Energy Talks

The future of energy with John Pearson

Darren Hill (00:05):

Welcome to Energy Talks with Petrofac, the podcast where we not only talk to the leading minds of people here in Petrofac, but from those across the industry as well to find out what's next in energy and find out a bit more about the people behind it too. I'm your host, Darren, and today I'm joined by John Pearson, Petrofac's Chief Operating Officer for New Energy Services. John has over 30 years in the industry, so he's got great perspective of not only where we've been, but also where we're going too. More recently, he's joined the OEUK boards as non-executive director. So he is got great insight into the UK's transition to lower carbon economy. So sit back, relax, and enjoy this conversation. John, thank you so much for joining me here today.

John Pearson (00:47):

It's a pleasure

Darren Hill (00:47):

So, I know you're a fan, so I've got a quote to start us offfrom Arthur C. Clark. Only if what I tell you appears absolutely unbelievable. Have we any chance of visualizing the future as it will really happen. So what does that quote mean to you?

John Pearson (01:01):

It for start, it shows me how far thinking Arthur was. He was trying to predict things 20, 30, 40, 50 years, that that's the future properly in a kind of business world, we think of tactics as one to two years. Strategy is two to five, which is probably right because we've got to achieve commercial returns and the future is probably far beyond that. So what do I take from that? It's super important because, you know, certainly in my job I need to look forward. I need to be looking outta the front window of the car, thinking about what's gonna happen next. But, you know, hats off to Arthur, you know, in the early, early sixties he predicted the mobile phone. He predicted remote working. That's really predicting the future. Very impressive.

Darren Hill (01:43):

I know many people didn't see that before the pandemic that we would all be working from home and whatnot. So true visionary.

John Pearson (01:48):

Yeah. And if you unpick, and I'm not a futurist, right? I'm just a humble engineer, but if you look at how these guys do it, they describe it really well in terms of looking at the ocean. They say, don't look at the waves because that's really not what you want. They say, look at the tides perhaps and certainly the currents look for patterns, look for things that there used to be more of

that there is now gonna be less of and more importantly, the reverse. Yeah. What is there not much of now, but it's definitely coming and that it's not rocket science. It's not something that's made up. It's real. And I think if you look at how Petrofac decided to reposition in new energies, that's an example. You could say it's not very visionary, but definitely there's gonna be more of that than there was in the past and that's why we're moving in that direction.

Darren Hill (02:35):

You obviously talking about your outlook. So does that influence how you have sort of shaped things? I prefer new energy to Petrofac as well.

John Pearson (02:42):

Yeah, I hope so. So we're in the great position of beinga kind of what would you call it? An incubator business unit if you like. Our job is to take all of the skills and talents of Petrofac, but point them towards a new market. And in doing that that involves things that are really quite new for the company. We didn't do very much in green hydrogen before, for instance, we had a great position in offshore winds. But we've developed that and crucially I think the market is different. The customers are subtly different. So it's fantastically useful that we've got a brilliant EPC machine based outta Sharjah. It's incredibly useful that we've got guys in the UK who know about hookup, who know about operations and maintenance. But the really powerful thing is to take all of that and kind of repurpose it for a different kind of customer.

(03:35):

Some of these people have different needs, wants, expectations. Some of them are international energy companies who are perhaps converting themselves from a more hydrocarbon base. And that's what's really cool about this. We take the things that Petrofac is great at. We take the gaps because, you know, no one's perfect and we try and fill those gaps and augment in perhaps how we would achieve onshore construction in the UK . A very difficult thing to do. And if we can do all this right, we can gather up Petrofac's, talents and skills and point them at this new market and deliver for new customers who have just an unbelievable amount of work that needs to get done.

Darren Hill (04:12):

You're talking about that and you've mentioned a slight problem in the UK about construction as well. But so all these new jobs, where's people going? Where are the people coming from to deliver over new energy? Cause we know it's already an issue for the sector at the moment about even just existing as we ramp things up again. So where are the people gonna come from for thisnew energy sector?

John Pearson (04:30):

It's all gonna come from Petrofac of course, yes.

