NAAREA

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SPEAKERS

Chris O'Brien, Journalist, Jean-Luc Alexandre, CEO of NAAREA, Speaker 1

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I think it's the first time we exchange. So before we start, just to give a bit of context, Mr. O'Brien contacted us yesterday, because he is preparing a story for seated. For later this week, I think about frenzies efforts to support nuclear startup. So maybe Chris, I'll let you introduce, introduce yourself and tell us a bit more about your subject. It's okay for you that

C Chris O'Brien, Journalist 00:55

that's a good summary. Thank you. And so I think you might know sifted, but it's the startup news publication supported by the Financial Times. And they were there were two things that caught their attention recently, one was the disco the president Macron introduce, celebrating the second anniversary of France doing a taunt. And he had mentioned again, the nuclear element of that program. And then I forget if it was the same day, or it was close timing that the new Laureates were announced, as part of the program. And so they were interested in knowing more about that. And in general, France seems to be now a hub of nuclear startups. Obviously, there's a historic nuclear industry here. So I know your company, and I'm sorry, is it pronounced Neria? Not real, not yet. Okay. Was I think, Well, early in that program, if I recall. But so yeah, so I reached out to you, they're interested, I think the story will probably actually run next week, but I'll finish it tomorrow. So that's the the main overview is to kind of get a sense of why companies like this are emerging here, and some of the opportunities and challenges. So I've read some of the press material, obviously. But since it's the first time we've spoken, if you could maybe just introduce a little bit yourself as John Luke, your background, and then kind of just a little bit of history of the company.

J Jean-Luc Alexandre, CEO of NAAREA 02:49

Okay, thank you very much. Nice to meet you, Chris. I'm an engineer. I'm the president and founder of Naria, I had an industrial career around the world, mainly in railways construction. And then in the water business. My former position was the head of the global inside the Suez group, we were the top leader in the world in water treatment, which can be wastewater, water, or desalination, for example. And then I quit swears just to stop this new project, because my problem was how to get the new form of energy and how to produce decarbonize carbon free energy everywhere I needed, meaning I had to find something with a high concentration of energy. Relatively autonomous, meaning that depending on any supply chain of fuel, and of course, no fossil fuel, and able to deliver the energy where the need for the industrial needs. So this is the start of Nigeria. And the second important point is that all started in 2015, during the cop 21, in Paris, because it was at that time part of the of this cup, and we were working a lot on the sustainable goals. And when we discovered that, finally, this was voted by 193 countries, we had the swimmer referential of the 17 SDGs. And I started to work with all my teams all over the world was how can we boost the achievement of those rules? And the answer was energy, pure energy, this is the unique transmits. So labor of sustainable works, its energy. So let's focus on energy and this is the old startup area. So then we we, we found that it was necessarily nuclear that we had to push forward just because there is no intelligence there is a very high density of of energy compared to the amount of fuel of material so all Is gather two together, we wanted also to use to build waste, because the waste to energy was also something I was doing everyday in my life in Suez, because the waste to energy was pressed the secret economy. So, you have both the ingredients on the table that that certainly may be going for this type of project. So, I, I founded the company during the COVID period in 2020. And all started with briefings I combined three major technologies the first one is the molten salt reactor, which is the fourth generation of nuclear have integrated nuclear, just for the sake of the passive safety, it will offer compared to the PWM which is the other technology that we found that you will find everywhere in the world. So a very high passive safety profile is the this is the the extreme the explanation of why having chosen the molten salt. Second technology, the fast neutrons to be able to burn long lasting waste nuclear waste, is the main problem we had we know that Auntie nuke people think they are anti

