

S2 E1 - Digitalisation of Generation Behind the Meter

Baringa's Energy Innovators Podcast

James:

Hello and welcome to Baringa's Energy Innovators podcast, where we help you make sense of the energy transition's greatest challenges and opportunities. I'm James Constable and in this podcast series I speak with the leading industry experts to learn how they're putting people first and creating impact that lasts to fuel their energy transition. Today I'm very excited to be talking to Karim Alnakkash and Nichola Plower about the digitalization of generation behind the metre, flexibility.

Nichola:

There isn't a one single vendor offering out there. There isn't a one single self-built tool that can do everything. You need to have insight quickly. You need to be able to see positions of where the market is going. That historically has happened across a number of different applications and number of different screens. Suddenly, what a shift ask on a physical trading desk is faced with is an enormity of assets and thus an enormity of data. It cannot be human dependent, it has to be digitally driven.

How do you assimilate lots of information across lots of assets, be it sitting at a large consumer, a large industrial customer sitting in the North Sea? We need to understand how that is going to contribute to the decision we're going to make and what we submit to National Grid and where we place different value in those value pools that you've been describing, Karim. Baringa has been developing that digital architecture for traders of the next generation and the short-term platform. We've been across Singapore, Australia, the US, Europe, understanding how different people are responding to it and we've built that kind of capability model and architecture.

James:

Karim is a former Chief Technology Officer at EDF and Nichola Plower is one of our partners specialising in digital renewables and flexibility. Let's get into the interview. Nichola, Karim, do you want to give us a bit of an overview of storage front of metre and flexibility and how that's been evolving over the last few years?

Karim:

Great. Yeah, no, thank you for having me firstly. Flexibility in storage, where does this sit in terms of the overall context? So we're moving essentially from a society that was extremely inflexible, used the energy it needed to when it wanted to and was very lucky to have very large, very flexible generation like coal plants that served it. And we're swapping that round. We're moving to a model where we're going to have extremely inflexible generation, renewables, wind, solar, and increasingly flexible societies and users of energy. So energy storage and flexibility is a key enabler of that transition and the past seven years of my life have been spent helping different players in the value chain, wearing different hats in Baringa, and prior to that in EDF, capitalise on the opportunity from that flexibility. So using less energy at certain times, generating more and supplying energy at different times to help in that switch that I've just explained.

Nichola:

Isn't it fair to say that when I met you at EDF, we were very much in a trading environment which was user and individual dependent? So, synchronisation, data digitalization was there, but it was

there in core systems like the energy trading risk management and with screen-based data, but actually, being able to take a price signal or a market signal and execute human light wasn't really something EDF or in any utility I'd say in the UK at the time was digitally set up for in terms of ability to capture. Because batteries, you need to be on it pretty quick. It's rapid, it's now, it's here, whereas the thermal assets where you could rely on someone's knowhow and insight to then decide what to do with it.

Karim:

Absolutely, absolutely. And I'm sure we'll cover that later. A group of Baringa friends, friends now, had to come and helped us along that journey. But that's right, as part of that change that we are embarking upon, it's no longer good enough to turn assets on or off and decide to do it the day before. We refer to that as day ahead. It's no longer good enough in order to manage a system where renewables will come on and come off and their intermittency and the different challenges that creates for the grid, which maybe we'll expand upon later. You need faster optimization decisions when to turn assets on and off, which means you need to have a greater simplicity in how you see and manage the data pertaining to those assets. And that was a journey we went on. It was around how do I manage these extremely flexible assets that are very helpful in us managing that energy transition but require completely different mindset and capability set to be able to execute on and gain the value from as an asset type.

James:

Yeah, I think one of the things is the audience listening to this. People are going to be listening to this from different levels of understanding about what we mean when we talk about digitalization, trading, flexibility. All of these are very hot buzzwords that have been for a while in the market, but I think one of the key points that we need to get across here that I think isn't necessarily always fully appreciated by everyone is how intrinsic the role of the trader is in the balancing and management of the energy system. So is it worth just expanding a little bit on why we're talking about trading when we're talking about flexibility and just unpacking that a little bit?

