik: Now I want to touch on what has to be the hottest marketing trend in the nuclear power industry. Something called SMRs, small modular reactors. I have to confess my naivety, when I first heard that phrase, I assumed that they were talking about nuclear reactors that would be both small and modular. Given the name Small Modular Reactor frankly, I don't think either of those things are true for products like the Westinghouse AP 300 or the ge Hitachi BWRX 300, which seem to have taken over that marketing phrase of small modular reactor.

So let's just talk for a minute about why would small be better than large? In the first place. 'cause as you said the whole trend of the 1960s and seventies was to go to much larger reactors for the sake of economy of scale.

So why do you want to go from large to small in the first place? And how small does it have to be in order for that benefit to actually be realized? And do these SMRs, like the AP 300, achieve that goal?

Matt: In terms of achieving the Henry Ford vision for nuclear, there is a sweet spot in terms of size and that size of all the modules for the reactor and the whole plant.

But if you think about it, a reactor that's too small will have very bad economics for physics reasons, it has a very poor neutron economy, and if you go too large, you can't ship it on normal roads. So if you're trying to build one reactor a year. Then, yeah, I'd say build a bigger reactor. But if you're trying to.

Ship 10,000 reactors per year. You've gotta have something that's the right size to ship normally on everyday roads and the rest of the global transportation network. So that's the thinking between that's the thinking behind what is the optimal size for mass production and for rapidly achieving the scale that data centers are desiring.

But the other kind of thing to highlight, so the SMR term you correctly highlighted that. They're not small nor modular, but in my view one of the other major disconnects and maybe the biggest flaw in the SMR vision so far in terms of how it's been expressed is that traditionally those modules all come from different factories.

So a single company for example Westinghouse or Okolo, they could be a reactor. Designer, but something that often surprises people is ok. Low, for

example, is a fully remote company. They don't have a factory. So what happens is the reactor designers send the design of their SMRs to dozens of different companies who each have their own factory.

And when those mod modules come together at site, they don't fit. They have reworks and slowdowns, and that's why Vogel went 10 years over schedule and \$15 billion over budget. So if we think about the best approach to SMRs in our view, what that would be a single factory that takes raw materials in and outputs modules that we know will fit together.

In fact, we've integration tested them in the factory, and then when they come together at site, it's way faster and way easier. And by the way, they're all sized properly for mass transportation. That's what we think is really the proper incarnation of the SMR vision. And so that's what we're working on at all though.

Erik: I think we're very much aligned in our thinking because I've always said that what matters about small is it's small enough that you can ship it in the existing container, ship based and, flatbed, truck based global infrastructure of logistics. But the other side of this is. The time to actually build the onsite part of it.

And it blows my mind when I see Westinghouse bragging about this is gonna be great because with the AP 300 SMR, we're going to be able to build the entire reactor in only four and a half years. And I'm thinking, wait a minute, isn't that how long it takes the Koreans to build a conventional nuclear power plant?

It seems to me, Matt, that we should be striving for four and a half months at most to take an entire nuclear power plant that was factory built and set it up and hook it together and I don't mean the site work and grid connections, but once you've got the site prepared and you ship in all the stuff that comes from the factory, I think it should be months less than a year to completely set it up, hook it up, and get it running.

Is that realistic? And how long will it take to realize that vision?

Matt: I think we might talk about this a bit later, but our first power plant we are building currently. All in, it'll be under a year in terms of start to finish on turning that thing on. And the whole goal here again is to turn nuclear from a project into a product.

And so if you're doing more in parallel in the factory it allows you to, at the site really reduce the work that's involved. For example. If you're trying to make nuclear deployable more quickly and more predictably, a really dumb way to start is by digging a gigantic hole. Because different sites have different water table, different rock hardness, and that can introduce a lot of variability between sites, which can slow you down, and you really wanna try to make it so that every project is the exact same.

As predictable as possible, and that's where you see the speed benefits. So yes, we believe that it will be possible and it almost already is to deploy these reactors at this scale in under a year. And that's even accelerated further by some of the new licensing pathways under the current Trump administration around DOE authorization, categorical exclusions for NEPA and more.

So the somewhat short answer is yes. That will be possible, and it's gonna have to be to keep up with the pace of development that the hyperscalers are demanding.

Erik: Matt, you've mentioned something called industrial process heat a few times in this interview, so I want to come back to that and understand in a little more bit more detail what that means.

Only 38% of global energy is used to make electricity in the first place. What we normally think about when we're discussing nuclear reactors, of course, is making electricity. Now another 25% of global energy goes to transportation fuels, but almost a full quarter. Of global energy consumption. That's nearly as much as we spend making all of the transportation fuels that we need combined to power the entire global economy. The rest of that last quarter of global energy production goes into something that's called industrial process heat.

Examples of that are smelting, steel, making concrete, and so forth. Why are light water reactors poorly suited to delivering process heat? And what's better about advanced nuclear reactors in order to better solve that problem

Matt: with light water reactors, the reason they can't go to as high of a temperature is because water is the coolant and water boils at around a hundred Celsius.

So the. The way that water-based reactors have essentially made their designs to date is they apply a lot of pressure, hence the name pressurized water reactors, to allow the water coolant to go up to as high as 300 Celsius. But if you look at

industrial process heat applications, most of the applications occur at temperatures greater than 300 Celsius.

