00:03.587 --> 00:07.129
[SPEAKER_02]: [Automatic captions by Autotekst using OpenAI Whisper V3. May contain recognition errors.] You
are now listening to a podcast from the University of Stavanger.

00:09.650 --> 00:17.374
[SPEAKER_01]: Welcome to this podcast on offshore wind. My name is Mona Wettrus-Minde and I work at the Faculty of Science and Technology at the University of

00:17.434 --> 00:25.329
[SPEAKER_01]: Stavanger. The goal for this series of podcasts is to try and give you some insight into different topics that are important to the offshore

00:25.349 --> 00:33.739
[SPEAKER_01]: wind ecosystem. We're not going to go deep into the details of all the aspects of offshore wind, but talk to different people who are working

00:34.020 --> 00:43.845
[SPEAKER_01]: in and around the offshore wind industry to learn a little bit about the different topics. My guest today is Ã˜ystein Johannesson. And Ã˜ystein

00:44.045 --> 00:53.929
[SPEAKER_01]: is the industry coordinator for offshore wind Norway at Equinor. The hope is that this talk with Ã˜ystein will give us some insights into what

00:53.989 --> 01:03.513
[SPEAKER_01]: is important for operation and maintenance in offshore wind. And if we need to think different on this topic when we compare to traditional

01:03.533 --> 01:12.245
[SPEAKER_01]: offshore activities. So welcome to us, Ã˜ystein. Thank you very much. Looking forward to this. Yeah. Thank you for taking the time to talk to

01:12.325 --> 01:20.349
[SPEAKER_01]: us. Do you want to tell us a little bit about yourself and what you are working on? Yes, I can do that. My name is Sten Johansson, as you said.

01:21.310 --> 01:35.855
[SPEAKER_00]: Been in Equinor since 2007 slash eight. Actually, when I started in, then it was Statoil Hydro. I started working with renewables in what was

01:35.895 --> 01:49.667
[SPEAKER_00]: called New Energy back then. So I was part of this early startup of Showin in the company. Very exciting. So working with it today, continuing

01:49.767 --> 01:55.692
[SPEAKER_00]: what we started back then is actually really, really, really exciting. But between now and then, I've been working with basically everything.

01:57.128 --> 02:07.639
[SPEAKER_00]: all business areas in the company upstream oil and gas mid and downstream refineries projects research and development so yeah

02:07.659 --> 02:19.016
[SPEAKER_00]: basically everything also expat period in brazil which was very nice sounds nice so is it is it now different to work with with offshore winds

02:19.997 --> 02:29.723
[SPEAKER_00]: and renewables now in equinor yes it it's very different actually and also very much the same it's quite fascinating actually it's when i

02:29.783 --> 02:41.169
[SPEAKER_00]: started we were not many people working with this it was basically uh you know I think it was back in 2009, we decided as a company that we are going

02:41.229 --> 02:53.735
[SPEAKER_00]: to make offshore wind as kind of the strategic direction within renewables for the company. There were not many others. And when we

02:53.775 --> 03:03.740
[SPEAKER_00]: started up, particularly when it comes to floating, we decided to build the Hywind Demo back then, which was the first full scale floating wind

03:03.760 --> 03:12.400
[SPEAKER_00]: turbine. Nobody has done anything similar in the world before that. know it was it was uh you know we used our competence from the oil and gas

03:12.440 --> 03:24.671
[SPEAKER_00]: the spar technology you know that was we used it in many many places in oil and gas but never been done in in renewables so lots of skepticism um not

03:24.731 --> 03:36.092
[SPEAKER_00]: much experience with it but we made it work and i think that opened up the eyes for many And coming back to it now, I had many years that I've been

03:36.132 --> 03:43.917
[SPEAKER_00]: working with oil and gas and coming back to renewables now, it's completely different. So many more people. It's been so much more kind

03:43.957 --> 03:53.643
[SPEAKER_00]: of industrialized in a way. You see all these processes, so many people with competence. It's really exciting to see. Many, many companies,

