EP12

Managing both energy transition and huge data flows, with Ole Jacob Siljan VP & Head of Yara Technology center and Yara Porsgrunn plant

Capgemini

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00:00:00 [Guest] **Ole Jacob Siljan**
So that is one of the key elements that we're looking at to sort of see how can we help the operators to get the information they need to act and not all the information that they need to sort out themselves because then there is a high risk that you will do so on the important information.
[music]
00:00:18 [Host] **Caroline Segerstéen Runervik**
Welcome again to our podcast Keys to Intelligent Industry, and today we are recording from Sunny Oslo. Great to be back in Norway, by the way, and with me of course, I have my co-host Fredrik Gunnarsson. It's good to be in Oslo, Fredrik, isn't it?
00:00:33 [Host] **Fredrik Gunnarsson**
Indeed, always nice to be here in the West of the Nordics, sitting as in Skøyen outside Oslo.
00:00:40 [Host] **Caroline Segerstéen Runervik**
We had the pleasure to be in Oslo for a couple of days and. I really see even if you know there are strange news every day, I still see a very positive ambition in terms of market growth. And of course it's very interesting from an energy transition point of view. Here the oil market is huge, but there is a big ambition in terms of transition to renewables and it's really fascinating to be part of that. We are here today to actually have an engaging discussion with the key leader and a very interesting podcast guest, a leader in Yara. Yara, which mission is to be responsibly feed the world and protect the planet. So welcome, Ole Jacob Siljan, Vice president and Head of the Porsgrunn and also Head of Yara technology centers, welcome.
00:01:32 [Guest] **Ole Jacob Siljan**
Thank you very much. It's a pleasure to be here.
00:01:34 [Host] **Caroline Segerstéen Runervik**
This mission is a very strong one. What does it mean to you and can you elaborate a bit on it?
00:01:41 [Guest] **Ole Jacob Siljan**
There's a twofold mission here. One is, of course, to feed the world, which for me is the one that is closest to my heart, but also closest to my work as the portion plant produce something like four and a half million tonnes of fertilizer every year, feeding roughly 50 million people across the globe. And that is for me sort of probably the reason I get up in the morning and probably the reason why most of the people at the portions I get up in the morning because we know that we bring valuable product to the world and secure the food. Protect the planet means that we know that our business is polluting. We know that we let out CO2. We know that we have other emissions also coming from the site. So, our job is to constantly make sure that we produce the fertilizer with the lowest possible footprint. And also know that we are ways ahead of our competitors when it comes to the CO2 emission per tunnel product.
00:02:34 [Host] **Caroline Segerstéen Runervik**
And how were? How have you been able to get there?
00:02:37 [Guest] **Ole Jacob Siljan**
So mainly by the combination of process understanding and technology center, the R&D department where we in the late 90s, early 2000 developed the catalyst one of the key pollutants from fertilizer industry is N2O. So, laughing gas. 300 times as potent as the CO2 when it comes to greenhouse gases, and we created a catalyst that we installed in our processes that brings that harmful intro back into nitrogen and oxygen, also known as pure air.
00:03:14 [Host] **Caroline Segerstéen Runervik**
Impressive. So maybe coming back a bit to you and your role, how did you end up in this industry?
00:03:21 [Guest] **Ole Jacob Siljan**
I started back in 1990 in the aluminum industry in the former company mosquito, which then in 2004 spun out the Agri business, today known as Yara. So I spent 21 years in the aluminum industry and then from 2011 I've been in Yara in several management positions. So I started out as Vice president and head of research. Then I was leading the global improvement program for all over 26 plants across the globe. Then back into technology and efficiency in a combined group called Yara Technology and projects now, then heading one of the two largest plants in the area, the Yara pushing plant, Yara portion is one of the two biggest plants in Yara, but it's the biggest fertilizer plant and the plant is roughly 500 employees. It produced, like I said, 4, four and a half million tonnes of fertilizer every year to give you that in a perspective, it means that every two seconds we sit here, the plant produce enough fertilizer to bring food on the table for one family of four for one year. So it's extremely efficient.
00:04:29 [Host] **Caroline Segerstéen Runervik**
So can you describe what are you actually producing in this plant?