Nichola:

So I think exactly that. So very much on a half-hourly basis in the UK, grid will balance demand and supply. So that's us as consumers what we need with the generation that's been put onto the grid. And that, as Karim has just said, has historically been influenced by a very static, well-understood profile of us as consumers coming home, sticking the kettle on or the TV on. It was a predictable way to do it. So yes, there was data and digitalization involved in that, but actually, it was quite a predictable, repeatable pattern. It was known, you could do it in your head almost because you knew.

Likewise, you would know which assets would be on because you could see it on the screen. So you would then be able to know and influence based on the best economic view as to what you want to do with your assets. So you would provide that information to grid. They may ask you to do things up and down and that was done through the systems that exist. Where batteries changed that is as thermal assets started to fall off and more wind, the predictability of generation changed. So the predictability for national grid and the balancing changed. So we didn't know if the wind was going to blow as we wanted it to do. So we needed a lot more analytics and insight and data to drive much more understanding of where the balance would be when there would be too much generation, when there would be too little consumption at different times.

Batteries and storage offer that opportunity to quickly correct those things without taking manual action. Batteries are virtual, they sit and they're controlled remotely. We don't have people sat at stations doing the on and off switch that you do within big massive assets. We will send signals virtually to those and the battery will respond sub-second. So in a world where we've gone from engineers and plant controllers actually upping and downing plants and-

James:

Switching on the hydro station.

Nichola:

Switching on, exactly. We're now in a world where we're going to have a lot more less predictability. So digital and data have a role in trying to anticipate and drive and understand and get better predicting whether patterns, consumption patterns, but in conjunction with that, we're going to have to then be able to very quickly switch the demand and supply as required and that you can't then rely on people to be doing that. It's going to be too latent a process. We very much have to move to human light, digitally driven, algorithmic based systems and solutions.

James:

And that's where we've seen that starting to happen in front of the metre storage already?

Nichola:

I'd say front of the metre is probably in GB Amplified, our need to digitalize our trading systems, particularly in that prompt horizon. So when we talk about prompt, we're talking about everything that happens from the day before the electron or the molecules generated, right up to almost real time. That is the time where traders can best predict what's going to happen. They're getting signals from National Grid and they can understand where price is also going to play a role. Obviously, we want to protect consumers from high price periods where we can and that's what traders will try to do and that's what Grid will try to do as well.

So as much as we can use that data and insight and more using analytical tools, models to replace the need for the human to execute the action or to make the decision, that's critical and batteries have amplified that. It coincided really with, if we think about on a pan-European basis, the exchanges, the day ahead and interday exchanges, they started to go online and to become more accessible. So you didn't have to press a button on a screen, you could actually codify an interface to send an order and then to receive that order.

James:

And more granular.

Nichola:

And more granular, we could do it on a much more repetitive basis. So algorithmic trading started to take off, particularly in Germany where the EPEX exchange is based, but in the UK we were slightly behind that because we were doing less algorithmic assetless trading, we're very much still in that demand and supply generation.

James:

The old world Karim was explaining.

Nichola:

Old one, exactly. So batteries came and really amplified the need that and actually, to be able to quickly get in and out of a position to deliver additional value for trading businesses actually needed to do that in a lot more data-driven, insight algorithmic way.

James:

So Karim, your experience is directly pertinent to this, right? So actually having implemented really what Nichola is talking about, you guys worked together effectively, didn't you, pre you joining? So I think we're very fortunate to have that story really. So I think we should unpack that and just go through what that really felt like. Obviously you can promote Baringa as much as you want when you're doing that, be useful, but I think it'd be cool to just get into that and how did that project come about? How long ago was it? Let's get into that.

Karim:

So yeah, I was a client. I was a client for a long time with Baringa, so people keep asking me how I felt coming here? It's felt as I expected it to because I worked with Baringa for a long time. But to simplify the exam question, going back those six years, six and a half years, however long ago it was, that societal change that I talked about earlier, the market was aware of and-

James:

You were CTO, right? For a portion of that time?

Karim:

I was, a portion of that time. The quick version of the story was in EDF at the time, we were coming up with our answer to the flexibility question and what role we would play in that and how we'd capture value from that. In its simplest form, we had a page that we still refer to now where on one side you've got assets. It can be a generation assets like we've been talking about, or it could be a business like Sainsbury's or Tesco's or another supermarket. It could be a residential user like you or I at home. They are all different types of flexibility. Some of them can provide more energy to the grid at certain times and provide less at certain times, and some of them can use more energy at certain times and use less at others. So they're all forms of flexibility.