nuclear because of two major things. The first one is that we remain with long lasting waste. And the second is security. So I thought it was fantastic because France is one of the two countries in the world mastering the presidentials you have France and Russia. Only those two countries, it doesn't mean that you're not working on the on the on the subject, but only those two countries have built big size reactors. And of course, Russia has grown with their reactors. And friends, I decided for a stupid political reasons to close them, but we had the know how. And we kept the know how in France, why it was very important. So first, molten salt, fast neutron to burn waste, and then a very small reactor very Miko generator to be able to deliver 10s of megawatts and we explained, we needed operate on that, to be able to supply the energy directly for the industrial plants. And this is the the marketing targets we have, we want to deliver energy to the plants, because plants industrial plants are generating the co2. So if we want to decarbonize, we need to decarbonize at the plant directly. So we deliver energy and in two forms. The first one is that we produce electricity. And the second is that we produce high temperature, heat, and high temperature heat, and talking about 650 Celsius. degrees for the heat allows you to decarbonize the industry, because 80% of the volume, or 80% of the energy consumed by the pipe industry is for heating, industrial processes need hit. Today, a lot of people are saying let's go for electrify everything. That's not correct. Because if you want to electrify it means that you will have to produce heat with electricity differentials, the efficiency is the best one, when you do that, if you if you manage to do a very high temperature aid, you directly with very high efficiency, you decarbonize the industry. So this is why we combine everything, and it's a small as in a 40 foot container. So the the nuclear reactor with all the systems is big, like a nautilus. So you see how small it is, it's a very small one, fully manufactured in a plant, meaning that you don't have any more construction costs, construction is no more big and huge civil work, you get rid of all that. And this is a very good advantage in terms of time to market in terms of quality in terms of cost. Now, as we manage to have a very small technology, very tiny one, we get rid of water, we don't need any more water to cool down the reactor, meaning that it's not only an advantage in terms of safety, once again, no impact on the water resource as a resource. And it means that you can localize your reactor anywhere on the earth anywhere on the planet, whatever the location of the other plant, you can be there in the desert in the mountains everywhere and this is a very key advantage. So this is all embedded the new technology and why we have chosen this, this combination. And finally we have the last differentiation differentiating factor I would say is on the business model. We do not sell the technology. We sell the usage we sell the energy She, we are the energy provider, we are a utility should refer with no therapy, and we invoice the energy deliver, meaning that we are a designer, developer manufacturer, builder, operator maintenance, do we have the full cycle as in other industries, for example, and coming from the water business where this business model is the model is the standard model. Okay? So it's key because it allows you also to deliver directly be the energy to the the industrial guy, and the the sort of guy doesn't need to be a UK operator. Yeah. Just takes the energy.

C Chris O'Brien, Journalist 10:41

And so in building that model, what are the challenges in terms of is it a challenge of technology? Is it a challenge of finance? Or what are the main obstacles that you have to overcome?

J Jean-Luc Alexandre, CEO of NAAREA 10:56

Yeah, you have four main challenges to tackle and to address. The first one is the technology one, because of course, you need to combine what I said, the molten salt which has been developed in the US, the last during the last century, combining with the Fascinations that we that we have which we have the know how in France, and combining all these miniaturizing this in a smaller container. So there is a Technic, a technological challenge, but we believe with the experience we have with engineers with the supply chain, we have, we will copy that we will we will have it. The second challenge, of course, is the financing. Because with this model, it's capex intensive, but they are very small units. So even if you take the whole cycle, you say, you require more calories than in terms of just manufacturing, this is correct. But it's a very small unit, to at the end of the day, the capex per megawatt hour is very small. So you need less capex than in a huge project such as an EPR. So financing will be a challenge true, because we rely on the private funding, of course, we have this public funding, for example, the France political party, and we are and we are elaborating on that. And we are very happy to be the first French real rate purchase to be welded, inlay. And we will go with this project. But most of the funding comes from the private sector. And this is also very new thing in the nuclear business. Because most of the nuclear development in the last years were funded by public funding. Third challenge is the authority, the licensing. The nuclear authorities, not only in France, but they were everywhere in the world, they are used to license big units, big difference, big plants. Now we come to them with the new technology that they like, because it's a passive safety. So they like very much the passive safety, but they are just discovering new technology, new scientific behaviors, such as the molten salt, which is new, because more than so many you are in the liquid fission, not anymore in solid, efficient. It's more chemical than physical. So new challenges for that, meaning that even the safety authorities, any time, any time to be with us to, to study and to validate and to give us the license, it's a challenge. It's not a technical challenge. It's a time consuming challenge. And in terms of resources for them. And the last challenge, which is probably the most important is the sort of social acceptability of this technology. And we're working very hard on that, since they weren't actually put in working on that subject before tackling the technological hurdles, because we knew that everything is on that. So we need to be sure that you it will be accepted. And if we want the social acceptance, we need to understand why people are against nuclear in general. What do we bring as a new technology to satisfy the public opinion or to guarantee that the safety, security and everything yeah, they had in the end, we work? And what are the benefits of such of such a technology for the public opinion? Because having an abundance of energy, carbon free everywhere, you can imagine 1000s of different applications that will give a lot of benefits, which are totally unexpected, up to now. Yeah. So those are the first challenges.

C Chris O'Brien, Journalist 14:36

So let me ask a bit about maybe starting with that last one, just a little bit more. You referenced this earlier, but obviously, I've been in France for nine years now. And when I originally came here, the momentum was to reducing nuclear. Moving away from it. I'll forget exactly what the goals were but I think France is still may be number one in terms of the percentage of energy that comes from nuclear. And the goal was to move away. And then I think it was around 2019 2020. That shifted, and now has shifted more towards obviously then supporting the development of the sector. So how important has that been? To enabling like a project by yours, I'd have to imagine the climate in 2015 would have made this much more difficult to push forward on something like this.