03:53.743 --> 04:02.556
[SPEAKER_00]: competitors, suppliers that are working with this. It's a completely different thing. But still, when you look at the technology, it's

04:02.736 --> 04:11.481
[SPEAKER_00]: actually very much the same. So it's quite fascinating to see, and it's really, really exciting, I must say. But even though it's challenging

04:11.542 --> 04:24.715
[SPEAKER_00]: days right now, I also have to admit that. Yeah, I understand. And that's a topic that maybe we could talk a little bit about. In the media and other

04:24.755 --> 04:36.598

[SPEAKER_01]: places, we often talk about the costs for offshore wind and maybe specifically the construction phase, the project planning. Norway is

04:36.838 --> 04:46.022
[SPEAKER_01]: still a little bit in the starting phase. But what are the major costs for operation and maintenance?

04:48.644 --> 04:59.709
[SPEAKER_00]: You know, if you look at the whole life cycle of an offshore wind farm and you look at the big spending, it's actually in the project phase when you

04:59.729 --> 05:09.535
[SPEAKER_00]: develop it. When you are in operations, It's not like... This is one of those different things with oil and gas, where you have... In an oil and

05:09.555 --> 05:24.087
[SPEAKER_00]: gas facility, you need a lot of people working on this constantly. These are... lean structures, not manned, they're just producing power out

05:24.127 --> 05:37.514
[SPEAKER_00]: there. So you need to make sure that they keep doing that at all time. So the big costs is not that much in the operations phase, it's in the

05:37.594 --> 05:46.696
[SPEAKER_00]: project phase. That's where you see a little bit different from oil and gas. and but but if you go go back to that if you look at the operations

05:46.736 --> 05:59.446
[SPEAKER_00]: phase what's important is that is that you need to yeah you know you need to make sure that the turbines are working at any time and to do that you

05:59.486 --> 06:06.532
[SPEAKER_00]: need to have to make sure that you have maintenance program all those things that you are monitoring what's happening absolutely all the

06:06.552 --> 06:16.674
[SPEAKER_00]: time you have a basis you have a supply ships those kind of things so that's uh That's a little bit similar to oil and gas. We do the same thing

06:16.714 --> 06:25.077
[SPEAKER_00]: there. You have the bases and you have the supply ships and all those kind of things. So there are many similarities, but in the operations phase,

06:25.157 --> 06:38.020
[SPEAKER_00]: it's much leaner, I would say. And with respect to risk, HSE, it's also a different picture, right? Yeah, you know, it's when you... When you are

06:38.040 --> 06:46.207
[SPEAKER_00]: planning, for example, maintenance, we have a lot of emphasis on what we call preventive maintenance, which we believe is extremely

06:46.248 --> 06:57.293
[SPEAKER_00]: important. Basically, to make sure that the wind farm is operating, you can have two approaches to it. Wait till something goes wrong and you go

06:57.353 --> 07:06.655
[SPEAKER_00]: out and fix it. Or you try to do it preventive to prevent actually something going wrong. So our focus is the last one, and that's kind of

07:06.675 --> 07:14.237
[SPEAKER_00]: the industry focus. That is something that we really take also with us from the oil and gas, because that's the core of how we operate in oil and

07:14.257 --> 07:26.478
[SPEAKER_00]: gas. So to do that, you need to... You need to make sure that you have resources. You need to have the system, the planning. This is all about

07:26.518 --> 07:35.021
[SPEAKER_00]: planning, basically. And you need to understand the technology that you are working with. You need to understand the turbines, the floating

07:35.041 --> 07:44.004
[SPEAKER_00]: structure, the anchoring systems, all those kind of things. And you need to understand the risks. And the risks are different from oil and

07:44.024 --> 07:55.614
[SPEAKER_00]: gas. In oil and gas, it's... You have hydrocarbon under pressure, so you have that kind of issue. That's a different ball game, basically. But

07:55.634 --> 08:08.081
[SPEAKER_00]: you have other risks also in wind turbines. For example, as I said, it's kind of lean structures. It's not much space. You have to access them.