00:04:33 [Guest] **Ole Jacob Siljan**

So pushing plant is producing fertilizer. We are producing minimum fertilizer and we produce 2 products. One is the calcium nitrate which is basically used for high cash crops. So that is a product that goes into glass houses. Into drip irrigation and crops like Cypress, orange, pineapple, avocado, these high cash crops. And then they produce a fertilizer called NPK, which is nitrogen phosphor and potassium, which are the key ingredients in any crop to grow. And that is a broad field product, meaning that it basically spread, spread it out on the field. We produce 4, four and a half million tons. The size of the plant, it's the strength of the plant, but it's also at time the vulnerability of the plant because it cost us a lot of money when we're done so. We want to produce stable and produce high quality fertilizer every day, 24 hours a day. That's our target.
00:05:32 [Host] **Caroline Segerstéen Runervik**
And I have understood that you also have a leading role for the R&D and innovation within the Yara Group.
00:05:39 [Guest] **Ole Jacob Siljan**
So that was my previous job. The where I was heading YT. But at that time, I was also responsible for building the R&D portfolio of the Yara. So when I took the job in 2019, basically we saw that we were a bit scattered on our R&D and we needed to especially with the green transition moving towards cleaner products, how to utilize cleaner energy for the production? We decided that we needed to step up our ambition on the green side and then of course something had to go and then we spent a couple of months basically close to half a year to get to a new R&D strategy where you set aside enough money to really make a different impact on the green side rather than just following the trend and see if something can be used. We decided in a few years this is where we will be leading.
00:06:36 [Host] **Caroline Segerstéen Runervik**
So where are you investing most in R&D today?
00:06:39 [Guest] **Ole Jacob Siljan**
Most investments today goes into our production processes. All of our production processes, it's basically the NPK process, the CN process and the production of acid as an intermediate key product. If we are on, that's where we have our strength and that's what we build on and continue to strengthen. The Research Center sits in in Portugal. The majority of it on the technical side, we also have someone in in Brussels and in Sluiskil in Netherlands. They work together and the technology center has an ambition and also a mandate to deliver technology developments to all the Yara plants so irrespective of where we sit, we work for the complete Yara.
00:07:19 [Host] **Fredrik Gunnarsson**
How many plants do you have in Yara, totally?
00:07:21 [Guest] **Ole Jacob Siljan**
Today, 25, we have a couple of plants in Asia, in Americas, both North, Middle and South and of course Europe. Europe is our home base and it's that's where we have the majority of the plants. We have 16 plants in Europe and the rest across the world.
00:07:37 [Host] **Caroline Segerstéen Runervik**
And based on what's happening in the world as we speak, of course the fact that we talk a lot about bringing the production home again, For you, that's not really a challenge. And because you are already across the globe. But do you do you see that your strategy in terms of where to increase the production has changed? If you look at what happening in the world recently?
00:07:50 [Guest] **Ole Jacob Siljan**
Not really. What we see is that we you try to invest where you get the biggest bang for the buck. So you go for the plant that are well operated. The plants that have the size it. I mean it is a, that even though we are very proud of our high quality fertilizer, it is still a commodity product. It is not something that that Yara are as unique in producing so cost and size is really the key elements in in driving efficiency and productivity. So we try to invest where you see that here it will make sense. To do the comment and of course then for the plants that where you do not get the same amount of investment, you still need to invest enough to run safely. We will never compromise on safety in our production because it is dangerous from time to time and we need to protect our people and protect our the environment and the surroundings.
00:08:56 [Host] **Fredrik Gunnarsson**
You mentioned that you get sort of securing a stable production 24/7. It's really key for you and one of the largest or in the investment area is tactical production process. Do you want to go deeper a bit on you know describing what you do in? Securing that stability, improving the performance, quality, etc.
00:09:15 [Guest] **Ole Jacob Siljan**
There's basically two things or three elements. One is the competences of the organization, so the

people working there, how do you continuously build our own confidence and strengthen the confidence of our people? I always said that sort of the biggest asset we have is actually the people I know it's a bit of a slogan. But I really mean it. I know that we have competitors that has more or less the same technology as we have due to the fact that Hydro licensed the technology back in the 80s that runs the plants probably with half the efficiency and three times the people and this is due to the fact that we continue to develop our people. We continue to build competence and also involve the people in improving in the processes.
