

Battery Caffe - Batteries for Maritime - Transcript

Innovate UK.

Welcome everyone to this new episode of the Battery Caffe, focusing on batteries in the maritime sector. I'm the Knowledge Transfer Manager for Clean Energy and Infrastructure at Innovate UK Business Connect, hosting today's episode alongside my colleague, Silvia Boschetto. Silvia, over to you.

Hi everyone. My name's Silvia Boschetto, and I'm in the same team as Nikoleta at Innovate UK Business Connect, also covering batteries. It's great to be here on the Battery Caffe and looking forward to the conversation today. Just a quick reminder, the Battery Caffe is an initiative of the cross-sector Battery Systems Innovation Network, which is a community funded by Innovate UK Business Connect and the Faraday Battery Challenge. The Innovation Network aims to open new markets for the battery industry and promote innovation in batteries and to help decarbonise a wide range of end users.

Thanks, Silvia. Today we are lucky enough to be joined by three guests. Enora Pichon from Bibby Marine, Syb ten Cate Hoedemaker from Maritime Battery Forum and Prune Bouillot from Holder. If you could briefly introduce yourselves and explain your current work, company's work, in relation to battery technology in the maritime sector. So perhaps Enora, we will start with you.

Thank you very much, Nikoleta. So my name is Enora. I work for Bibby Marine and the Deputy Project Director. So I work on delivering a new vessel, a new electric ship to the market. Bibby Marine is a company that has over two hundred years of experience in shipping, building ships, operating vessels. We've seen three energy transitions, and we are getting ready for the next one, which is towards electrification.

Thank you very much, Enora. Syb, would you like to go next?

Yeah, thank you. My name is Syb. I'm the Managing Director at the Maritime Battery Forum, and the Maritime Battery Forum is a non-profit organisation aiming to accelerate the adoption of safe maritime battery technology, with the end goal to reduce emissions from shipping. Maritime battery technology and the knowledge about marine electrification is developing very rapidly, and we are trying to make it easier for everyone in the maritime industry to understand the opportunities for electrification by sharing knowledge and information and by building a global network of battery makers, users and experts.

Thank you very much, Syb. And last but not least, Prune.

Thank you. Yes. Hi, I'm Prune Bouillot. I work as a Naval Architect at Holder Limited, and I'm part of the Sustainability Advisory Team. So, Holder is a Maritime Design Consultancy, and we basically help ship

owners understand how they can best reduce their emissions using different alternative fuels or green technologies so that they can meet upcoming environmental regulations. So, we work a lot with battery energy storage systems, like batteries and basically integrating them in the concept designs that we work on.

All right. Thank you so much for all those introductions. Now to all our listeners, can you please make yourselves a coffee and join us. Today, we're talking about battery trends, opportunities and solutions in the maritime sector. Over to you, Nikoleta.

Thank you, Silvia. And I will start with Syb actually, if you could set the scene for us and tell us why battery technology is important in the maritime industry today.

Yeah, of course. Currently, there are already more than a thousand battery powered ships in the world. So maybe it doesn't sound like that much yet, but it's increasing very rapidly. And usually, people think that batteries can only be used maybe for small ships or then specifically for ferries. And although ferries are indeed very suitable for using batteries, we are seeing batteries being installed on all types of ships now. So, the fastest growing segments at this moment are actually cargo ships, both for inland, coastal and ocean-going transport. Out of all those battery powered ships, only 20% of them are fully battery electric, so the rest is all hybrids or plug in hybrids, having batteries in combination with either an internal combustion engine or a fuel cell. In the future, most ships will rely on some sort of alternative or low or zero emission fuel, and all these future fuels will be more expensive and have a lower energy density compared to the fuels that we are currently using. So, no matter what type of fuel you want to be using in the future, you want to use as little as possible of it, and that's where batteries can really help to reduce the fuel consumption and increase the efficiency of all types of ships, so we see batteries as an enabler of other zero emission technologies as well.

Thanks, Syb. That was really very helpful. Now this is a question for Enora. I wonder if you could tell us about your company's focus on net zero and where that's taking your assets?

Yeah, absolutely. That actually exactly fits in very well with what Syb just said. So, Bibby Marine is a family business and we carve our values that we're building for the next generation, and that's what has driven us to build the next ship as a zero emission vessel. You know, we're committed to reach net zero by 2040 and to build a clean vessel before 2030, so that's very much part of our commitment. And we've started the journey about two or three years ago now to find out what is the best asset, what is the best zero emission technology for our asset. And we looked at different things. We looked at governance, safety, efficiency, and it was very much a combination of an electric ship first, with methanol range extender, for the range, as well as safety concerns. The battery is an essential part of this project, as you can imagine, and that's why we very much focus on building the electric first SOV. So for that sense, for service operation vessel.

Thank you very much. And Prune, how do you see battery technology playing a role in the future of ship design?