08:10.819 --> 08:22.423
[SPEAKER_00]: And they are high. So this is working in heights. It's a thing. And so then you have the issue of falling objects, those kind of things. So the risk

08:22.463 --> 08:33.106
[SPEAKER_00]: picture is different. And then you need to plan for that. And that's basically what we do. But we use the methodology, the way of thinking,

08:33.487 --> 08:43.305
[SPEAKER_00]: planning, how to structure it, that we take with us from the oil and gas. So Equinor already have some offshore wind projects running. Hywind

08:43.345 --> 08:54.149
[SPEAKER_01]: Scotland and, of course, Hywind Tampen, the world's largest offshore floating wind farm, opened in 2023. So what's your experience

08:54.409 --> 09:04.493
[SPEAKER_01]: in running the wind farms? Well, first of all, I have to say this is a journey. It's a learning journey, which has been very important. And

09:04.653 --> 09:19.514
[SPEAKER_00]: it's... As I said, it started with Hywind Demo actually before that. Our first big experience came with Sheringham Shoal in the UK, which was

09:19.554 --> 09:31.071

[SPEAKER_00]: the first commercial offshore wind farm for any Norwegian company. We did it together with Statkraft. And then it's built on. And then we have

09:31.531 --> 09:42.253
[SPEAKER_00]: HyWind Tampen, as you said, which is a floating wind farm, which is different than the bottom fixed. And this is the largest floating in the

09:42.293 --> 09:45.774
[SPEAKER_00]: world, actually. It's 11 turbines, each of 8.6 megawatts.

09:50.595 --> 10:01.021
[SPEAKER_00]: Now we had one year of full operations, and we are really excited about it because we see that it is working. We see that the HyWind concept is

10:01.381 --> 10:16.173
[SPEAKER_00]: working. We are capable of producing electricity from these huge structures out there, and we are very happy about that. And it is also

10:16.233 --> 10:26.260
[SPEAKER_00]: because it is a pioneer project. Nothing similar has ever been done on this size before in the world. So it's kind of a first move. And first move

10:26.360 --> 10:35.726
[SPEAKER_00]: things are always a little bit, not scary, but it's something you need to pay really close attention to because you need to make sure it's right.

10:36.247 --> 10:47.775
[SPEAKER_00]: And also because since it is a startup industry, We also have to prove to the world and the society that we are actually capable of doing this. We

10:47.815 --> 10:55.859
[SPEAKER_00]: can do it in a safe and efficient manner. So that's why we are very satisfied to see that it's working really, really well. But it's been a

10:55.899 --> 11:07.366
[SPEAKER_00]: startup year. We have experienced issues, some that we knew were coming and some that was maybe a little bit of a surprise. But we have also been

11:07.426 --> 11:18.210
[SPEAKER_00]: very glad to see that we have fixed it and we managed it. And now they are actually producing at world class, I would say, when it comes to

11:18.430 --> 11:30.754
[SPEAKER_00]: production. So when it's the biggest learnings from HyWind Tampen is maybe You know, it works. That's a good thing. You know, that's a really

11:30.794 --> 11:40.103
[SPEAKER_00]: great learning, of course. But we see that there is an industry challenge that needs to be solved when it comes, especially when it

11:40.143 --> 11:50.513
[SPEAKER_00]: comes to high waves. Getting access, you know, from a floating unit, a ship, to another floating unit, a turbine, that is difficult.

