

The Perch Pod Episode 23

Tom Raftery [SAP]

Climate Geopolitics

Jacob: You're listening to the Perch Pod from Perch Perspectives. Hello listeners. And welcome to another episode of the Perch Pod as usual. I'm Jacob Shapiro. I'm your host. I'm also the founder and chief strategist of Perch Perspectives, which is a human centric business and political consulting firm. To join us on the show today is Tom Raftery. Tom is a Global VP, Futurist and Innovation Evangelist for SAP. It's a title I'm a little bit jealous of. He hosts The Digital Supply Chain podcast and also a new Climate 21 podcast, which we talk about on the show, both are really great podcasts. If you're interested about supply chain, geopolitics, all that sort of thing. If you need some more podcasts in your life, besides the Perch Pod, of course, I highly recommend his podcast and I'm an occasional guest on there as well.

Jacob: Thanks Tom so much for coming on and taking time. This was a really great conversation. Really focused on the future, focused on energy and really more of an optimistic take on some of these things that I think is, is normal on a geopolitics podcast, because I think geopolitics gets mired a little bit too much in risk, a little bit too much in fear, talking to somebody like Tom is really good for shaking out the cobwebs in your head and thinking about what is possible moving into that sort of, leaning into love instead of fear. So thanks so much, Tom, for coming on. Listeners as usual, it's my sort of episode tradition to ask you to please leave a review or leave a comment on the podcast, wherever you're listening to podcasts. It takes just a small moment of your time. Doesn't cost you any money.

Jacob: But it actually helps us a lot. Helps us get the podcast moving in the right direction. If just one of you... if everybody who listens to this podcast does that, it's huge for the podcast. If you get one person in addition to yourself to do it for us, that's amazing too. They don't even have to listen to it. So just thanks in advance for taking the time to do that for us. Otherwise, if you want to get in touch, if you have comments about the podcast, if you want to chat, if you want to tell me a great book you've been reading, or more importantly, if you want to reach out and learn about the services that Perch Perspectives can provide and helping you think through how geopolitics is affecting your supply chain, your business, your investments, please don't hesitate to



reach out info@perchperspectives.com. I read everything and I reply to just about everything as well. So onto the show, cheers y'all, take care.

Tom: My job title is Global VP, Futurist and Innovation Evangelist. I had great fun making that one up. I do a lot of talking, I guess is probably the best way to put it. I was doing a lot of podcasts years ago. I resurrected podcasting when I joined SAP in 2016, but I was also doing an enormous amount of keynotes. Keynote talks around the whole innovation topic. And of course that came to a screeching halt in kind of February of 2020 when travel restrictions were put in place in the organization and rightly so. In 2019 I did something like 42 keynotes and something like 38 countries. So I was running the podcast at the same time, The Digital Supply Chain podcast. And I was pushing two episodes out, no, I was... Yeah, two episodes out a month, once every two weeks.

Tom: But a lot of that was what I was sprinting between flights and tight connections and airport terminals and things. And of course, when the lockdown came, I then went to pushing out two episodes a week off the supply chain one and starting up a new one, The Climate 21 podcast, which is a pushing out at the moment, one episode a week. So supply chain one is Monday and Friday. Climate 21 is Wednesday. And then I do a live stream on Tuesday afternoon CET. So that's... it goes out 11:00 AM Eastern, 8:00 AM Pacific.

Jacob: I love the idea that you're a self titled evangelist and that you've resurrected podcasts. There's a lot of rich metaphor in there to work with. I also...

Tom: I was doing podcasting in 2005, six, seven, that kind of timeframe when it was really just starting out. And that was great fun. I started a podcast then called Pod Leaders and it was the time of Web 2.0 and Tim O'Reilly and all that kind of thing. And very few people were actually doing podcasting at the time. You kind of had to hand roll your own XML feed was great fun. And because I started it, and I didn't start podcasting, because I started the Pod Leaders podcast. I called it Pod Leaders, because what I was doing was, I was inviting on lots of luminaries from the Web 2.0 world the kind of Mike Arrington and the Robert Scoble and people like that who are all big names at the time.