00:09:56 [Host] **Caroline Segerstéen Runervik**
How do you involve them in improving the process?
00:09:58 [Guest] **Ole Jacob Siljan**
You listen to them, you ask them for what could be an improvement. You listen to them when they have the improvement doesn't mean that every good idea is being followed or executed, but at least make sure that they are involved. Make sure because they live with these opportunities and also these challenges every day. And the more of those that you can take on as a value or remove, that is very good.
00:10:20 [Host] **Caroline Segerstéen Runervik**
I still would like to ask, there is a huge debate in Sweden as we speak that it is actually a challenge today to find enough people who are technology savvy and able to work on the production sites. Do you see the same challenge here and how can we encourage even more people to actually take these kind of jobs?
00:10:41 [Guest] **Ole Jacob Siljan**
Yes, we see the same. We have tracked and monitored over the last almost 10 years the number of applications and you can see that it's a downward going trend. It's both for management positions, it's for process, technical positions, it's for operator. It's for craftsman and I think in Norway we have for a long time been fighting with the oil industry, which pays better. They have probably more fancy routines for how they work and operate at the level that we can't compete cost wise. But I had a very interesting discussion today with a colleague from a different company and they said that they had for the last five years. They had invited schoolchildren at the age of 15 to 16. That's when you start choosing your career further. Invite them into the industry and show them our control rooms or computers to get both the students. But he said it also the mothers, because it's usually the mothers to decide for the kids. Where to go to get?
00:11:35 [Host] **Caroline Segerstéen Runervik**
And sparkle their interest.
00:11:36 [Guest] **Ole Jacob Siljan**
Yes. And also to see that the industry today is very different from the pictures you see in the history books, which shows the basic, the picture from the 50s to 60s.
00:11:44 [Host] **Fredrik Gunnarsson**
Really interesting. Yeah, we see that's a bit elsewhere as well. And also creating that spark and interest at that age is crucial.
00:11:51 [Guest] **Ole Jacob Siljan**
Yeah, it's crucial.
00:11:52 [Host] **Fredrik Gunnarsson**
So, the investments you're making in the production process, one competence in people, you mentioned a couple of others.
00:12:00 [Guest] **Ole Jacob Siljan**
Always looking for new technologies either self, self developed or technologies that developed by others that can help us to move forward, and that is especially on the on the sort of process technical technologies and the last element is of course automation, digitalization and autonomy or AI or whatever you would like to call it. Basically, how do you how do you bring these new tools that we have in the computer world to really start helping us?
00:12:28 [Host] **Fredrik Gunnarsson**
And when you invest in this, if you look at the key KPIs in the production process in terms of targets, what do you really want to achieve to improve further?
00:12:36 [Guest] **Ole Jacob Siljan**
It depends a bit on the type of plants or technologies. With our plants today we say that we should at least have an up time efficiency of 85% in our fertilizer production plants in our what we call the gas plants, which is usually acid production and the ammonia prompt you should be looking at 90-95% efficiency. At least that is to keep it stable and then you need to balance. Then your chase for volume through increasing the speed or keeping the speed stable and increasing the run length. And that is a

sort of you need to take some decisions there. On what is most cost efficient.
00:13:14 [Host] **Fredrik Gunnarsson**
I believe you're also working very actively to improve flexibility. What's the important aspects of flexibility and why is that so important for you?
00:13:22 [Guest] **Ole Jacob Siljan**
I mean up to only 2-3 years ago the sort of energy pricing always was extremely stable. Today it is not stable at all and that puts some other parameters into the bucket that you need to control when necessary and also when beneficial. You can reduce production because you will save on energy cost and you'll probably save more than you would if you just kept on producing. So that type of flexibility and understanding that is very important, but that again that brings the need for a new set of competences because it is counterintuitive to what we would like to do, which is sort of run flat out at a very high level. And sometimes you need to sort of step down because it makes more money. So getting that flexibility. Also getting the flexibility in the workforce to increase competencies and at the same time then be able to rotate and know more about the production. In Pushkin, we have four production areas. I would say they are world class in this their segment. But I don't make money from being the best of producing ammonia. If the rest of the plant is not keeping up. So it's also just about understanding the value creation in the value chain, which is basically how you take the gas molecule coming in. And transform it as rapid as possible and as cheap as possible to a product that we can send out. And to do that you need to communicate.