11:52.182 --> 12:03.510
[SPEAKER_00]: critical. And you asked me previously about the cost of operations. If we are not capable of doing the maintenance, if we are not capable of

12:03.650 --> 12:13.533
[SPEAKER_00]: fixing things when you have a shutdown because you can't access the turbine, then it becomes a cost issue or it affects your profitability

12:13.613 --> 12:23.798
[SPEAKER_00]: and it becomes a big issue. So to make sure that we have the technologies and solutions to access the turbines in really rough weathers, that's

12:23.858 --> 12:33.062
[SPEAKER_00]: important. Because one of the good things about floating wind compared to, for example, onshore wind or even bottom fixed is that the wind

12:33.422 --> 12:47.543
[SPEAKER_00]: resources are amazing. They are really good. But the flip side of that is, of course, you have waves and you have pretty rough conditions. So we

12:47.583 --> 13:01.187
[SPEAKER_00]: need to fix this. If we are able to fix this in a good way, we're going to have access to wind resources of world class. And we see it, this is kind

13:01.207 --> 13:11.128
[SPEAKER_00]: of an industry challenge. We have started initiatives together with suppliers and others to find better technology, better solutions to do

13:11.148 --> 13:21.253
[SPEAKER_00]: this. So I'm 100% sure that we're going to fix it. But it's just one of those learnings that we make when you try to be a first mover. So it's a

13:21.273 --> 13:32.851
[SPEAKER_00]: good thing. Yeah, I know. Interesting to hear of your experiences. Do you think this is the main challenge with the operation of maintenance

13:33.232 --> 13:45.162
[SPEAKER_01]: that we are talking about now for floating offshore wind? Yes, it's at least the core of it. And it will affect so many other things. For

13:45.202 --> 13:51.304
[SPEAKER_00]: example... One other thing that we need to find a good solution is to develop

13:53.385 --> 13:57.728
[SPEAKER_00]: systems and practices and technologies to ensure that we are capable of doing

14:00.870 --> 14:08.435
[SPEAKER_00]: maintenance offshore, that we don't have to tow the turbines into shore. But to do that, we need to make sure that we are capable of managing

14:08.475 --> 14:18.978
[SPEAKER_00]: the waves. So it's one of those issues that kind of affects absolutely

everything. It comes up in several operations. Exactly. It's kind of

14:18.998 --> 14:29.142
[SPEAKER_00]: the critical factor in so many things that we need to fix. I also want to ask about this towing to shore. But before that, maybe I could just ask.

14:29.522 --> 14:43.305
[SPEAKER_01]: But this is also a challenge within oil and gas industry to move from floating. But why is it more difficult for the offshore wind? We don't

14:43.446 --> 14:54.253
[SPEAKER_00]: use helicopters to determine. Some places they use helicopters to get people in and out from turbines. It's easier on an oil and gas facility

14:54.273 --> 15:03.298
[SPEAKER_00]: because they're bigger. They're bigger and much more steady in the water. The turbines, they are much, much smaller. They are huge, just

15:03.339 --> 15:12.399
[SPEAKER_00]: having said that. They are really huge, but compared to an oil and gas platform, they are small. so so that's basically the the issue and of

15:12.459 --> 15:20.303
[SPEAKER_00]: course in the turbine you have the blades and this makes makes things a little bit tricky and they are floating much more you know they are going

15:20.463 --> 15:31.888
[SPEAKER_00]: not much up and down but they are a little bit sideways and they move like in kind of an eight number of eight in the water so so you you're more

15:32.028 --> 15:43.711
[SPEAKER_00]: vulnerable for for the uh the um the waves in the turbines And I guess also it's difficult for bottom fixed as well, because you will still be in

15:43.771 --> 15:52.173
[SPEAKER_01]: something that's floating when you want to. Yes, but you have only one floating unit then. The other one is fixed. In floating, you have two

15:52.253 --> 16:04.095
[SPEAKER_00]: floating units. So that just adds up to that. But of course, you have the issue in bottom fixed as well. But it's somewhat easier.