Tom: And I had a lot of really interesting guests because I was one of the few podcasts out there and we're happy to jump on this new medium. I had Vint Cerf on. That was awesome. That was really cool. I had Dan Bricklin. If you're not familiar, Dan Bricklin is the inventor of the spreadsheet. That was a great episode as well. So fantastic. Some guy, at the time I lived in Ireland, some guy, I was working from home, so some guy, some nobody in the backwaters of Ireland sets up this podcasting and starts getting all of these rock stars on it. It was amazing.

- Jacob: There's something very Irish about it actually. But you were talking about traveling, I can't believe I miss airport terminals, but I kind of do. I'm in New Orleans this morning and I think, are you in Barcelona right now? Is that where you're recording from?
- Tom: No, I live in Seville, just outside the city of Seville and the outskirts and that's where I'm based. Yep.
- Jacob: Well, it's amazing that we can connect and get to talking. You mentioned being-
- Tom: In fact, in The Supply Chain podcast, one of the episodes I had, we were talking about this and we were talking about... I was talking to some guys from a company called MSC-G and one of the questions I said was, "If this pandemic had happened in 95, how would we have coped? How would we have survived?" There was a long pause, because the kind of things like you and I talking now, you in New Orleans me in Seville, we have video up so we can see each other, that kind of thing would have been done over POTS, plain old telephone system phone lines back in 95. And they would have been very little else.
- Jacob: Yeah. If even, and this is a little off track, but I it's actually probably useful to talk about, which is that I also don't know that COVID would have become such a big deal in a year like 95. Because previous flu pandemics and stuff like that, there were flu pandemics, if you go back in the 60s and 70s and stuff, people just... they dealt with it. And a part of that was I think, they weren't afraid, there wasn't good information out there, so you didn't really know any better. So there's something about...
- Tom: Probably, there wasn't much travel as well.
- Jacob: Yeah. Between... I guess that's a good point too. Just the way that globalization has worked, something like this is a lot scarier in 2020 than it is in 1995 versus-
- Tom: Oh, there was Spanish flu in 1918, 1919, killed millions of people.
- Jacob: It did. But that was also... it spread because it was the end of World War I. So you had this artificial globalization thing happening that wouldn't have been normal. Well, just because you had all these troops coming home. And you're in Spain, it wasn't actually the Spanish flu. It was just the only thing the French and the British and the Americans could agree on, was that they didn't want it to be the British flu with the French flu. It was probably the French flu. And they said, "No, we'll blame the Spaniards because they're weak and they can't do anything about it."

Jacob: But I was also reading an article the other day. The vaccination stuff has changed as well. When you read stories about smallpox vaccination and polio vaccination. Once we had the vaccine, we rolled it out. I'm sort of shocked. I thought that once we got to vaccine land, that we were all going to get shots and we were going to be back on the road. And I think we're going to be lucky to be back on the road this year at the rate things are going, don't you think?

Tom: Yeah, I know, absolutely. I did a two piece podcast on this. And I did the... called The Challenges of Vaccinating Seven and a Half Billion People. And it's exactly that. I had a flu vaccination shot in November, never had one before. But the company offered it and I said, "Okay, I haven't had of a vaccine shot for the flu before, I'll go along and see what it's like."

Tom: And I got the appointment for 8:00 AM morning, which was just as the center opened up. So I was the first person in. So, that was great. No crowds, no nothing, went in, filled out the forms. So the nurse got the vaccination, left whole process from arriving to conclusion was 10 to 15 minutes. Multiply that by two shots, now you're into the kind of 20 to 30 minutes by, in Spain, 40 million people. And suddenly it starts to take a lot of healthcare workers time and they don't have that, the number of healthcare workers. So you multiply that 20 minutes by 40 million people and divide by the number of healthcare workers and you're talking months and months and months and months and months.

Jacob: Yeah. And that's not to say anything about the cold storage also that is necessary for some of these vaccines.

Tom: And then there's the tracking of it. Because you do want to track who has been vaccinated and who hasn't come back for their second shot.

Jacob: I was talking to somebody on this podcast, it was Tony Renna , a couple episodes ago. He's based in South Korea, he's an American based in South Korea. And he was talking about how... they were talking about the vaccine program and how is it going to work for him and his family members back at home? Did he have a national ID number so that they could get everything tracked? And he sort of... the idea to the South Koreans that there wasn't a centralized body in the U.S. that had everybody's number and could roll something out like this, was like shocking to them because like, they're just going to roll that stuff out. But I think that's sort of the flip side of some of the parts of liberal democracy that emphasize the individual. You don't want people to be able to track your data or put you in a database and find you. And we're sort of seeing...