00:14:41 [Host] **Caroline Segerstéen Runervik**
Do you rotate the teams?
00:14:44 [Guest] **Ole Jacob Siljan**
No, not today very or at least very, very little. And I think this is something that we need to work on. How do we not necessarily rotate the team, but how do we make sure that people are capable and competent to rotate and cover a bigger part of the process and understand the value chain that every operator understands that the way we make money. Is basically by seeing the value chain. What is my job in the value chain and why I do what I do here create value?
[music]
00:15:15 [Host] **Fredrik Gunnarsson**
You mentioned before Yara's role in the global network and I believe you also try to get better sort of closer collaboration and flexibility across the site.
00:15:24 [Guest] **Ole Jacob Siljan**
When we do technology developments, we always do a pilot when before we go into full scale production and of course with 25 factories around the globe, you have the ability to test different areas. It will also make sure that you involve the other plan much more. You will always learn by going to the point you always learn something that is useful if you willing to search for it. If you're willing to listen, and if you're willing to discuss, you will always learn something that you can bring back home.
00:15:51 [Host] **Fredrik Gunnarsson**
You mentioned that one of the key investment area is stand the digitalization and automation and that's something we have discussed. Not a lot in this podcast before how we can enable sort of digital tool. To improve, for example, the production of factories. Can you not elaborate on the different types of solutions you are sort of investing in under the umbrella of the utilization automation and what that brings to you back to the overall objectives you have with the plan?
00:16:23 [Guest] **Ole Jacob Siljan**
Yeah. So, one of the first things that we invested in was sort of the what we call the digital production platform, which means that data from our so we get a lot of data every day from our system and for our from our so. So, the question is, it's not the lack of data, it is a lack of how do you use that data, what is noise and what is really valuable information. And also how do you share that across the plant, senora? And can you also by sharing can you also then see some common denominators on what the challenges are? So, the first thing we did was to build them the digital production platform where all the data from the different plants are uploaded. So that you have it there and you can then start extracting data, you can start analyzing the data. You can start looking for trends. You can look for common denominators on failure procedures or success rates or whatever. That's one of them. We have also installed what we call APC, which is advanced process control. Trend minor tools like this to sort of really start looking at what are the trends there? How do you optimize production? APC started as sort of optimizing your volume and then you realize that you can also optimize on energy. You can also optimize on money. That you make so it's really doing that whole development to see where do you take out the value, how do you bring the value because it's from a technical point of view and traditional production in this industry is

sort of just run flat out. And it's not always the best way to do it. If you want to make more money. We have done, the digital twin started that in one order. Ponce and the pushing plant is one of the pilots there. We're more or less the whole plant is now on the digital twin that we use and we can see how that brings value both, for if you want to do debottlenecking of the plant, if you want to do predictive maintenance number tools that we introduce and do and that we see bring value, but in my experience, we started this out a couple years ago. That was also after sort of three or four years ago, everyone talked about the industry 5.0, which was already now, is already computed to run the world, at least the process. Our experience was that basically we had too much hope for the computers fixing everything and too little respect for the fact that there are some tacit know. That the people have that you need to bring into the computer models, otherwise you will not get there. So, I hope so that the industry is 6.0 will bring this together and really see start from what is it that you need?
00:19:05 [Host] **Caroline Segerstéen Runervik**
And how do you do that? Because of course it's a super valid point, but how do you encourage that to happen? Also, in your current plant?
00:19:13 [Guest] **Ole Jacob Siljan**
We have a laboratory. They measure the quality of the product, so they look at sort of what they do are within spec. And one of my questions to the computer guys was. That if you're at home and if you start with 1K of flour to create a bread, it's unlikely that you will get 10 kilos of bread. It's also unlikely that you will get .1 kilos, so why can't we calculate the composition of the product that we're producing when we know all the inlet streams? So really starting looking at how can I use all of these data and where you missed data? What can I use other data to see? This is a good enough approximation and then see what the product quality is and then sort of how can you do that and see if that can also at least substitute or help out the laboratory analysis to do that. We also looked quite a lot on what we called alarm management. So, when you run this process, you get alarm saying that there's beep, there's or you're running too high or too low or too fast. And in some of the ponds we have like 500 a thousand 1500 alarms every day. And if you calculate that that is quite a few number of alarms every minute. How they distinguish between what is noise and what is the real alarm? And how do you build a system that takes over and really takes away the noise. So that is one of the key elements that we're looking at to sort of see how can we help the operators to get the information they need to act and not all the information that they need to sort out themselves? Because then there is a high risk that you will lose up on the important information.