16:07.676 --> 16:18.505
[SPEAKER_00]: Yes, and also the wave things might also be a little bit different. Interesting. A little bit back to when we mentioned this with towing

16:18.545 --> 16:33.816
[SPEAKER_01]: structures to shore. So for Hywind Scotland, last year you towed five turbines to Gulen in Norway to do major component change. Is this

16:33.856 --> 16:47.420
[SPEAKER_01]: something that we will need to do for... All floating offshore wind? Hopefully not. Back again, floating wind is really in the startup

16:47.460 --> 16:58.682
[SPEAKER_00]: phase. HyWind Scotland was the biggest back then. It was five turbines. And now HyWind Tampen is the biggest with 11 turbines. So it's a really,

16:58.742 --> 17:07.745
[SPEAKER_00]: really new industry. And we need to... develop so many things you know and one of those things that needs to be developed is to have the good both

17:07.805 --> 17:19.715
[SPEAKER_00]: technologies but also the systems of doing you know what you alluded to for example major components changes in the structure you know at site

17:20.256 --> 17:26.961
[SPEAKER_00]: so you don't have to tow them in because you can't do that you know it's it's not sustainable if you have to take them to shore every time you need

17:26.981 --> 17:35.953
[SPEAKER_00]: to do some kind of changes like that. So that's also a part where the industry needs to, you know, find new solutions, basically new

17:35.973 --> 17:46.255
[SPEAKER_00]: technologies. And that's what happened. You know, we are pretty confident that this will happen because, but there's one, you know,

17:47.115 --> 17:55.517
[SPEAKER_00]: there's one conditions for that to happen is that, and that is that we need to start, you know, we need to have, start building bigger farms. If

17:55.557 --> 18:07.117
[SPEAKER_00]: we do that, then you're going to see a completely change in supply chain, different companies, R&D, much more resources will be put into it, and

18:07.137 --> 18:16.940
[SPEAKER_00]: they're going to develop solutions that fix, for example, these things. So the big thing for finding these solutions is actually to get

18:17.000 --> 18:30.603
[SPEAKER_00]: started and start building larger farms, basically. And I always say that one of the good things about Norway is that we have quite long

18:30.663 --> 18:41.607
[SPEAKER_01]: experience in working offshore. So that has to be a good thing, I'm thinking. And these people who do this, like the maintenance on

18:41.627 --> 18:53.494
[SPEAKER_01]: Hywind Scotland, are they the same people you would use in oil and gas? Or are they specifically trained to do... Offshore wind? It's a little

18:53.514 --> 19:06.062
[SPEAKER_00]: bit both, I would say. It's much of, you know... much of the competence is quite similar actually it's you know it's mechanical company you know

19:06.382 --> 19:16.825
[SPEAKER_00]: this these are big mechanical structures that are rotating you know you

need to know these things electro those things you need to really yeah

19:17.246 --> 19:26.789
[SPEAKER_00]: these are the competence that we need but then of course you need to adapt them to a wind turbine so typically what we are using a lot is actually

19:26.809 --> 19:36.035
[SPEAKER_00]: people with background from oil and gas and you have to what you call it, you have to teach them about the wind turbines and those kind of systems.

19:36.055 --> 19:43.465
[SPEAKER_00]: You have to go training and educate themselves on these things so they get that competence in addition and then you can start working for it.

19:44.734 --> 19:53.856
[SPEAKER_00]: But I also believe that when this becomes a bigger industry, you're going to have a more specific and targeted education and competence

19:53.956 --> 20:08.180
[SPEAKER_00]: within offshore wind. But there's a lot of similarities. For example, if you look at Hywind tampen, our operations team, the head of

20:08.220 --> 20:18.574
[SPEAKER_00]: Hywind tampen, he is a former platform manager. and we have one geologist and we have one from drilling in wells and one electro of

20:18.654 --> 20:30.798
[SPEAKER_00]: course so and they come and they they come in and we use also hywind tampen now to teach younger employees, you know, trainees and graduates

20:31.038 --> 20:41.804
[SPEAKER_00]: coming in and get the experience of working with wind turbines, high wind turbines, so that we are kind of building on what we have to develop