Tom: I'm kind of in a middle ground there, because coming from Ireland, there isn't a centralized database of everybody living in Spain, where there is.



So it's interesting. And it's kind of taken for granted here. When you sign up here to get your DNI, which is your national identity card, you're fingerprinted. Everyone in the country is fingerprinted. Well, I don't have a DNI so I haven't been fingerprinted by the Spanish. But I have been fingerprinted by the Americans every time I've gone through customs and border patrol. I've put my fingers on those scanners.

Jacob: Yeah. Well, Tom, you didn't come here to evangelize the COVID-19 and all that other sort of stuff. We wanted to talk about climate change a little bit, specifically because you just launched this Climate 21 podcast and listeners this is very good. You've had some... I was... the guests that you've been able to get on are amazing. You went from having an SAP head, to having somebody at Microsoft, and then somebody at Shell came on. To hear an executive at Shell come on a climate change podcast is the kind of content I'm here for. So maybe talk to me a little bit about-

Tom: There's more to come. Believe me, I've got some amazing guests coming.

Jacob: Oh, I can't wait. But tell me a little bit about the inspiration behind Climate 21 podcast, because I know it also... it's kind of growing off that climate 21 initiative that SAP is doing, right?

Tom: Exactly. Yeah. So just on that first. SAP has this initiative as you rightly called climate... It's called Climate 21 and the 21 doesn't refer to the year 2021. It refers to the century, the 21st century, because this is a decade long process. It's not going to be over in five years or 10 years or 20 or 30. This is for the long term. So the SAP initiative is to build climate accounting into all the business processes that we have encoded in our software. Essentially, for people who are unaware SAP provides backend business software for every single type of industry. We've cataloged industries into 25 discrete buckets, different types, mining and milling energy resources, all that kind of thing. Right to tourism, hotels, transportation, yada yada, yada, you name it. We have software to run it.

Tom: And now we're building carbon accounting into that, because we say in SAP that we are exemplars and enablers. On the exemplar front, what that means is we do our very best to get our own carbon footprint down. But, our carbon footprint is around 300,000 tons a year, which is a drop in the ocean, getting that down by 10% deal. The 2020 carbon footprint will be well below the 300,000 because there was no one traveling. So... but even getting that down 10%, down 30,000 tons, it's almost negligible at that point compared to the carbon footprint of our customer base. So that's the enabler part. The exemplar is great, but the enabler part is far more important. It's got a much greater or potential impact. Because I mentioned we run the businesses have of...

Tom: Our software runs the business of huge companies, all the mining and milling companies, all the energy companies, well, not all, but the vast majority of them, the utility companies, et cetera. They all utilize our software. And if we can help them reduce their carbon footprint by a half of 1%, and obviously we want to go far beyond that, but even a half of 1%, that's millions of tons of CO2 per year. So it's a much greater lever that we've got there. And the aim of our Climate 21 initiative is to allow companies to see the carbon impact of every single business process and transaction that they do, calculate it, account for it. And also look down through the supply chain and see the carbon impact of the decisions they're making there, so that they can then choose their suppliers. And so on, based on not just pricing but also carbon impact and that way make decisions that can allow them to reduce the carbon impact of the things they do day to day.

Tom: So that's the SAP Climate 21 initiative. And this is something that I've been challenging SAP to do since long before I joined SAP, because before joining SAP, I was a sustainability analyst. I get that word out. Sustainability... I should be able to say it, seeing as I was it for so long. I was a sustainability analyst. And also just from an education perspective, I am a biologist by training. I did a post-graduate project on using biological control to control pests. So this kind of thing is in my DNA. It's who I am at my core. I drive an EV, I've got solar panels on the roof, all that kind of thing. It's fun. It's fundamentally what I believe in. So, when I was approached... Oh, sorry. When I heard about the Climate 21 initiative within SAP, I'm not part of that organization, but I approached the project lead guy called Toby Croucher, and I brought him onto the supply chain podcast and he explained it, and you can listen to that episode at the supply chain podcast, it's there.