Jean-Luc Alexandre, CEO of NAAREA 15:35

It it, you had a combination of factors of events, even during the last weeks, if you just realized what had been decided during the 28th. It all started the last two years, when people discovered that we had a problem of delivering enough energy to the people discovering in France that we are we had a nuclear fleet with some technical problems to solve, urgently. There are people started to think what will we do in the next years? And the other problem two or three years ago, as people were discovering that the the podcast of the energy transition, because everybody said a few years ago, and only a few years ago, okay, let's go for energy transition, we need to de fossilize the energy, what are the consequences of this? It means that you will replace by one electrification. Okay, what are the forecasts, and then a lot of people were absolutely afraid of the figures, the most conservative figures show a multiplication between 3.5 to four times the energy we are delivering right now. In the next 30 years, when you look at the time, you need to build brand new power plants, you demonstrate that you are unable to face this demand that will occur for the next 30 years with the actual technology. And these open the chakras of everybody saying that we need something different. So let's open the way to innovative nuclear, which is one of the oldest solutions, because people were also saying, Let's go for renewables, that renewables is intermittent. How do you go? Do you compensate the intermittent with gas? No, it's possible. But there is a product do we need this energy mix? Of course, we need renewables. Of course, we did either. But we need something else. Besides the conventional nuclear that we need to, to emphasize because we need the EPR. But EPR, just that you were just producing energy, and then just deliver a piece energy to a network. The problem is that network is saturated. Even in France, it is security in the rest of the world, the network is not enough is not sufficient to deliver this. So we have a problem. And one of the answers is that the one we are bringing is decentralizing the production of energy. And it all started with that. And then you had this President, our President was totally understood the situation probably one of the first having understood the situation. And say, we need to open this, let's open the door to innovative new PR. Let's look at the startups because probably the southcentral quicker than any other big companies to deliver the new innovation. To innovate. You need freedom. Freedom, you don't have it in the big groups. I know coming from big groups. Innovation was really a problem because we are the groups are always we are always replicating what we are used to doing for 10s of 10s of years. This is totally different. So we have a president who has made a very courageous statement. It was the first school of Belfer two years ago. And then he has launched this France 2030 with the the dino active nuclear code for that call for tender. It's been no, it's been a long time to to address the different types. We are very happy to be the first French one to be awarded. And now it's not the end. It's just the beginning. We're just a step one, we have two other steps in front of us. Now we are delivering the things to go quicker than anybody because there is an emergency. A lot of people are challenging today our calendar is saying that it's very ambitious. But wait a minute. We are the defining the calendar. It's the climate change, which is in which is putting the calendar on the table and saying this is subject of the one so we need to fit into this and this is why all the startups if you take them today, they are roughly the same calendar they want to be on the market by 2030 because there is an emergency.

C Chris O'Brien, Journalist 19:49

So let me ask you now about fronts. 2030. I can't recall if you have publicly said how much you received from that particular program. Are you able to disclose that?

J Jean-Luc Alexandre, CEO of NAAREA 20:01

Yeah, it's probably we have received failures.

C Chris O'Brien, Journalist 20:05

Okay. And so you talked before, you know, I'm aware that you you raise private money, you got money from friends 2030, I read the Bloomberg story, where you were talking about your outracing, I think now 100 and 50 million round. So you're obviously with the with the technology and the mouse and describing you can attract private capital. So why was the government money important to you? What did that help you do? Or what did it bring to you? Besides, obviously, just the money itself?

J Jean-Luc Alexandre, CEO of NAAREA 20:42

Yeah, it's a good question. If you if you remember, three years ago, when the French 2030 was launched, or when you had that, I would say, it's something important for a startup like this, I guess, because we are only a few people having the inner world, it means that the government gives you a stamp on the credibility of your project. Because, of course, we had a kind of an overall a demonstration, we had to demonstrate to a white jury with a lot of experience in the jury, how works your technology, what are your goals? How do you want how do you explain your industry or scheme, and we have been working on that. So it means that there is credibility, and it helps in raising the money because a lot of private investors, they need to get a signal from the from the government saying, I believe in that technology, especially from France, which is a nuclear country, with a nuclear era with a nuclear know how which is recognized everywhere. So for us, it was key on the credibility of the project, on the fact that everything regarding nuclear will be on a public private partnership. So this is the first step of the public partnership. And it's not only money, because when you look at what's in the inside the funds the program of the government, it's not only money, it's a lot of collaboration from the French state owned company, such as the CEA, for example, which is one of them, or I know all this, also focus usual suspects, I would say in UK or in France, they have a lot of partnership with us. And this was under the umbrella of 21st 2014.