(04:31):

Good. <laugh>

(04:32):

Now when it's joking apart, the old cliche about every challenge is an opportunity on its head. The people challenge is the biggest of the lot. You know, we're probably short on capacity in factories and yards in the supply chain for manufactured things. But ultimately you can fix a lot of that. It takes a bit of money. People have to invest and take a gamble, but it's fixable. Yeah. The hardest part are people, people have feelings and thoughts, but the cool thing is, I can't think of anything much more engaging than this. Yeah. There is the ultimate purpose and we're trying to decarbonize, we're trying to get energy security. There is so much really cool work. It's not even dull work. It's great work that if people were ever thinking about what kind of career they should invest in I think we've got an awesome offer for them.

(05:25):

It's, it's great work. It's global, it's evolving, you know, it genuinely is to some degree saving the planet, you know, we're very safe. We pay well, you get to travel the world. I don't, I dunno what more folk would want. And I think part of what we have to do is take that value proposition to our employees and just be really enthusiastic about it. And if you, if you were in the UK and you were leaving university or college or apprenticeship, you know, I could get with all the negative publicity around oil and gas, you might be thinking, oh, is this something I want to commit myself to? But the world needs a transition in its energy supplies. It's gonna go on way beyond anybody who's even leaving uni right now. And that's just a super cool thing to be part of. So it's our job, right? We can mourn about it or we can get on and do something about it. And I quite fancy that bet. I think we've just got the best employee value proposition to, to sell to people.

Darren Hill (06:20):

Brilliant. Yeah, so how can, going back to Arthur C. Clark, and you're talking about waves and currents and things, so how can people apply that to their own career and their outlook?

John Pearson (06:31):

Yeah, if I, if I was, I mean my kids are 18 and 22 and they're both in various stages of university, one just starting and one going on to do a master's. And you know, you've gotta do what you're passionate about, but you also need to look, again, looking at currents, look at the fundamentals of what you're going to do. Is it something that the world will need more of? Is it something that, is it perhaps in danger of being digitalized and commoditized? Does it involve human beings? Does it involveyou know, engagements and choice and things that the world will need more of? And in all those aspects, you know, I think the energy transition, which is a very broad thing, right? I'm sure we'll talk about what it is and what it isn't. But there's never been a more pressing need. The, the, it's a moral imperative. It's in law now in half of the world. There's a huge gap between the reality and what needs to happen any way you crack that it'll need great people who are passionate, energetic, who've got skills. And so I think, you know, if I was a guidance teacher, I'd be saying to young folk.

(07:39):

You can engage in this in a hundred ways. You can be an accountant, you could be an HR professional, you could be an engineer, a project manager person. It kind of doesn't matter. The fundamentals of this market are great. The companies that you'll be working for and with are pretty good. They're very professional. This is a pretty good area to be committing yourself to.

Darren Hill (07:57):

Yeah. That's, yeah. That's really interesting. I quite like that take. I'm gonna go for another quote now. So five years ago, I have rumor tell from a good personal colleague and friend that you said I don't see.

(08:11):

I'm gonna have to read it out to make sure I get it right as well. So... I don't see how we can make money through renewable energy. Do you still think that?

John Pearson (08:18):

I better not think that <laugh>. So, I was reflecting on that and I need to thank my colleague for reminding me. I said that stupid thing, <laugh>, but it is, you know, all markets have a certain timing to them. So you need to have a market that you can engage with. You need to have some services that you can take to that market in a profitable fashion. And we globally talk about the energy transition that's millions of sub-markets, all of which are at different stages. And the market models don't yet exist for some of those things. So the UK government's been very proactive, but if you were to look at the hydrogen market in the UK, there's a tremendous amount of early movement. And that's fantastic. And we are delighted to be supporting it because we see hydrogen as a big part of the future.

(09:08):

But you just don't get the same market maturity at the cutting edge of development, like green hydrogen in the UK that you would do in offshore wind in the UK. So the trick for me, it's timing, it's knowing your markets, it's having something to offer. And then at the end of the day, to make money, you have to have something that somebody wants to buy at a sensible price that allows us to do a great job for our customers. So do I think there is a good business in the broader energy transition? Absolutely. To be silly for a second and, and do reverse futurism. If you wanted to build a business doing green hydrogen in the UK in 1950, you wouldn't have made any money out of it. So it's timing, positioning, and just having something great to offer your customers.

Darren Hill (09:55):

Yeah. Was it that part of what inspired you to then pursue and take on the COO role for new energies at Petrofac?