Tom: But after that, I said to him, "Toby, I would love to kick off a Climate 21 podcast myself, have it loosely associated with the Climate 21 initiative within SAP, call it the same thing, but also bring on people from outside to set context, but also to..." and when I say set context, people like Stephanie Bertels, who was on a couple of weeks back, academics, people like that to talk about the climate issues. But more importantly, I want to bring on customers of SAP, partners of SAP, competitors of SAP, people who are doing successful climate emission reduction programs. So, that they can talk about those. So, that they can share what they're doing. So that they can educate and inspire others to follow in their lead. That's the aim of the podcast.

Jacob: Yeah. I'm going to ask you a couple of questions about that. But the first, just a random aside here, I didn't know that you were a biologist by training and certainly that you were doing biological control of pests. I worked at a kibbutz in Israel for a month or two, way back in another lifetime sort of thing, called Sde Eliyahu. And most of the kibbutz team in Israel are actually going out of business because the business model doesn't work, but Sde Eliyahu was actually one of the kibbutz team that

has done well. And it's because they have a little company on the kibbutz called BioBee. And so you have the dairy and you have the idyllic. I was up in the date palms and in the spice factory stuff, none of that is actually doing very well. But they breed, genetically modified male fruit flies that can then be introduced into an atmosphere as a natural pesticide sort of thing.

Jacob: And that's been allowing that kibbutz, that sort of socialist farm in Israel to live for decades beyond what most of the other kibbutz seem. So it's-

Tom: Tremendous.

Jacob: Just a random aside there, because I rarely get the opportunity to throw that out. But you called... you talked about being exemplars and enablers, but it seems to me you're also... you're positivist, because the problem with climate change, at least when I've talked to clients about it, is that human brains were not engineered to think about such a big problem. When people are asking me about risk in a financial market or risk on a supply chain, I can quantify those things fairly well.

Jacob: Climate change, just because of how complex and how many variables we have, it's really hard to go to the client and say, "Well, here's your carbon footprint. Here's what you can reduce. Here's what you're doing." Sort of thing. And it sounds to me like what SAP is doing and what this initiative is doing is... it's not going to solve everything. But you're at least going to give them the data so that they can start making informed decisions because once you have the data, the thing becomes real in a way that is operative. Is that fair? And also you mentioned-

Tom: No. That's exactly it.

Jacob: But you mentioned specifically carbon, is it just start with carbon and hope that that builds out from there? Or are there other parts of it that... walk me through it?

Tom: No. It's climate emissions in general. So it's all climate emissions. Carbon is the main one, but it is... if I said carbon emissions, I misspoke, I should have said climate emissions because that's what the project, and that's what the podcast is about. It's climate emissions.

Jacob: How do you...? And the people that you've been talking to, and as a sustainability analyst, in the past, how have you communicated the climate change challenge to different companies and clients? Without this magical SAP data that you can actually show them the X and Y, how would you have made that conversation work when you were starting out?

Tom: So, what I was doing as a sustainability analyst in the past was, I was looking at the sustainability projects that companies were undertaking, and I was critiquing those as opposed to going into companies and saying, "You need to do X, Y and Z to be more sustainable." So, yeah, I was going into the IBMs the HPs, the Microsofts, the SAPs, and looking at what they were doing because it was... I'm a technologist as well. So it was sustainability from a technologist perspective. So looking at the programs that they were rolling out and critiquing them, saying how they could do better, some things that were missing, some things that they were doing well, that kind of thing.

Jacob: Well. What's been the most interesting thing you've learned on the Climate 21 podcast so far, that's maybe shaped the way you're thinking about climate change in the next decade and dealing with it?

Tom: The episode that's coming up, there's so many to choose from, but the episode that's coming up next Wednesday, whatever date that is. Today's the 15th so... but the 22nd or so, the episode that's coming up then, is with a guy called Paul O'Connor. And Paul is ESG Debt Capital Markets leader for J.P. Morgan. And that's the one I think where I've learned the most because I don't have a financial main gene in my body. I used to tell people, I couldn't balance a cheque, nevermind a book. So having a conversation with Paul about ESG, debt capital markets, the investment managers, the assets, and how all of that is changing investment portfolios and how risk is really redefining so much of that.