Yeah, so I think battery technology definitely has a very important place in the future of ship design, already today, to be fair. Especially with the decarbonisation target that ship owners are setting themselves. Either like short term toward like 2030 or longer term towards 2040, and beyond. As Syb said earlier, you need battery technologies to support other alternate fuels. So, in the design work that we do, we rarely design a ship without a battery system to support its operations. And whether it's a hybrid system or even designing a battery system to support your emissions in port, or to support your emissions in a specific part of the ships operation, or a fully electric ship, if that's possible with the vessel that you're looking at. I think in this transition period towards making the maritime industry more clean, battery technologies are definitely really important for that.

Thank you very much, Prune. And again, thank you all for your perspectives. It gives us a great context for our conversation today. So, Syb, as part of delivering net zero in the sector, battery technologies have become a key part of maritime decarbonisation. Can you tell us about some of the trends you're seeing across the globe?

Yeah, so there are actually many different ways that batteries can be used on board ships, and especially a lot of different ways in hybrid applications. So, in a recent paper that we published together with CMAC, we defined several hybrid applications where batteries are used to optimise the usage of internal combustion engines or fuel cells to reduce fuel consumption or emissions or operational costs. And we also define several dynamic applications where batteries are used to assist internal combustion engines or fuel cells again, in various operational modes, to improve their dynamic response behaviour. So, examples of this for the hybrid applications are load leveling, cyclic operations or spinning reserve. And examples of the dynamic applications are, for instance, boost function or a dynamic load transition and peak shaping, so many different ways of how you can use batteries onboard ships. And some applications have more potential on specific ships than on others. So, it is the challenge to determine which combination of applications have the best result for your ship, and what type of size and battery performs best for that combination of applications. And that's where we're seeing that the maritime industry is making a lot of progress in trying to understand what those different use cases are and how to select the right battery to go with that recipe.

Thanks, Syb, it's very useful to try and understand the trends, as we try and understand what the global trends are. So, Enora, this is a question to you. From your perspective, what is the biggest challenges or limitations that you face when trying to incorporate batteries into your fleet?

So, based on our recent experience of identifying the best batteries for our project, it's been very much the evolution how quickly the whole landscape, battery landscape is moving. We were looking at different technologies, different suppliers. It's very much a world that's changing really, really quickly and it's hard to keep up as an owner. Another aspect of that is also the life cycle. So, we're looking at batteries to last for around 10 years on both our vessels. Some technology will allow you a 20 year life cycle. And it's quite difficult to say, okay, what would the life cycle of our batteries look like, and in five years time would they be completely obsolete? And that's one of the questions that we've been trying to answer throughout this project. Another aspect is also the cost of the battery. So, the cost of batteries has been going down, and it's been keeping going lower and lower and lower, and it sort of doesn't give an idea to you. It makes you think, okay, we're going to get these big investments in batteries, this

huge, you know, huge, huge capex. But we know that in, you know, one year's time, two years' time, the cost would be so much lower, and the technology would have moved so much. Which is a little bit of a barrier, I would say. No, a challenge. We don't see ourselves that way. And you know, if we want to really be net zero by 2040 we have to act now, which is why we are taking this test.

Thank you very much, Enora. Prune, I know Enora, touched a little bit on this, but what do you think are the unique maritime challenges when it comes to adopting batteries compared to other sectors?

Yeah, thank you. So, I think, in Enora has already touched on that a little bit, but from a ship designer perspective, one thing that we work a lot on is designing and finding, or like integrating a battery system that makes sense with the vessel type and operations that we're looking at. So, for example, like batteries that, sorry, vessels that operate on short sea shipping. First, it makes more sense to integrate, like, maybe, a fully electric battery system, because you have access to, you're like, closer to the coast, and so you have access to more charging infrastructure, and that's not the case with different types of vessels that maybe operate around the world on longer distances. And so, I think that touches on the fact that you need to work with port authorities and to make sure that the infrastructure is there as well. It's mostly if you're looking at fully electric vessels, and in that sense, for us, the challenge is to recommend solutions that help with reducing emissions but are also a cost-effective solution that makes sense with the vessels operation.

Thanks Prune. That was really, really helpful. And I'm sure that our audience is finding it really interesting to hear this discussion and it would be good to try and maybe discuss further these challenges around integration and innovation. So, this is a question for Syb. There's been a lot of discussion around hybrid systems, and I wonder if you could talk a little bit more about if there are any solutions that actually work best for particular applications in the work that you're seeing?

Yeah. So, as I mentioned earlier, it's a lot about finding the right combinations for your application. So, it all begins with understanding what type of ship do you have, and what are you trying to do with it, to try to figure out what is the operational profile. And then when you figured out what the operational profile for your ship will be, then try to find the right combination of hybrid use cases for using batteries to improve the efficiency of your ship. Now, the more you can do with the batteries on board, the more you will reduce your fuel consumption, and you will reduce your emissions. So, what we see a lot is that when people retrofit their ship to become hybrid, they start with a relatively small battery, also related to the cost, of course, and then they start sailing with it. And after two, maybe three years, they say, okay, what if we have a little bit more batteries, then we can do even more with it? So, you're starting to see some battery upgrades to unlock more potential. And that's something that we see over all ship segments, that the average installed battery size is increasing to, yeah, unlock new potential and making use of them in different ways. So, the easiest way of installing or starting with using batteries on board in a hybrid configuration is, for instance, spinning reserve. So instead of having an extra generator running as a backup, in case one of the other generators fails, you have a battery that just kicks in whenever is needed. So, you're not just burning any fuel without using it. You just have that battery sitting there for whenever it's needed. And when you start with that, then you can think, okay, I have this battery on board and only using it maybe once or twice per year when the generator fails, what else can I do with it? So, every little step will get you maybe one or two or three percent benefits,