00:20:53 [Host] **Fredrik Gunnarsson**
And you are able to do that for that specific issue for example?
00:20:56 [Guest] **Ole Jacob Siljan**
Not me. No, that's sort of the guys working for me are quite good at. Yes.
00:21:01 [Host] **Fredrik Gunnarsson**
Just a question, when you're saying that you roll out sort of the data platform, the solutions on top of the use cases, are you doing that across all the plants? The reason why I asking is that the question we almost always get is how we scale.
00:21:15 [Guest] **Ole Jacob Siljan**
Yeah.
00:21:15 [Host] **Fredrik Gunnarsson**
Because you can do you know, connect machines, you can start creating data layers, but across all the plants, how do we actually get the benefits from those kind of? So do you roll it out at scale or do you have different solutions per plant or?
00:21:28 [Guest] **Ole Jacob Siljan**
With the digital production, the sort of the focus is always that sort of, it shall be scalable. So you always have all the plants in mind that this needs to fit for all of the plants, so they should be involved and included at the same time you use a couple of plants. Wants to do the pilots before you scale it. So the reason is that the scale of the plants scenario when it comes to resources are quite different. So plants is a big problem. Slow scale is a big problem. We have resources to help and support the central functions on this one or they to support us, but they're also are quite a number of smaller plants where this is quite difficult and then when you come to these plants it is beneficial to have a solution that you know is working already also because it's quite costly to have 405 hundred different solutions running.
00:22:21 [Host] **Caroline Segerstéen Runervik**
How do you pick up the best from the different plants? Because it you said it yourself, you really learn when you're out on the field and visiting the plants and we already heard you are present globally. You have a lot of different plants. How much do you travel and visit the plants? How much do you get

inspiration? From even other companies of ideas to bring into the plants, because a lot of what we talked about is around innovation and continuous improvements and really picking ideas from the people on the sort of floor working there every day. How do you do it?
00:22:47 [Guest] **Ole Jacob Siljan**
One of the things that we installed when I was head of white piece of technology project was something called communities of practice, which is it's not already, it's an idea we stole from some of the big mining companies and caterpillar and some of these companies we have in there. I think we have 17 some 15 to 17 ammonia plants. Then you create a community of practice for the ammonia plants where they meet on teams or digital or whatever. But they also have question sites that you can go into on your computer where you can raise questions. You can bring forward ideas. You can show what you have done. So really trying to spread it from the bottom up and then lift it up to the. And this is run by the central function so that they also keep an eye on what are the ideas. How can these ideas be useful for other? And that was something I was much more involved in when I was head of YTP. Now I sit in in the Yara and my task is to make sure that my head of the monochrome use that community of practice to get ideas and also bring forward our ideas for this. So we can we can share between ourselves because there's a lot to be gained by just talking, understanding and being challenged.
00:24:06 [Host] **Caroline Segerstéen Runervik**
Coming back maybe to some of these technology investments and technology accelerators, you mentioned the AI automation in the beginning. What kind of investments have you done in your plant connected to AI? How do you actually see that it's it is supporting in terms of your production, capability and efficiency?
00:24:27 [Guest] **Ole Jacob Siljan**
One of the things we have done, we have installed Copilot. It's or it's a first test to see what we can achieve and what this can. Used for and our key, or at least my key take on this one is sort of how can we systemize how can we extract the value of all the data we have. We have a lot of information. We are extremely good when something has happened to go back and recall and say that yes here we can see. That's what happens. How can we use this data or use this data into an intelligent tool that can start predicting. Start telling us that guys, you better look out now because there's something that's abnormal here. There's something that's out of range. There's something that is moving in a in a different direction. That would be really helpful to go from. If you look at the maintenance side to this one, go from run to breakdown to run on condition based. So you will get the tool to say that there's something going on, can you please take a look at this?