John Pearson (10:02):

It's, it's an interesting story on how that came to pass. So when I first joinedPetrofac, four and a bit years ago now, I had an operations role, but I also had a role working with colleagues in strategy and doing corporate development. And one of the things that was striking at the time is that Petrofac had been incredibly successful by being really focused on, you know, essentially oil and gas major projects in O&M and a couple of major geographies and in the world we were heading into that felt incrediblybrittle, if you wanted a better word. And so I was lobbying that we should do work to embrace the transition, not everywhere and in every way, but where it made sense for us where we could offer something. And working with a lot of people who are far clever than me, we did all the strategy work, took it to the board, and the board and the CEO basically said, look, you seem quite excited by all this, maybe you should run it.

(11:00):

And I must admit, I had, I had a stock take moment that said, look, this is a, it's a startup within a PLC and there's a tremendous list of things that were really cool and exciting about it. But on the other hand, I didn't umpty-ump thousand people working for me. And it was all on the to-do list. You know, there, there wasn't the normal routine of safety visits and customer visits and the thing that you become used to when you've run a big P&L for a lot of years. But ultimately, I remember I had a cup of coffee and I thought, if I don't do this, I will forever regret that and I'll watch the person who's lucky enough to do it and I'll secretly know that I should have engaged in it because it's, this is, I think you get amazing market moments a few times in your career if you're lucky, I guess if you were at the birth of semiconductors or maybe the oil and gas boom in the seventies.

(11:52):

Yeah. And that's what this feels like. It's just it's not, I think, too fanciful to say it's a kind of a turning point for the world. Yeah. Because we, we've talked about climate change, then there's a sort of moment where everyone went, okay, I'm convinced this is real now, and we're in this phase where governments are committing incredibly stretching targets and they're gonna need companies like Petrofac and people like ours to come and fill that gap because policy statements don't cut carbon, real projects cut carbon. And that's, that's what we do. We, we try and make the energy transition real.

Darren Hill (12:27):

Do you think you need more, more people like yourself or those that can see that like this pivotal moment, is it our duty and other's duty to bring everyone along with us, like supply chain, etc?

John Pearson (12:39):

Yeah. Let me start by saying my wife would absolutely agree that the world doesn't need more people like me <laugh>

Darren Hill (12:46):

I'll check in with her on that.

John Pearson (12:47):

No, you please. I sure you don't need to.

Darren Hill (12:49):

I'll get the real story.

John Pearson (12:52):

Is it our job to take the supply chain with this? Absolutely. In the same way that we want our customers to engage us, to ask us how we can help rather than just say, here's a tender, could you please fill it in by next Tuesday? Yeah. This is new, right? Almost no company is perfectly formed for the new market. And so we need to, if you go back on a typical project, 80% of what any one company does, is done by their supply chain. So you're arrogant at a minimum if you think that you can figure it all out yourself and just tell somebody what's needed. So, you know, for us being a little bit humble, spotting the things that you're not great at as well as the things you are, and then just saying, right, come on, we need to fix that.

(13:35):

It's not a big deal, let's just get that sorted. Yeah. And then also being thoughtful about how you want to use your supply chain. We all need to move really quick. Petrofac can't do it all itself. So we are actively developing as we speak, key partnerships in various elements of new energies. And how do you develop a key partnership? It's, it's like you've gotta be a partner yourself. You've got to go talk to people, you've got to find out what their, they and their company want to do. You've got to treat them right. You know, a partnership is better when you do it again and again and again, not just once. We've got to be fair and reasonable in how we, you know, pay look after our companies and then they need to respond. Right? We're all not perfectly formed. I'm okay with that. If I work with you, Mr. Company or Mrs. Company, I'm gonna give you lots and lots of work. I want to work with you again, again, again, I want to get better myself, but I need you to get better too. And I need you to help me not just be adversarial and be, you know, classic subcontractor in inverted commerce. So partnerships are, are super critical and our role is to go and instigate those partnerships.

(14:46):

It's not our supply chain's job to second guess everything we're gonna do, but we need to reach out to those guys and say, right, I need your help here, here and here. You know, talk to me, what, what can you bring? Please be honest. You look after me, I'll look after you. How hard can that be?

Darren Hill (15:00):

Yeah, that's, that's a really good outlook, I think especially it's a, as a competitive industry to see it's, we're not only building like a more carbon future, but a more collaborative future as well with our suppliers or with our, almost our competitors as well.