but combine it with each other, it will give you quite a lot of benefits. And as you progress and try to understand what you can do with your batteries, making sure that you can charge the batteries while you're either in port or what you also see now more and more is offshore charging that's being developed, charging your batteries directly from the local grid, of course, gives you the energy with the lowest emissions possible depending on where you are in the world, of course.

Thank you very much, Syb. Enora, tell us what do you think about how do you balance innovation with safety and efficiency?

Yeah, absolutely. Thank you, Nikoleta. So, our vessel service operation supports technicians working on offshore wind farms. As you can imagine, its safety is critical to our operations. We have people onboard. We're next to very expensive assets. We are providing key energy for the countries we operate in. So, safety is very much central to our project. And one of the things that we've been doing is we've been working very, very closely with the different regulation bodies, so with the flag, with classification societies, in order to ensure that our solution was safe. Another work that we're doing, and that's more around how to make sure that we are efficient, is working with these different battery suppliers to really understand the best, the most efficient way of operating, and that goes through digitalisation. So, we are looking at, you know, what is the state of health of the battery? What is the state of charge? What is the best range to operate? And in terms of the way we operate, the vessel will go to each wind turbine, every day, to do the maintenance on them. And you know, it goes all the way down to route optimisation and how to make sure that the ship is working as efficiently as possible, so that the batteries are used in a way that would maximise their life.

Thank you. Thank you very much. And Prune, the next question is for you, and it's a wider question. So how important do you think is the collaboration between different stakeholders? So, asset owners, engineers, battery tech developers, in moving the industry towards zero emission vessels?

Thank you. So, I think collaboration is hugely important in the maritime industry. Whether it's advancing battery technology or any alternate fuel, green technologies, we need to decarbonise the sector. The main reason for that is that you need the information share and the transparency of the data, so that you know vessel owners, like people like Enora from Bibby Marine, they know they can understand the technology that they're working with and the key questions that they have to ask, so that they can have the vessels that go along with their requirements. And then for people like us, like designers, it's really important to keep up with the state-of-the-art technologies and how they're progressing and evolving with batteries, like, how more energy dense they become, for example, in the coming years, and how that affect the way we design vessels. And also, ship owners can, like, sort of use their vessels as way to trial new technology, and that sort of initiative in the sector that can only happen if collaboration is there and if all the different stakeholders are talking to each other to make that progress go forward.

That was wonderful. And maybe each of you could give us a closing thought, just what one piece of advice would each of you give to maritime companies or professionals looking to adopt or invest in battery technologies? I'll start with Syb, and then go to Enora and not least Prune at the end. So Syb, maybe you could take us through the first one?

Yeah, sure. I actually think that both Enora and Prune already mentioned the two things that I think are very important for everyone to be active in maritime battery technology. And one is to make sure to collaborate with the right partners and to keep on developing your knowledge of battery technologies. So, there's no one that knows everything about all maritime batteries. So, collaboration is key when it comes to finding the right solutions for your needs. And the technology is developing so fast that it might be challenging to keep up to date with everything that is happening, and that's where the maritime battery forum tries to help. So, it's important to not make the common mistake that if you have done one or two projects with batteries from a certain supplier, that you think you know everything there is about batteries so that you can do the same trick for all battery powered chips in the future, it will be a different challenge every time you do it.

So, Enora from your perspective?

Just on collaboration. I did a list of how many companies we've collaborated with on this project. Now, over a hundred. From government agencies to charters to vessel operators. And it's been very much the key to the project has been to making sure that information was thrown correctly and in the right direction. It's definitely a key to this, to electrification. As a closing thought, from the point of view of the vessel operator, it's a very exciting time. There hasn't been such a transition in the shipping industry in at least a hundred years. And you know, it is possible. There's been all sorts of talk about a chicken and egg situation, where you need to have infrastructure together, working with regulation, working with ship owners and suppliers. And it really feels like we're getting there, and it is now possible to build an electric ship.

That sounds great now. Prune what do you think from your perspective?

I think, yeah, I completely agree with what Syb and Enora just said. And I also think it's a really exciting time. There is so much to do and so much that can be done. And so I think, as a closing thought, from the perspective of ship design, is just to work with other people in the industry, other stakeholders, to understand how you can best use battery in your operation, and how that will impact your design, if you're looking at a retrofit or a new build. But I think definitely, collaboration is the main thing with the way things are going now.

Thank you very much, and a big thank you to all our brilliant guests for your excellent insights and thank you all for listening. We hope you enjoyed this discussion as much as we did. Don't forget to visit our online hub on ukbatteriesnetwork.org, and register to receive our updates and participate in the networking area of the hub. Thank you again, and bye for now.

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