20:41.864 --> 20:49.849
[SPEAKER_00]: these new competences. So we are prepared for more activities. So I would say it's a little bit of both, but now we are in the startup phase. So

20:49.869 --> 21:02.554
[SPEAKER_00]: then maybe it's typical that we are, you know, using... people from good old oil and gas platforms. But it's still a need for people, what should I

21:02.594 --> 21:16.719
[SPEAKER_01]: say, within the energy sector as a total. Maybe we are at the phase where we need people for different things within the energy, and it can be the

21:16.759 --> 21:29.569
[SPEAKER_01]: same people, not Yeah, it can be the same people, but there are some core competences that we need. And that is, of course, to understand how,

21:29.909 --> 21:39.872
[SPEAKER_00]: understand, you know, rotating mechanical equipment, for example, you know, processing technologies in wind turbines, you know,

21:39.952 --> 21:53.526
[SPEAKER_00]: electro, those kind of things, really, really important. And then they have to be prepared to work offshore. So you need to take a lot of courses,

21:53.866 --> 22:00.348
[SPEAKER_00]: emergency preparedness things. It's all these things you need to teach.

22:02.689 --> 22:05.590
[SPEAKER_00]: So I would say that

22:08.531 --> 22:20.872
[SPEAKER_00]: you're going to need a lot of people that can work on many different things, I think. But they need to specialize to make sure that you can

22:21.292 --> 22:34.677
[SPEAKER_00]: work on, for example, a wind turbine. So it should be a good opportunity. And as I said, our operations team consists of people that have lots of

22:34.697 --> 22:47.017
[SPEAKER_00]: experience from the oil and gas sector. Great to hear that you're also so excited about the projects you are running. And it will be interesting

22:47.638 --> 23:04.590
[SPEAKER_01]: to see what comes next. Yes. It's a few things I just would like to say. The first one is that I don't think people understand how big this is. And

23:04.610 --> 23:18.993
[SPEAKER_00]: then I mean physically. it's a and of the good things about the offshore wind is that you can use you can you can build large wind farms you know and

23:19.033 --> 23:34.217
[SPEAKER_00]: you can use large structures so anyone that has seen one of these up close get kind of overwhelmed how big they are and when you see it and then you

23:34.237 --> 23:45.320
[SPEAKER_00]: understand that you're going to need maybe 20 30 40 of these structures you really understand that this is this is big industry it's really

23:45.360 --> 23:57.042
[SPEAKER_00]: really big industry and so this is not something that just you just do like that and and and then you have it it takes a lot of time and it takes a

23:57.082 --> 24:10.983
[SPEAKER_00]: lot of effort and it takes a lot of um Many companies, politicians and others have to kind of... You have to take the risk. You need to decide

24:11.603 --> 24:21.325
[SPEAKER_00]: whether you want to do it or not want to do it. But if you decide you want to do it, then you need to go for it. And it's not like tomorrow then you have

24:21.385 --> 24:27.507
[SPEAKER_00]: fixed it. Then everything is in place because it's so big. You're going to need huge...

24:32.300 --> 24:37.823
[SPEAKER_00]: kind of huge

24:37.923 --> 24:50.250
[SPEAKER_00]: competences within think about it if I take if you take the whole oh I'm sorry if I take the whole whole life cycle for example when you start

24:50.290 --> 24:58.857
[SPEAKER_00]: planning these things what you need to know you need to know what are the area we are talking about how are the sea conditions you know the

24:58.977 --> 25:11.182
[SPEAKER_00]: currents the waves the sea bottom the ecosystems that lives there the marine life the bird life all those things you need you really need to

25:11.202 --> 25:20.828
[SPEAKER_00]: know these things And that creates a lot of need for R&D, research, those kind of things to make sure that we fully understand that. And then we

25:20.868 --> 25:31.432
[SPEAKER_00]: need to make sure that we are capable of coexisting with other users of the scene. So we need to understand, you know, the fisheries, marine