John Pearson (15:14):

Yeah. And it's a little bit of rhetoric, but people often refer to the just transition. And when you unpick that past the rhetoric It's trying to say, look, if we do this right, there'll be huge benefits for everybody. There'll be better jobs, you know, we'll be able to support secondary industries, whether they're hotels or pubs or taxi firms or whatever. And it's that broad minded approach that says, we need to do this for society, but then we also need to be thoughtful about how we do it. And I'm engaged in some of the work I do elsewhere on how we get the optimum amount of this work done in the UK. And that's sounds very myopic and UK focused. We have the same view around the world where we look at in country value.

(16:01):

But the UK has a lot to offer, but a lot to do to optimize that, just transition and make sure that we get the jobs done. But we also, you know, bring the UK with that. Yeah. We, we level up and inverted comas, we create great jobs. We have a story to tell younger folk about why they should get into this market and you know, we create something that if we've done the work in the UK. Then we can then export it around the world. And you look at Subsea, the much toted example of that. That for various reasons we've built a genuinely global capability and capacity in the UK and that drives great exporting.

Darren Hill (16:41):

Yeah, that's great. Very good point. We're quite open and we say that energy transition is the core part of our strategy. And we want to create like long-term value for our stakeholders, our clientsshareholders. Sowhat is our core role here to drive energy transition?

John Pearson (17:00):

So if you look at what we do, it's always good to look in the mirror hard, isn't it?

Darren Hill (17:05):

Yeah.

John Pearson (17:05):

So what do we do? I mean, we engineer, we do concept work. We engineer, we do projects and deliver them in really tough parts of the world. We operate, we maintain, we decommission or repurpose afterwards and we do a whole variety of services without trying to list them all around us. So that's what we do, and what we're doing is we're taking those services and we're applying them essentially to a new market. So that's, that's what gives me confidence actually, that we're not trying to re-tool our machine to do something that we just don't do at all. This isif you use strategy, you look for things that are adjacent. And you can kind of jump one adjacent. So you can jump a customer type a geography, maybe half a service. Yeah. You can't jump two or three. But the beauty of this isessentially if I, if I keep it simple, we make projects happen and then look after the assets afterwards, whatever happens in the energy transition, this just requires vast amounts of new assets. That are in geographies, customer types and skill sets that are really, really adjacent to what we do. That's why I think we can be successful

Darren Hill (18:14):

In this last year. Particularly energy security is totally dominated conversation, especially with the war Ukraine. So I want to ask you in particularly from your perspective, what's been the immediate impact on the industry and has it changed our Petrofac's short-term approach to things?

John Pearson (18:31):

Short-Term Yeah. Is the key phrase because there's been a terrific amount of short-termism in the last couple of years. A cynic would say perhaps driven by various COP events. And then the tragedy in Ukraine has sort of rebalanced that in a very graphic way. But you go back to Arthur and his currents and ignore, these are all waves. Cop and Ukraine, Important waves. The current, the direction was we will decarbonize most of the world by about 2050. Yeah. To decarbonize that you have to manage a transition. And it always really annoys me when people are like, turn this off, turn this off.

(19:15):

And I think a lot of people without being rude, and I'm not claiming perfect, so, but I don't think they know what they're talking about. So you turn off anything. Let's turn off water. That would be really bad, wouldn't it? You could dig wells, you could do all kinds of stuff, but turning off water would be a very bad idea. We are slowly turning off hydrocarbons, but you know, the UK imports half of its hydrocarbons right now. Where do those hydrocarbons go, everyone? I dunno where they think they go but half. There's gonna be so much more dependence on electricity in the new world, electricity and hydrogen and probably water and a few other key commodities, but half are electricity in the UK comes from gas right now.

Darren Hill (19:59):

Yeah.

John Pearson (19:59):

Even in the ultimate end state, 2050, about half our industrial power is gonna have to come from some gas, probably hydrogen, not natural gas.

(20:10):

And what folk don't seem to get is that if people didn't eat bread, bakers wouldn't make it. Right. So it's not turning off the supply, it's turning off or turning down and altering the demand. If you turn off the supply without turning down the demand, you get some of the supply chain crises we've got in the world. That's why you can't buy a new car for a year. It's why, you know, prices of everything have gone through the roof. So what we must do, we must cut through all the rhetoric, all the BS if you'll excuse me being rude and say we want the optimally managed transition that gets us from where we are to a decarbonized future in a way that doesn't put energy bills through the roof, that causes people to have, you know, turn their heaters off through cold winters, etc, etc, and just cut through it. Get on with making that real. And the things that are limiting that decarbonization, it's got, in my view, it's got nothing to do particularly

with producing oil and gas that will decline naturally as the users of oil and gas decline. Yeah. If we turn off the supply before the demand, bad things will happen. And Elon Musk was in the news a couple of days ago predicting the end of civilization. If we do that, maybe a bit extreme, but

Darren Hill (21:25):

He likes an extreme.