On the other side of the page was markets. Some of them, listeners will be more familiar with than others. There are markets such as the wholesale energy market where energy is bought and sold, but there are other forms of markets. Some help the National Grid balance the system. Other markets are local markets, there are different forms of markets that exist. Some of them are very distribution network markets for example. And the exam question was how do you monetize the value of flexibility? How do you use flexibility to make money in markets and share that value that is created with customers and also partly for the organisation? That was the exam question.

And fast-forward six and a half years, the summary would be value appeared in a particular area of that very quickly, a particular generation type which was energy storage surfaced as a very strong opportunity because at the time, it was relatively cheap to build the assets and it was an extremely high amount of value in the markets. Why? Nichola explained intermittency earlier, the wind doesn't always blow when you want it to and the sun doesn't shine when you want it to. So that creates an

exam question for National Grid and batteries are extremely helpful in being able to do that because you can turn them on and off extremely quickly.

It also, batteries also help the grid with some of the other challenges from having a lot of wind and solar on the system. There's a challenge around frequency and voltage, which I don't think we'll go into now, but it's safe to say that batteries are better than probably most other assets at helping grid balance the system from the challenges that having lots of wind and solar create. So what that ended up with in EDF in our exam question at the time was we created a business, we went in a particular direction which was initially looking at batteries of a smaller nature. And then we pivoted to this front of... When you say front of metre, we're talking about large assets, large direct assets that are often directly connected to the grid. And we helped asset owners access the value from markets and I ended up taking the business that we developed and into the core trading operation of the business. And then I took a role as the CTO of that business, which we grew to become market leaders in the GB market.

Nichola:

And the thing that I think EDF did, if you look at where the market was at that time, typically in the UK market you had your aggregators and utilities. They were the providers of generation and consumption, but what was starting to happen was you had technology led, digitally led challengers. So organisations coming in that didn't have the legacy of old systems or old ways, didn't have a heavy manpower based team, what they could do is they could basically use new technology, new data, new models to replace people and to get access to this value. So we had the likes of Limejump, Flexitricity and others really starting to nibble at the core business models of EDF and others.

And I think EDF took a very brave step in their innovation lab to actually go, "We don't want to do this or how we would typically do this. We want to go and be digitally led and build a digital business which will do this either leverage deep subject matter expertise that was in the business paired with the innovation lab led approach," and that's the business that Karim and the team built was around actually a very different way of bringing new services and new ways of working to the legacy trading business. And actually, the business since, and we can talk about it later, has evolved and taking that model and creating a much more digitally led business as a result of that over the last six... I would say from the outside that that's what you guys have done very much. As I said, that's why I think for the UK, I think batteries amplify the need and others are now seeing the benefit of the investments in digital and data to drive value.

James:

What do you think the biggest challenge was when you were doing that? So my experience, so EDF, you guys decided to build. I was in Origami at the time and it's how I met Nichola. So back then, let's just go build this ourselves and try and effectively sell it into the likes of EDFs and others. Although we quickly found out that some people were building their own so it made it harder. But what do you think from doing that within a utility, what was the biggest challenge there? You mentioned picking the right assets to start with and having to pivot and move around. What were the biggest challenges of that journey? Because I think if you are a listener and already maybe you're sitting in a B2B retailer and you're thinking, "We're dealing with this problem right now," what would be your biggest piece of advice?

Karim:

I think to pick one, I would say the biggest challenge is also the biggest asset when doing that in a utility. The biggest challenge is when building a business around this particular type of flexibility, we have to create and demonstrate value to asset owners, extremely interested customers who want to scrutinise where value's been made and how. It is no longer good enough to use systems and processes that were built around a trading environment of the past where you optimised assets largely at the day ahead stage.

James:

Right.

Karim:

You need a dynamic trading force that is interested and very involved in understanding batteries because different in terms of their asset types, and is understanding the different markets that you can put batteries in, in quite a lot of instances, not the same as in all cases that you would be for the rest of the fleet. So the challenge, to answer your question, the challenge would be pivoting whilst continue to run the existing business that you have as a utility where you have to trade all of the other asset types that you have.