25:31.492 --> 25:40.655
[SPEAKER_00]: industry, you know, whatever there is, you know, we really need to understand that. And that takes a lot of competencies. And then we go

25:41.235 --> 25:47.897
[SPEAKER_00]: onshore, you know, because this is not just happening offshore because that's where you have the wind from. You have a cable route to shore and

25:47.917 --> 25:57.882
[SPEAKER_00]: then you're going to be attached to... to the to the power grid. So then you need all those things that happens there, including also, you know,

25:57.962 --> 26:08.068
[SPEAKER_00]: market understanding, trading that part of the business. So you will need a lot of people that understands the power market, the financial

26:08.128 --> 26:14.152
[SPEAKER_00]: parts around it, you know, the trading things, all those those kind of things. And then. You.

26:18.204 --> 26:29.629
[SPEAKER_00]: I don't think people understand how much resources the companies are using in preparing these projects. It's quite a lot. And you have a huge

26:29.689 --> 26:38.648
[SPEAKER_00]: variety of competencies that are actually preparing these things and working with it to make sure that you actually have something that we

26:38.708 --> 26:44.173
[SPEAKER_00]: believe is doable, that has the

26:45.794 --> 26:54.262
[SPEAKER_00]: profitability and the acceptance according to risk and all of some things that we are sure that we are capable of doing this in a sustainable

26:54.682 --> 27:09.352
[SPEAKER_00]: and good way. And again, it's so big. This is really, really big things. So that means that we need to spend a lot of time and a lot of resources in

27:09.452 --> 27:19.081
[SPEAKER_00]: making sure that if we are doing this, we are going to do it right. And then you're going to have a decision maybe to develop these things. And what

27:19.101 --> 27:25.065
[SPEAKER_00]: do we need then? OK, we're going to need a lot of things we're going to need. For example, you're going to if you're talking about floating,

27:25.866 --> 27:37.915
[SPEAKER_00]: you have a let's say you have a 15, 18 or 20 megawatt wind turbine that is two or 300 meters high. Huge amount of steel, you know, the blades, you

27:37.935 --> 27:46.262
[SPEAKER_00]: know, all these things that's going to be produced by by a supplier of the turbines. But we're going to need a floating structure. Which are going

27:46.302 --> 27:58.693
[SPEAKER_00]: to be big. And again, this is big industry and we're going to need many of them, maybe 20, 30 of these ones. And we are going to use the hywind in

27:58.713 --> 28:06.660
[SPEAKER_00]: Norway. If we are if we are developing in North, we are going to use the hywind in concept and then we're going to need a floating structure that is

28:06.720 --> 28:16.297
[SPEAKER_00]: approximately 100 meter deep and a 20 meter in diameter. And think about it. And you need many of them and we need to build them somewhere. So we're

28:16.317 --> 28:26.202
[SPEAKER_00]: going to need a fabrication yard with cranes, all those things. We're going to need a lot of concrete. We're going to need steel, so much more

28:26.242 --> 28:27.843
[SPEAKER_00]: equipment attached to these things.

28:30.664 --> 28:38.772
[SPEAKER_00]: That's where you talk about the industrialization of shaping. That's where you see these big things happening. And then you're going to have

28:38.992 --> 28:51.075
[SPEAKER_00]: anchoring systems, mooring lines. You're going to have cables, you know, for again, maybe 20, 30 turbines. You're going to need ships that

28:51.355 --> 29:02.377
[SPEAKER_00]: are taking these in and out. You're going to need to store these things on

shore. And this is the construction phase, right? And then we're going

29:02.417 --> 29:08.922
[SPEAKER_01]: to have to think about standardization. Exactly. You're going to need... The upscaling in numbers. Exactly. That's the thing about

29:08.982 --> 29:16.967
[SPEAKER_00]: offshore wind. This is what we talk about. It's mass production. You know, you're going to have... There's not... As I see it, it's not like