John Pearson (21:26):

He does like an extreme and he's probably got a better platform for it than me, but, you know, so we just need to make a plan and deliver against it. So we even just to deliver the UK's offshore wind or hydrogen targets is likely to take a massive supply chain response. That will stretch everybody, even the biggest companies to produce the kit required to do that. So for me, that's where we should be focusing attention. If you want it to happen quicker, we all do. Let's look at the real world things that are stopping that happening and fix them. Let's get more engineers. Let's get more yards. Let's cut through the red tape that governments require for connecting to grids. Let's get on with it. Let's not, you know, pontificate about more of this or less of that, do all that. Right. And the market will balance everything else out.

Darren Hill (22:16):

Yeah. No, that's good. And I did, like you mentioned there, and I think we, would be wrong of us not to mention it, people are quite rightly, looking at energy companies just nowas they see the energy prices rising. So in your opinion, are we as an energy industry doing enough to bounce the needs of people today versus that that long-term future that you're talking about?

John Pearson (22:37):

That's, that's a super tough question and probably one without ducking it, and I won't duck it almost more for government. So Yeah. If you, and I'm not flying a flag particularly for energy companies here, but you kind of unpick they're a commercial entity. They were set up to make money for their shareholders. They made huge losses over the last few years, and that's just part of the slings and arrows and the cycles of the market. Now they're making big profits. Interestingly, most of the profits don't come from the UK. So there's a flaw actually in the argument that says you made X billion, we're gonna tax that for the UK. You can't actually tax profits that come from a different part of the world in my view. You know, is it a crisis that an awful lot of people will struggle to pay their energy bills in the UK? That is, and something needs to be done about it.

(23:29):

And in the same way that we intervened in the pandemic, you know, I think interventions are required in the energy market to make sure that folk don't freeze, that there isn't genuine hardship for people. I think economically in a pure economic hat on, windfall taxes have been proven to destroy value, not add. Do I personally think? This is a pure personal opinion. And I'd say that very advisedly, particularly as a board member of OEUK I think the industry possibly

missed a trick in not getting out in front of this and saying, look, it's actually not about the money for us. Yeah. I don't mind a profit's levy for awhile, but, I want to, I want people to see that we're doing the right thing here for the citizens of the UK and trying to support those who need it.

(24:24):

We do need to make investment decisions. It's impossible to make investment decisions if you don't know within a reasonable degree of certainty what the tax regime is. Yeah. We need these projects to happen back to what I said a few minutes ago. So the more uncertainty there is, the more people's boards will find it really hard to say, why should I invest in the UK versus somewhere else in the world if the rules keep changing all the time, and specifically if promises to do one thing turn into something different. So to me it's just all about collaboration. We should sit down and there are, you know, really good conversations between industry and government and say, look, come on guys, we all get this. I think industry needs to be seen to do the right thing through what we all hope is a, a passing moment of inflation and, and global difficulty.

(25:11):

But we need to sanction projects that the UK needs energy, energy comes from a variety of sources, including oil and gas for another 30 years. So can we cut through the chat for want of a ruder word and just make a real plan to do something real? And, you know, if that includes supporting vulnerable people over the next few years, I think that's exactly right. We should do that. But then not lose sight of the fact that we need to sanction energy projects too. Otherwise the problem we have today will be massively worse in 10 years time.

Darren Hill (25:44):

Well you've mentioned the energy levy there and I'm glad you brought that up because I was actually going to ask you that next.

(25:48):

Do you think that it's going to influence behaviors around how people invest in new energies versus, oh, I'm gonna put my money into hydrocarbons just now. I think we've seen recently that the government or the future government is, it'll be at this point are looking to sanction about 130 new oil and gas fields. So what's your take on that? Do you think that, is it gonna detract from the green energy investments or is it actually going to, people are gonna see that as the future?