Tom: And money is fleeing to carbon lite areas away from carbon heavy industries or within carbon heavy industries to the less carbon intensive incumbents in that space are new and up comers in that space. That was a huge education. I had a bit of an inkling, so I've listened to others speaking on that topic, but to hear Paul talk about and go into so much detail on it, it was just phenomenal. So that's one to watch out for, as I said, that's coming up next week. Talking to Stephanie, Stephanie hinted at some of that. I say, Stephanie, Professor Stephanie Bertels, she's the professor of sustainable business in the University of Vancouver, or the Beedie School of Business in University of Vancouver, I think it is.

Tom: And she's also a co-founder or founder of the Embedding Project, which is an open project where they do assessments of publicly stated goals by companies. And they have a database there, where you can look through all the public statements of companies and how their climate goals have been assessed. So, what they're doing well, what they're not doing well, all that kind of thing. That was really interesting as well. The podcast with Lucas Joppa from Microsoft was amazing. I didn't learn a whole lot there because I knew most of what they've done, because they've been very public and open about it. But still to hear him elucidate all the things they're doing, it was just amazing. In several of



the podcasts leading up to that, knowing what was coming, I mentioned that the podcast with Lucas was coming, and that what Microsoft are doing in that space was really the gold standard. And I'm sure the other interviewees hearing me referred to do an upcoming as the gold standard, probably was less diplomatic than I could have been, but nobody ever accused me of being diplomatic before. So, that's okay.

Jacob: That's fine. We try not to be diplomatic on this podcast, actually. There's plenty of other people out there who are doing diplomatic stuff. And also one question though, that I have, and this is one thing I struggle with actually, is because what you're talking about is really a bottoms up approach. And it seems to me that one of the things that is so challenging also about climate change is that the global international system is based on a certain economy, a certain way that things work. And it's sort of like if you leave it to itself, things are just going to go to the most cost efficient basis. And sometimes when you have to do transformative change, like when you're moving from less climate aware to more climate, or even if you're moving from 3G to 4G and stuff like that, there's a lot of upfront costs that maybe people aren't going to want to bear.

Jacob: And one of the things I worry about is that we're in this space where now the reputation of being good on climate and actually being good on climate are actually two different things. And you have a lot of people who are trying to show that they're good on climate by doing very performative things. And they want to be on the in-crowd. But then, when you actually look at what they're doing, it's small bites at the apple, not any fault of their own, the system is not geared to that sort of way. So just talk to me about that. How do you think about that if you're a company, if you're challenged that way, where, "Okay. I have this data now about my emissions footprint, but if I'm less competitive in the short term doing this, what is the benefit there?" How does SAP think about that messaging and think about how to use some of these things you're talking about to both do better and also make money?

Tom: Yeah, no, it's a good point. And I brought up a similar point to Paul O'Connor and it basically comes down to some way of quantifying how well you're doing that is cross comparable, which is essentially what the Climate 21 initiative from SAP is trying to do. So it is... right now it's very straightforward or it's reasonably straightforward for companies to cross compare how they do in the financial markets, how their profit and loss is, how their revenue is, all these kinds of things. And that they have annual audited reports, they put out quarterly statements, all this kind of thing. We need something similar in the ESG space. And there is a certain amount of that there, but it needs to go further. There's a certain amount of that there, because carbon is a, in some markets, is a financial instrument that's traded. And consequently, it has to be audited. Now that's not everywhere, but it is in some markets. And so there's a certain amount of it there.

Tom: But carbon isn't the only factor as we've already alluded to. So we need a... we need to come up with an equivalent to the accounting standards that we have for financial transactions today. We need to come up with an equivalent for emissions so that we can then cross compare and that companies do better off the back of their reporting. And so... and it's cross comparable. And the point I made earlier, the point that Paul made on the podcast that's coming up, was that money is going to these organizations that are becoming carbon lite because they are mitigating the risk. And that's hugely important for the investment managers and the portfolios, the asset managers are looking at getting out of risk, getting away from carbon if possible. And so that's where, to your point about maybe taking a short-term loss for long-term gain comes into it.