00:25:33 [Host] **Caroline Segerstéen Runervik**
And have you seen some good exciting sort of use cases so far? You just in the starting?
00:25:37 [Guest] **Ole Jacob Siljan**
Yes. So we are in the starting, but we are not connecting more and more of our vibration monitoring on all our pumps on our turbines and these systems to a common tool and that we can use to monitor both across the Yara but also at the plant in Porsgrunn. We do that to see sort of, we now know that sort of OK here we can see there's vibration coming on this tool. What do we do? Do we need to replace it? If so, do we need to do something, for instance by running down speed a little bit, producing a little bit slower so you can bring it forward to the next 14 days when we know there's a stop rather than continue to run and then you have to stop and then you have another sop 2 weeks later.
00:26:19 [Host] **Caroline Segerstéen Runervik**
Yara is very, very heavy consumer of energy, to say the least. So you have the challenge, as many heavy Industries as you to secure that you consume less. What is your strategy connected to energy and how are you progressing in terms of this?
00:26:41 [Guest] **Ole Jacob Siljan**
The Porsgrunn plant to use energy in two ways. We use gas for the unborn production, so it's both as a raw material, but also as an energy source. And the other element on energy is electrical energy in the Prosgrunn plant. We have spent something like 10, almost 15 years in electrifying the plant. So it's probably the most electrified plant in the world when it comes to this type of process. So rather than burning gas to produce steam to run the generators, we have electrical motors. That was very smart in Norway when the energy was cheap, and then it has a different challenge to it now when the energy is fluctuating and also partly very expensive. So then it's up to us to make sure that you balance this. How do you run the plant when the energy is very costly to ensure that you continue to use the green energy because that lowers the emissions, but also it needs to be with black numbers in the book, you can't protect or help the planet with red numbers, so that challenge. How do you optimize your energy consumption and continue to produce good results? Few things there we have a neighboring plant called

Eramet which produce silicon manganese alloys for the steel industry. They have an off gas that is based on or is mainly Co so carbon. And they have two choices. They can flare it and burn it to get CO2 and some energy. But what we have done for almost 20 years is that we take that off gas into our ammonia plant and use that as a fuel for our ammonia plant for the total community of Greenon where these two factors are these doing like this reduce the total CO2 emission in that area, with about 60 to 70,000 tons every year.
00:28:27 [Host] **Caroline Segerstéen Runervik**
And what is your perspective then on the energy transition overall here in Norway and? And are the large companies enough engaged and also maybe pushing for some important decision more from a government point of view?
00:28:42 [Guest] **Ole Jacob Siljan**
Very important question in my view. I think that Yara in in 2021 and now in 24 we opened the we reopened our way of thinking around water electrolysis for producing hydrogen rather than from gas. And we opened a pilot that today at least is the biggest in Europe. 24 megahertz producing then roughly 20,000 tons of green ammonia area. So ammonia with no CO2. Our ambition was until last year was basically to remove all the CO2 by going electric at Porsgrunn. The problem is that there is not enough power in the southern part of Norway to do that during the M1 and complete the electric would take something like 3% of the produced water power in Norway and that is not available in the southern part. We do not have grid capacity to get the power in, so we're lacking those two and we also struggle very hard to see or get clear answers from the government on what are the subsidies or the initiatives to help us to come through that transition. So we asked that we have shelved that product for now. Because we can't lift it due to these three constraints. But our ambition is still to decarbonize Porsgrunn. Within 2030, but we will have to look at all the ways of doing it, more step wise like step wise electrification, step wise, CS or whatever. But we are still our ambition is to decarbonize, but the lack of power not only in the southern part of oil, I think you see it all over Europe at least that the this. Desire to go green is still there, but people start to realize how much energy it requires and that that energy is not there today and the cost of that energy when it's there is too expensive.
00:30:38 [Host] **Caroline Segerstéen Runervik**
I think it's very clear. We also need to continue to look at many different energy sources and still hope and believe that technology can help us to do things even more efficient in the end. Also, when it comes to energy consumption. But I would assume that this is something that will be discussed when you are actually. Joining for the industry this summer in the beginning of June because I know you will be there and you will be also one of the keynotes. What will be the topic you think during this week so this is. Sort of one of the most important weeks in Norwegian business, right when the large companies are meeting and etcetera and networking, what will be the topics of this year?