So with advanced reactors using high temperature gas or sodium, or molten salt. You can achieve temperatures in the range of 500 to 800 Celsius, and that unlocks essentially roughly half of all industrial process, steel applications globally, which could be decarbonized and replaced and powered by nuclear in order to reach the higher temperatures.

Still, you could. In theory, you use more advanced nuclear designs or electrical assistance to reach those higher temperatures. So it's still possible with nuclear. But at the lower temperature from 500 to 800, you get a really nice benefit on efficiency. Because traditionally when you make electricity with a nuclear reactor.

Two thirds of your heat energy overall is going to waste heat and only a third is converting to electricity. But if you are doing industrial process heat, you can essentially use the heat coming straight outta the reactor and use a hundred percent of it or much more of it using, much more efficiently than the electrical use case.

So it has extra economic benefits there as well. But yeah, fundamentally you can think of it as data centers will be the ideal initial customer to bring the cost down and it unlocks all these other markets to help bring industrial process heat to be decarbonized with nuclear around the world.

Erik: Matt, I can't thank you enough for a terrific interview. But before we close, I want to give you an opportunity to pitch what your company is working on, because frankly, you're the only advanced nuclear company that I've found that shares my own vision for mass producing, not just nuclear reactors, but entire.

Nuclear power plants in Gigafactories for the sake of cost reduction. It's that Henry Ford concept of bringing the cost of nuclear way down by mass, producing it in a gigafactory, so that all that has to happen on site is setting it up and hooking it together as opposed to any kind of custom building of anything.

Again, listeners, in the interest of full disclosure, I am an investor in Matt's company. Matt, give us the elevator pitch on Aalo Atomics. What are you working on? When will your technology be ready for commercial deployment? And where can our institutional investor audience find out more about your company and its business plan?

Matt: Thank you again for having me on this. This has been a real honor and privilege. We are all atomics. We're mass manufacturing nuclear power plants that are purpose built for powering AI data centers.

We started around two and a half years ago, and at that point we were two people. Now we're 140. To date, we've raised 180 million and we're on pace to turn our first nuclear. Power plant on in under Just a few months. I can't say exactly when that's confidential, but it is very soon. So hopefully when I say that, the audience is shocked.

Because going from fanning to fission in three years is very unprecedented. But right now we are raising our series C. It'll be 500 million to a billion, and the use of this fund will go towards the first gigawatt factory. So scaling out our 40,000 square foot. Pilot factory space that we've already built into a million square foot facility that will have the ability to mass produce at least one gigawatt per year initially, and then scale up to five and then 10, and then likely around 20 gigawatts per year per factory in the not two distant future.

So essentially we're turning the first plant on in the next few months. It's a 10 megawatt plant that's purpose built for powering and data center at the end of the year. It'll achieve full power operation. And that's the aggressive internal goal on powering the world's first cot, nuclear planted data center.

And it'll be a great demonstration of something that I think we'll see a lot more of in the years to come. Yeah, thanks again for having me on and it was a real pleasure.

Erik: Matt, I'm really excited about what you're doing. That's why I invested in it. But I just want to probe a little bit on the business plan because first of all, I think you're doing exactly the right thing, but selling a nuclear power to data centers sounds to me like selling private jets to rich guys.

Is your strategy eventually to get to the point where you can bring the cost down enough mass, produce these nuclear power plants at a price point where you don't have to be an AI data center to afford one. And can you give us a rough sense? I know it's it's probably an unfair question, is that two years out, 10 years out, 20 years out, when do we get to the point where factory mass production brings the cost of nuclear down to the point where it starts to compete with the cost of fossil fuels?

Matt: So I think the interesting is right now, if you look at the Hyperscalers builders of data centers. The price point they're seeing for net new natural gas

production is in the 10 to 15 cents per kilowatt hour range. We're seeing as the current pipeline gets tapped out, new fracking, new pipeline expansion has to be.

Built out. And that also adds costs and delays. So the interesting thing is, even at the speed that we're talking about right now for, and the scale for powering data centers today we can come in at a price point right around that same range initially. So by, by many measures coming in right off the bat, being competitive with the ideal oil and gas solutions for this customer.

But as in order to. Displace much more of oil and gas. It'll have to get cheaper. And we believe within n equals 20 to 40 or so. So in other words, after the first 20 to 40 reactors, which would be around, five, call it five to 10 pods getting well below 10 cents is fully within range.

So it doesn't have to be in the thousands to see a very good price point, but in order to eventually get to 3 cents, which is a very aggressive number, it's our, essentially our company mission. That is more of the multi-decade effort, but I'd say probably in the early 2030s to mid 2030s getting below 10 cents is very achievable.

Erik: Matt, I'm really excited to be investing in what you're doing, and I just wanna say that I hope that other companies will come to the table and share your vision and my vision of mass producing nuclear energy in factories so that all you have to do is set it up and hook it up on site as opposed to custom building anything on site.

And I think it's really going to be important that the western nuclear industry embrace this idea because frankly, the People's Republic of China. Gets it. And they're working hard on this too. And if we wanna be competitive in the west, more companies need to follow the lead that Matt's company is taking.

So that's my soapbox for this episode. I wanna move on now and encourage everyone to stay tuned for our post game segment. After the feature interview, ironically, we happened to go a little bit off of our usual macro theme for this nuclear focused episode in a week where the world went To Hell in a hand basket.

And we've got lots to talk about around Iran, the evolving geopolitical situation and so forth. And that's coming up when Patrick Ceresna joins me as Macro Voices continues right here at macrovoices.com.