Jacob: Are you optimistic for the next decade ahead? Because, I mean, it's hard for me, because I'm sitting here in New Orleans, which is one of the cities probably most effected by climate change in the world. And it's one of the reasons I'm here. I think it's going to be really interesting to watch if the city can get a grip on what's going on around it and actually act proactively rather than just off the cuff. So I sort of, I oscillate between moments of despair and intense hope. Where do you fall on that spectrum in general?

Tom: And it's funny that you asked that question because the podcasts that I run are unscripted similar to this one. And it's the format I prefer. But there are a number of questions that I ask in every podcast, both in the supply chain one and the climate one. And in the climate one, one of the questions I ask in every episode I ask, "Are you optimistic, given everything we've talked about?" Is one of the last questions, "Given everything we've talked about, are you optimistic?" And to get back to your question to me, am I optimistic? I actually am. I am by nature an optimist. So this glass we're looking at here, it's half full. I know it looks empty, but no, it's half full. It really is. And I think you have to be. I think pessimism achieves nothing, because people who are pessimistic there's always a temptation to throw your hands up in the air and say, "It's all a waste of time. We can't do anything. We're doomed."

Tom: That achieves nothing. Whereas it's only by being naively optimistic that you think, "Oh, of course we can solve this." And throw all of your effort into it. And it's only... there's the expression, aim for the stars and if you hit the moon, you're not doing too bad. So if we aim for the stars with climate change and we make the world a slightly better place, then that's not too bad either. But I think we'll do better than that. We're seeing a huge amount of change in things like the energy markets. The amount of, according to the U.S. Energy Information Administration, the amount of new electricity generation being brought online in 2021 will break down to 11% from gas. Then 70% from renewables.

Tom: That's 39 from solar and 31 from wind and another... Oh, how much is it? Four or 5% from batteries? From batteries, from lithium-ion batteries. For the first... there have been several places in the U.S. now, where they've set aside the idea of building a gas generation facility, and instead decided to put in a big battery plant. And so it's changing. 70% from wind and solar in 2021 in the U.S. In Germany in 2020, renewables generated more electricity than coal for the first time. So... and this is all... this is not because people are going, "Oh, climate change is a problem we've got to suck it up and build out all these horrible renewables things." No, it's not that. It's because of economics. It's because now, it's cheaper to build a generation facility on solar or on wind than it is on coal or oil or gas or any other fossil fuels.

Tom: It's cheaper to do it. In fact, in some regions, depends on the latitude, but in some regions of the world, it's now cheaper to build new solar or new wind than it is to operate existing gas plants. And costs are only going down. So the cost of wind and solar are dropping. I think the numbers are something like, between 2012 and 2019, the drop in the cost of solar was in the order of 87% and the drop on the cost of wind was in the order of 50%. And those numbers keep falling because you're getting the experience curve and you're getting economies of scale. And of course, that's a beautiful virtuous circle because as the price drops, the solar and the wind become more attractive to more people. So more people order it. So there's more experience, more learning curves. So the price drops more, so it becomes more attractive and so on and so on and so on.

Tom: And so the price keeps falling year on, year on, year again. There's a two gigawatt solar plant being built at the moment in Abu Dhabi. For people who are unaware, a gigawatt is roughly the output of a nuclear reactor. So there's a two gigawatt solar plant being built in Abu Dhabi. And the electricity coming out of that for the next 20 years is going to cost 1.3 cent per kilowatt hour, 1.3 U.S. cent per kilowatt hour. Now, I was talking to executives from DEWA, DEWA is the Dubai Electricity and Water Authority, and I was asking them about their electricity. And they said they generate 95% of it from burning gas, and it costs them nine cent per kilowatt hour. The solar is coming in at 1.3, and that's a guaranteed price because it's a power purchase agreement. It's a guaranteed price for the next 20 years.

Tom: So gas prices fluctuate all the time. Whereas, these renewables, they're all through power purchase agreements now, and the price keeps dropping. So for people who are on the purchasing side of it, this is great. You've got guaranteed low cost electricity for the next 20 years. So it's incredibly attractive, in terms of pricing and getting cheaper all the time. In fact, that 1.3 cent per kilowatt hour, you could throw a huge battery plant in beside it, and it would still be cheaper than the gas. And so you've got it's cheaper. It's also faster to build. You can build a large solar plant or a large wind park from planning on books and

environmental impact assessments through to electricity coming through the wires in the order of two years. For gas, for coal, for oil, you're looking at six years, for a nuclear it's 10, 12, even longer pending.