29:17.007 --> 29:27.173
[SPEAKER_00]: you're going to have this... Of course, you know, somebody could invent something that kind of disrupts the whole industry, maybe. But if you

29:27.333 --> 29:37.758
[SPEAKER_00]: look besides that, the big thing about cost reduction is this boring work about making this an extremely efficient and structuring

29:37.938 --> 29:53.630
[SPEAKER_00]: structured assembly line that's the thing and and that's also why we as a company is very cautious about you know delays and unforeseen risks you

29:53.670 --> 30:04.035
[SPEAKER_00]: know if you have for example a one part in this assembly line one company for example that is not making money that could be bottlenecks or

30:04.095 --> 30:13.222
[SPEAKER_00]: bottlenecks in this it's very critical because when you start if you press the button and start developing these things this has to go clack

30:13.262 --> 30:24.756
[SPEAKER_00]: clack clack clack if that doesn't happen then you are in big big problem but if if if we make this happen and that's where we talk about this

30:24.856 --> 30:36.322
[SPEAKER_00]: industrialization why this is so important because if we make this happen you have a highly efficient and competitive assembly line this

30:36.382 --> 30:51.211
[SPEAKER_00]: is going to work But again, it's big. I don't think people understand how big this thing really is. So that's also the exciting part of it. It's

30:51.451 --> 31:02.058
[SPEAKER_00]: really, really exciting if you're allowed to work on these things. Yeah, yeah. A fantastic... opportunity to to to do engineering and and

31:02.078 --> 31:10.221
[SPEAKER_00]: uh make something an impressive structure actually so it's it is i think you know everybody has that has seen and if you see it for example hywind

31:10.241 --> 31:22.185
[SPEAKER_00]: tampen is 8.6 megawatt they're half the size maybe or what are going to come next so they are so big and they are it's and it's quite a lot of them

31:22.605 --> 31:31.624
[SPEAKER_00]: it's going to be developed It's going to be interesting to see. And it's quite sure that this industry, if it goes like you are talking about now,

31:31.684 --> 31:41.848
[SPEAKER_01]: it's going to need a lot of different people. And that's also going to be a topic of one of our other podcasts to have a look at what type of people,

31:41.888 --> 31:49.371
[SPEAKER_01]: how many, what level of education. So it's quite complex. Yes, it's very complex. And one of those things we need right now, of course, is people

31:49.411 --> 32:00.194
[SPEAKER_00]: that can really think how to reduce cost. So because we are in a challenging situation right now as an industry. All industries goes up

32:00.234 --> 32:12.844
[SPEAKER_00]: and down. We are in a down right now. But I think the DNA of the industry then is to really, really work on to see how to reduce actually the cost

32:12.884 --> 32:19.890
[SPEAKER_00]: and become more efficient. And that's why we need people to make sure that we find the solutions. But if we don't have the people, if we don't

32:19.910 --> 32:29.800
[SPEAKER_00]: have the competencies, we're never going to succeed in that. So that's why it's important. And I'm pretty sure we're going to make it, but it's a

32:29.840 --> 32:38.286
[SPEAKER_00]: little bit rough times. But I think that's also what comes with experience is that... Yeah, you have seen rough times before. It comes

32:38.326 --> 32:46.775
[SPEAKER_00]: and goes. And there will be more rough times ahead as well. That's for sure. That's for sure. It's good to hear you're optimistic. Thank you

32:46.815 --> 32:58.186
[SPEAKER_01]: very much. It's been great talking to you, Ã˜ystein. I learned a lot. I hope also our listeners were updated a bit. I hope also our listeners use

32:58.206 --> 33:08.191
[SPEAKER_01]: the chance to listen to some of our podcasts to get insight like you have given today in the offshore wind industry. Thank you. Thank you for

33:08.211 --> 33:10.352
[SPEAKER_00]: being here. It was really, really nice. Thank you. Thank you.