C Chris O'Brien, Journalist 22:29

Now, when I you describe now, some of the, I guess the priorities for the future as you continue to develop, and the challenges, one area I'm wondering about, I'm familiar with some of the startups, not all the startups, you mentioned the big groups, do you see among them, also competitors emerging? People offering either similar or different solutions, but trying to potentially address the same customers?

J Jean-Luc Alexandre, CEO of NAAREA 23:01

We are competitors, because there is a huge demand on the market first thing, so we will not be on the push market, but on the poor market, the market will pull us. So there is room for everybody. First thing second, we are no longer. We are not at all on the same segments. We are on 10s of megawatts most of my competitors are based on hundreds of megawatts, totally different application. If you deliver 200 300 megawatts, you will never deliver this to the industry that there are caveats to the network. And the network, we spread it out for the for the industry. So different positioning. Third, we don't have the same business model. Yeah, we are probably the only one of the small reactors, saying that we sell just the energy. So we are different, that we are complementary, or delivering, as I say, as a whole to be a strong contributor for this huge demand that would go over the next two years. Yeah. Yeah,

C Chris O'Brien, Journalist 23:57

I know. I mean, I, I'm familiar with one, I think called Jimmy, I think their plan is to actually build reactors at the site of people who want to use them, which is obviously different capital model, a different business model in terms of proposing, who operates at all those things. So yeah, two very different approaches, I think in terms of who you can serve and how that would happen.

J Jean-Luc Alexandre, CEO of NAAREA 24:25

And look at the sobriety of the project also because when you're doing nuclear, you need to correlate this for the fuel to this fuel cycle. Which is absolutely key. We are building waste. If you take the one you have mentioned they are not burning waste. And where does come from the fuel comes from the Far East, not from Europe. We are relying on the fuel cycle which relies today, at least on everything into Europe. Totally different way of regarding approaching the way of nuclear business as a whole, because if you look at the sustainable goals, you cannot say I will, I will bid on the usual fuel as we do for the last we've been doing for the last 50 years. Now it's different, we are burning waste, we guarantee that there will be no more long lasting waste in the world. That's the commitment of now at least you won't want to do that thing. And we combine it in the Neria. system, we have the fuel cycle, meaning that we are developing the fuel cycle coming out from the universe spent fuel for the Convention on nuclear, to the ecosystem in the fuel reprocessing or the fuel, not not all the computer or embedded that in the project. We are totally different. But the good news is that there is room for everybody. And we are working with everybody. And we are working all together to try to, to put in comments, some, some specificity, some studies, some approaches to try to rationalize a little bit the efficiency or the resources that we put on that. So we are not working on our own in silos, we are working all together, and especially at the European level, to try to bring the momentum in front of the political momentum, which is absolutely unique in Europe, and now outside Europe with a couple GA, a unique momentum of industrial people industrial startup saying we don't have the same technology. But we have so many things in common that we will put this in common and we are we are smart guys. We can do it. We can do it quicker with less resources. Sorry, Christy will be your last question. Because we have quick minutes in small.

C Chris O'Brien, Journalist 26:49

I, but let me if you okay, I'll ask one last question. Again, we've talked a lot about France, a bit about Europe. But you know, a company like yours, I assume has global ambitions. I come from the US, you know, the nuclear market there has been frozen for a long time. But in general, do you see movement across Europe, outside of France toward more support for nuclear? And do you see other markets also shifting for the same reasons, perhaps to be more supportive of nuclear options?

J Jean-Luc Alexandre, CEO of NAAREA 27:27

Yes, it's moving everywhere, everywhere, people will come to the conclusion that they have to go for nuclear. So it's good news. And insert to insert to us now to try to bring it to bring this huge international partnership. In Europe, we are discussing all together because we want to have a European restaurants, at least for having some different players but adding something sound we are discussing with the US we are discussing with with our our cousins out on the other side of the Atlantic, just because we know that we need to do a lot of things in common. And this market is a common market. It's energy, because if we decarbonize if the other ones don't decarbonize the carbon will come back to us and it will there will be no impact on the on the climate change. So we are discussing within, we don't discuss with the power Yes, countries, such as Russia, for example, we don't want to discuss too much with the Chinese. But we discussed when people wanted to have a common goal with maybe different technologies, but some of them will be very, very similar. So we try to once again to rationalize and to say how can we be all together? A sun responds to the world. And it's a global market, as you said, we need to address these global market.

C Chris O'Brien, Journalist 28:47

Okay, I will stop there. Thank you, everyone, for your patience. I'm sorry, we went a bit long. One request would be if you have a media kit, images, photos or anything you can send by email, that would be great. And I'll be in touch by email if I just need to check any of this. But thank you so much for doing this last minute. Very much. Appreciate it. Thank you, Chris. I'm sure we'll stay in touch