Tom: Hinkley C, is a nuclear power plant that they're trying to build in the UK, 3.5 gigawatts. So it's three nuclear reactors. They've been... they started the project, and I'm open to correction on this, but it's around 2008, they started the project. They're now saying it will be concluded hopefully in 2030. So, that's 20 years ballpark add to get a 3.5 gigawatt nuclear plant online. At the same time, well, not at the same time, but right now they're building out an offshore wind park in a place called the Dogger Bank just 80 miles off the East coast of the UK, 3.6 gigawatts.

Tom: And it's going to be online in two to three years, from drawing board to electricity coming through the wires. So nuclear will have a part to play because it's low carbon and it does have certain advantages, but the electricity from nuclear doesn't scale, it's expensive. And it's horrendously slow to build out. Renewables, you can build them really fast, really cheap, and it's really clean electricity. So, and then when you combine it with storage, it becomes really compelling.

Jacob: Yeah. And all this has happened. The lowering of these renewable prices. I think people assume that we were going to hit peak oil, or we were going to start running out of hydrocarbons and then it was going to take over. But as you've pointed out, the really bullish thing here is that those prices are dropping. Even as oil markets are oversupplied. You mentioned that-

Tom: Sheik Yamani, who was the OPEC oil minister in the 1980s, very famously said, "The stone age didn't end because we ran out of stone." And he then went on to say, "And similarly, the oil age will end long before we run out of oil." And he's been proven right, to your point. The amount of new oil and gas plants being built now is cratering. And there are a number of reasons for that. But it's mainly down to the fact that renewables are so much better and cheaper.

Jacob: And we're recording, on January 15th, you talked about gas prices fluctuating, oil prices fluctuating with what's going on in China and Japan and Taiwan, just in the last couple of weeks, because China's had its coldest temperatures since the cultural revolution. Just think about that for a second. Since Mao was running around. Japan's had record snow. Taiwan has had record cold temperatures too. And so they've all been-

Tom: Northern Europe as well.

Jacob: Yeah. And well, so Europe was actually soaking up that oversupply last year because gas was pitifully cheap and they couldn't sell it to anyone. Then China, Japan and Taiwan suddenly need a bunch of gas. So they're taking that gas away from Europe. The Europeans are freaking out and now the prices are just absolutely ballooning. They're going to go back down obviously. But to your point, there's a stability there.

Jacob: I do have one question though, because my first impulse is to say, "Can I get an amen, on all the stuff you were talking about renewables." But you mentioned Abu Dhabi. They're in the middle of the desert, so it's not going to be... it's not going to be possible for everybody to have a solar plant like Abu Dhabi. You mentioned the UK, a wind farm sort of thing. Is your sense that some countries just aren't going to be able to do this sort of thing? Or is there some mix that can work on renewables no matter where you are in the world? Because I'm worried about the former, but I wonder what you think.

Tom: I don't think there's that many countries that will have a problem rolling out renewables. It would be very hard for the likes of Switzerland to have an offshore wind farm.

Jacob: Sure.

Tom: But there's... I'm not aware of any country that has such a big land issue that they couldn't draw off solar or wind. There might be one or two. Yeah, sure. But it certainly wouldn't be the majority or even a large minority. Even if we look at the Netherlands, they have offshore wind farms and they have onshore wind farms, plenty of them, and lots of solar as well. And the Netherlands is not the sunniest of climes. I think there's only like 1% of the population of the world that lives more northerly than the Dutch. And it's not that far North.

Jacob: Yeah, for sure. Before we wrap up. We've talked a lot about energy. Water is one of the things I actually focus on the most too, though in, climate change is changing water in really intense ways as well. Does that figure into some of what SAP is doing? Or how you're thinking about this? Or is that something that's going to have to be added in later? And energy is just the low hanging fruit.