00:31:20 [Guest] **Ole Jacob Siljan**
For me, I think one of the most important topics to raise is the fact that a couple of years ago we were a bit sort of stunned by the Biden administration introducing the IRA. This inflation reduction act, where you actually you have tax rebates or tax refunds if you go green or go blue or take up the CO2. And it was very easy to calculate how much you were getting back. So, for instance, Yara looking at building 2 blue ammonia plants in the US based on the fact that you get tax refunds for 10 years, depending on how many tons of CO2 you remove. Meaning that's where you know the cost of them on your plan, you know your tax refund and you can make a business case. In Norway, we know the cost of the plant, but we don't know what are the. So how do you get the money back? Because producing green ammonia is more expensive than producing grey. And for me, getting the authorities to really start, if I might be a bit tough and polite to them, don't continue to tell us what you can't do. But try to tell us what you will do to help us. Otherwise, I fear that we will lose our big time on some of the industry in Europe because it might go somewhere else. And I do not think, I don't think that is beneficial for Europe as a as a continent.
00:32:40 [Host] **Fredrik Gunnarsson**
Just a question on the business case to produce green ammoniac and green product in Yara. Is there's a premium the customers are willing to pay. If you have a complete green product.
00:32:52 [Guest] **Ole Jacob Siljan**
I would say yes. Today there are, but I think that's also linked to the fact that the volumes produced green today or carbon decarbonized products are quite small volumes. So you will always find some companies that creates very premium products that are willing to pay that price. But if you were going to convert everything green today, no, there's probably not market to do it. But one element there is that when we calculated the going completely electric on the amount of plant we I think we calculated that

the cost of a bread for the customer would be something like 1020 cents more expensive than the current bread. Today the problem is someone needs to bankroll this.
00:33:38 [Host] **Fredrik Gunnarsson**
We have the exact same discussion, for example with green Steel, where there's large initiatives producing green steel, 0 carbon also with the similar hydrogen technology by the way. And they're expecting a premium on the product, but the business cases is a tricky business case to. Just thinking how it was playing out in your industry.
00:34:04 [Guest] **Ole Jacob Siljan**
I think it's the same way. I mean if you look at a building an ammonia plant that use it, let's say that we decide today to build an ammonia plant. It will take at least three years before the ammonia plant is up and running. And in that time, first you need to invest in the in the building. Then you need to invest in getting all the people in there. Then you have to start producing and then you're further down the value chain. So. Who's going to finance that one up front when you're when you're not quite sure that the market is willing to pay the price? Our CEO said it very, very good. Once that sort of we are very good at handling technical uncertainties, we can handle financial uncertainties, but we are not very good at handling political uncertainties. And I think that is one of the key elements. It's we need help from other politicians.
00:34:48 [Host] **Caroline Segerstéen Runervik**
We talk a lot about Europe need to be self-sufficient and if you look at your products, ammonia, fertilizers, etcetera. Do we have enough of production capacity in Europe? What more do we need to do to make sure that Europe is strong enough compared to the other markets? And maybe also what is needed then from the politicians?
00:35:11 [Guest] **Ole Jacob Siljan**
We are a net importer of ammonia to Europe, so we don't have enough production capacity to produce our products. One of the key challenges is that Europe will do not be strong. Word but. They don't have a surplus of gas as a raw material. We need to import gas, as was very obvious with the Russians and the and the Ukraine war. So we lack that infrastructure, we lack that raw material to come in. That means that if you want to continue to build in your, either you need to have long term contracts with. With friendly countries to get the gas in or you need some different type of energy and then you're back to what we had talked about already, where do we get that energy? How do we, how do we Europe build up enough energy fast enough to really not only stay in the game but also be an important play. In the game, and I think that the politicians in Europe have also the European people, for too long have sort of been thinking that we have it all, we have everything. But we are really starting to lose out the industry because we don't have the energy and we are spending in my view. Two more time discussing how to do it rather than start building. If you look at the drug report, if you look at the latest reports and structures coming from the European Union, you can clearly see that that people start to realize that. We are losing out. Then we need to do something. And also if you look at locally important one of the things that when you discuss that you are always coming back to energy and you need to understand that the society we have built and that we have today will be jeopardized if we don't continue to build energy to continue to develop this society. I think that's an area where. Both. We as a business, we're the politicians and other we have not been clear enough that this is not about cheap energy to make more money if we are, it's about cheap energy or energy at the reasonable price. So that you actually can continue to build the society that we have.