John Pearson (26:17):

Yeah. Back to waves and currents. Will it have a, an effect on the waves, probably will for a number of months? Will it have an effect on the current? No. I mean, companies are rational investors. You know, as a executive director, you get sued if you're not looking after a shareholder value. So they will do what is right for shareholder return in the medium term, right. Does have the recent changes and the sort of surprise around them. Has that caused difficulty for some of my customers in getting sanctions through their board, which may sit in Paris or Madrid or Houston or wherever the heck it says. Yeah. It has absolutely. Do people understand

that we need energy security and we need energy and that that energy will include oil and gas and hydrogen and wind?

(27:07):

They do. And I think for me that's the current underneath the waves, I don't think that's changed. And I think almost paradoxically, the security of supply challenges we've had has really focused the mind on what does a diverse energy mix look like? How much gas storage do we have? How much wind do we have? What happens when the wind doesn't blow? How do we back that up with hydrogen and hydro and nuclear and all kinds of things. It's at the end of the day, if, if you take electricity as an easy example, it all ends up in the wire. Your light bulb doesn't go a different color when you've got gas powered electricity versus wind powered electricity. So we need a joined up energy strategy that, you know, it takes, what, 20 years to get a nuclear reactor, eight years to get a gas fired power station. The grid itself is starting to creak because, you know, we used to have power generated A, B, and C and consumed at D, E, and F and that's all different now. So there's a tremendous amount of joined up thinking first, but then project second, that are required PDQ to make all this happen. So I, I think in the round, to answer your question more succinctly, I think it's made waves but not changed the currents.

Darren Hill (28:21):

If there was no red tape and you had unlimited budget, how would you reshape the energy industry of for the future?

John Pearson (28:28):

It is, it's an interesting question because if you, if you take 2050, and that's by anyone's definition, that's the future. Yeah. In those horizons we talked about earlier, there's a reasonable degree of clarity around 2050 because governments have said, look, by law we need to do X, Y, and Z by 2050. I think that looks to me to be as far as I can tell broadly, right. You know, more of this, less of that. I think the challenge is not in finessing the exact energy mix of 2050 because that, you know, again, currents very directional, more of, less of, it'll be wrong, but it's right enough. Yeah. The, the thing I would do if I was, you know, king for a day, is I think we need to be really, really practical about the things that are holding that journey up. Without causing outrage in, in some of my customers we and the government have used this rhetoric.

(29:25):

They said, look, we need a pandemic mentality to some of this. If they're, look what we got done in response to Covid. It was by any description really amazing. Things that couldn't happen that quick happened that quick, a vaccine in however many months, it was amazing. And if we can have a bit of that mindset and that approach and say, right, we need 50 gigawatts of offshore wind. Yeah. How much have we got just now? 12. Hmm. That's a lot. What's stopping us? When's the next grid connection 2029? Hmm. That doesn't sound very good. How are we gonna fix all this stuff? How are we gonna get about 50% of it done in the UK? Where are those people gonna come from? How, how are we gonna develop the supply chain? So my, my wish would be to cut through some of the generalities and get right down to the practicalities and say, look,

a bit like the pandemic and, you know, never waste a crisis, etc, a terrible thing, but we did learn a lot, I think as a civilization through that.

(30:23):

If we can talk Turkey now, get after some of this stuff, we'll get a far better, more "just" transition than if we don't. And I think there's a wee bit of either denial or da da da. I'm not listening to some of the difficulties. They're surmountable, but only if we talk about them. So I think for me, that would be my one ask. Let's get really, really practical about how we can make all this stuff happen in the best possible way. Let's not get surprised when we find there's gaps or difficulties. There always are. How can you do, you know, an exponential increase from something that's ever been done before and not find some gaps. It's just like illogical and then just get on with it. In a really, really practical way. If we do that, then we'll have created a fantastic success for frankly all the stakeholders that decarbonized world, profitable companies, people will have had great jobs and been able to go on great holidays and buy fast electric cars.

Darren Hill (31:21):

Nice. Thank you so much for joining me today, John. I really appreciate and I think you've given us a really, food for thought anyway. And I think we're all gonna have to scramble and sort of look at videos and books and whatnot. So thank you so much for joining me. Thank you very much.

(31:35):

Thank you so much for listening to my conversation with John today. I hope you got a ton of value. I certainly feel like I did, and I'm definitely checking out Arthur C. Clark, whether it's old videos, articles, books, you name it. I think we all need to be a bit more aware about those waves and follow those currents as we look to the future of energy. If you enjoyed this episode, please consider subscribing and leaving a review and tell us what you think. And until then, until the next episode, take care.