Tom: All of the above. No. Water is very much a big part of what SAP does because again, water utilities are our customers. And it's very much something that I look at as well because sustainability and it's a very large area of interest. And something that you got to think about is, as a futurist, one of the things I do is I look plans, I'm sure you do similar. And if you plot forward, you go back, you look where things were, where they are now and you plot forward. If you start to do that with the renewables and you start to see, "Okay, where's this going to be in five years time? Where's it going to be in 10 years time?" And you start

to think, "You know what? The price of electricity is tending towards zero."

Tom: And if you think, I'm holding up my phone too, because this phone has got something like 40,000 photographs on it, and that would have been inconceivable 20 years ago when we had film. If you had 40,000 photographs they'd have taken up a whole side shelf in your office and it'd be full of negatives or physical stuff and would have cost an absolute fortune in purchasing the film and getting it processed and so on. But now because the cost of photography has gone to zero, it's trivial for me to have 40,000 photographs on my phone. Similarly, as we move into an age where electricity, the price of it tends towards zero and the price of transportation by the way, is tending towards zero as well. That's a whole other conversation, but let's stick with electricity.

Tom: The price of electricity is tending towards zero because the cost of generation is going down and down and down and down and down, there will soon be fixed costs so it's never going to get to zero. There will soon be fixed costs during distribution and transmission, but generation is tending towards zero. What does that mean? That means the cost of building massive, and I mean massive solar farms and massive wind farms and combinations. There's a project in India at the moment where they're building a 35 gigawatt renewable park, combination of wind and solar. So that would be... if you tried to build a 35 gigawatt nuclear plant just forget it, maybe the Chinese could do it. And it would be part of a five-year plan that would take 15 years. And it's entirely feasible.

Tom: There is a project in Northern Australia to build a 10 gigawatts solar plant with a 20 gigawatt battery beside it. And they're going to draw a cable to Darwin and power the city of Darwin from it. And they're going to draw a cable three and a half thousand kilometers North and power Singapore from it. Mike Cannon-Brookes is one of the leading financiers behind it. So these kinds of things are only possible because the price is tending towards zero. What does that have to do with water? We're going to get to a point where, because electricity is close to zero, we can build these massive generation facilities and we can take saltwater and desalinate it. Desalination of water right now is horribly expensive because it has a massive energy cost and that energy is electricity. But electricity is close to zero in cost, then it's trivial to do it.

Tom: And so I can see, for example, building massive desalination plants in the Northern... in North Africa and using the water to start turning the Sahara into arable land. Why not? For example. Another thing you can do with it of course, is you can take, and there's proposals to do this in Australia, you can take massive wind farms, and massive solar plants and create hydrogen and turn that hydrogen into ammonia. Why do you want to turn it into ammonia? Because ammonia is so much easier

to transport than hydrogen. So, that's another thing. Again, you can create massive amounts of ammonia, and this is a storage mechanism for that electricity, ship it to wherever you want in the world, and suddenly you've got a whole new energy producer who is maybe subverting the likes of the Middle Eastern countries that are producing energy at the moment.

Jacob: And look no further than Israel, for how water desalination can actually work in practice-

Tom: Very true.

Jacob: Because they're doing it now for years and making it work for them. So it's not impossible. Tom, you're going to have to come back on. We're going to have to do a whole other podcast on transportation and hydrogen and all that other stuff. But we're running out of time here. I want to get you out of here on this. Let's assume that it wasn't COVID 19 pandemic land. Let's assume I was visiting you in Seville. We can eat one food dish together. Where are you taking me? What are we eating?

Tom: Well, the obvious one is going to be tapas, obviously, because, the South of Spain, Seville in particular. Seville is the place where tapas were invented in Spain. So you get the amazing tapas bars here. So I would take you out to one of the local tapas bars. We would have tapas and cold beer. The local beer here in Seville is called Cruzcampo and it's really nice beer. It's a Pilsner style lager and you get it ice cold. So you get the plate of tapas, what's called a campia a glass of Cruzcampo. And you're set.

Jacob: I've sworn off alcohol for the month, but on February 1st I will go to the specialty liquor store and see if I can find a beer and toast you. Tom, thanks so much for coming on. We'll have you back on soon. Check out the Climate 21 podcast, check out the Digital Supply Chain podcast. Tom has been nice enough to host me on there a couple of times too. So you can even hear me pontificate or evangelize or anything else along with Tom there. So, Tom, thanks so much.

Tom: Jacob. Thanks for having me on.

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