[music]
00:37:16 [Host] **Fredrik Gunnarsson**
We talked about the whole range of different transformation and transitions, the sort of change production process, the digitalization, data, AI and also now the electrification of some of your plants. It must mean a big shift in competences and where you're working, So what was the competence shift you need at your site to manage all of those changes?
00:37:40 [Guest] **Ole Jacob Siljan**
I think that's all I mean if you look at from sorry European slash Nordic perspective of the in Europe and in the Nordics especially are very skilled. So I think so we need to continue to build on those confidences. We need to continue to strengthen what we are good at which is really having a good schooling system that takes people forward. And nurture that interest in in sort of finding the next step finding the next solution. And for me, that is where we need to help our people to be even better. And I think that we need to put more weight on building competence.
00:38:15 [Host] **Caroline Segerstéen Runervik**
Talking about intelligent industry, I know it's a bit challenging today to say that we should look long time

ahead, but if you look 5-10 years ahead where is your plant then?
00:38:28 [Guest] **Ole Jacob Siljan**
Five years from now, we are now looking into the project on basically build. One common Control Center, so taking down the control rooms out in the plant as such, not because they're not functioning, but because I believe that by bringing people together again with this concept of the value chain, how do you understand the value chain and how do you communicate? I think that is for me. One of the key elements to bring people together. Upskill the people to really control the process and probably need less people in the management system and leave more of the job to the people who is running the process. And that means that they need to be of skilled. And you also need to bring them physically together, and they need to bring them the tools that can help them to do this. And then you're also back to what we talked on digital, how do you make sure that the information you get to act on is accurate and precise and not only noise? Of course, in in our business, I also, we're always looking at how can you produce more. Because that is really cost efficient and it's such a huge point you should be able to put more out of it just on improving reliability, improving the up time, but even safer because you have the skilled operators and because you have the system in the background helping you.
00:39:48 [Host] **Caroline Segerstéen Runervik**
So if you like to share with the audience, you know two to three key success factors, because you talk a lot about the people, you talk about continuous improvements, you talk a lot about how to create these communities, et cetera, what are the 2 three key success factors that you have had as your mantra to always go forward?
00:40:09 [Guest] **Ole Jacob Siljan**
As a leader, you should set direction you be clear on where you want to go. Be clear what the target is and then you hire good people that you empowered to do the job. That means that if you get if you work for me, you have the right to take the decisions you mean is correct to deliver on that. And then of course, you need to balance that with accountability. So if you take wrong choices, at least let's sit down and discuss. What did you think? What could we have thought about and how can we do this better next time underneath that, I think sort of I like to communicate with people and that is for me then back to the other element, bring the people on board and be willing to listen to what they have to say. You're building to discuss doesn't mean that you say yes to everything that I suggest to yes to everything, but try to understand their perspective. Try to understand their reservations, because at least that gave you the ability to rethink some of your ideas. I think as a leader, one of you. One of the main things you need to understand is your weaknesses. Don't focus too much on the strength because they are there, but understand your weaknesses and make sure that your leadership team or your team around you balance that. Make sure that they cover up where you are bad.
00:41:21 [Host] **Caroline Segerstéen Runervik**
So it's interesting because we ending this discussion a bit where we started you basically started to say it's the people who made your company and your successful. Thank you for a very interesting discussion about people, about empowerment. About ensuring that you focus on continuous improvements, but also for a very interesting discussion around the energy transition and also the importance of this industry in in Europe, right.
00:41:52 [Guest] **Ole Jacob Siljan**
Yes, thanks all. That's a pleasure.
00:41:53 [Host] **Caroline Segerstéen Runervik**
Thanks a lot.
00:41:55 [Host] **Fredrik Gunnarsson**
Thank you. Thank you.

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