Some of them huge like nuclear fleets and residential customer bases and INC customer bases. You have to keep the wheels on the bus for doing that, but then you have to introduce at the same time this new capability is very, very different. That was the biggest challenge. But on the other side, it was also the biggest asset because you mentioned Origami and others that are out there. One of the biggest assets that we had and fundamental business case was we had an existing trading desk, it had access to exchanges, it was all of the processes around collateral management and all the other things you need to do as a trading operation were in place. So what we were essentially doing there was leveraging that asset that already existed. So the asset that we had was also the biggest challenge, if that makes sense.

James:

Yeah. So I suppose you're differentiated there doing this within a utility is that you actually have access to those value pools directly, whereas other technology providers didn't, which is why we saw that you've mentioned Limejump as a really good example. They were accessing some of those National Grid value pools, some of these smaller tech players, but to your point, it's no longer good enough just to rely on access to those specific value pools. It's now about other more complex strategies, isn't it, around those assets?

Nichola:

Yeah, and I think very much at that period, if I look back at that period, there was a lot of competition, competition to innovate commercially, competition to innovate operationally and digitally because it drove a lot of change on the market. It drove a lot of ways in which people looked at their technology stacks and forced people to think a little bit differently. So the kind of concept of product owners and DevOps really came to the fore in that. So that's now part and parcel with the way in which EDF delivers and it's that fail fast, change quickly. It was very much previously you'd have the big waterfall approaches, you do big design, then big delivery, and then only at the end would you see if it all actually was working out the way in which the digital ways of working and taking small pieces and delivering value quickly is definitely a much more sensible approach and we can test things much quicker.

But yeah, Limejump and Flexitricity and others were very much leading the charge in innovation and being able to offer better value and doing it at a core space that was a lot less to the traditional players because of the investment in technology.

Karim:

When you actually reflect on that, a lot of organisations created those innovation labs. And from an EDF perspective, thousands of ideas didn't come out of the lab that created value power shift did. But I think overall, it was actually a very clever decision that was made because you're exactly right, those things were being spoken about initially. But if I think about one of the biggest changes that had to be implemented, it was moving from being an internal service provider as a training organisation where you look at how much demand from your INC and your residential customer base on a daily basis and then you look at how much you're going to generate from your nuclear fleet and you marry one against the other and trade the residual.

You are moving from that which is an internal focus to having customers, which means you need to be obsessed with what customers want and what they might want next quarter, which means you need to demonstrate performance. Do you see what I mean? And that cultural shift is one of the most valuable things that was achieved, but one of the most difficult and I think the innovation lab helped create the flexibility and the kind of freedom to work in a different way where you could create that. And then when it was at a certain size, bring it into the business.

Nichola:

I think the other thing I was going to bring in was around why observations and what I learned from the journey and how Baringa has evolved its thinking in this space as well, which is I characterise that kind of short-term trading window and the need for that kind of platform. It's like a digital jigsaw. There isn't a one single vendor offering like that, there isn't a one single self-built tool that can do everything. You need to have insight quickly, you need to be able to see positions of where the market is going and you need to be able to react.

That historically has happened across a number of different applications and number of different screens. That wasn't possible when you're basically... If you're dealing with eight assets, fine, but distributed energy is talking about hundreds if not thousands of assets. If you think about the number of wind turbines we've got around the UK, each of those can be controlled and need to be controlled, different sites and solar farms will need to be curtailed if there's an on-farm grid connection.

So suddenly, what a shift desk and a physical trading desk is faced with is an enormity of assets and thus an enormity of data. We've suddenly existentially grown what they need to have and make decisions on which... Hence it cannot be human dependent, it has to be digitally driven. And that's very much the journey that I think a lot of EDF and your peers have gone on over the last couple of years is actually to understand how do you assimilate lots of information across lots of assets, be it sitting at a large consumer, a large industrial customer, or be it sitting in the North Sea? It's very much we need to understand how that is going to contribute to the decision we're going to make and what we submit to National Grid, and where we place different value in those value pools that you've been describing, Karim.

And I think that is very much where the journey that I think the UK has been on in that market is catching up on some of where Europe was in terms of that trading, but actually, I think now is maturing and thinking about that next generation of architecture and that digital jigsaw. And that's where I think Baringa has been developing that digital architecture for traders of the next generation

and the short-term platform. We've been across Singapore, Australia, the US, Europe, understanding how different people are responding to it and we've built that capability model and architecture and it's starting to prove itself.

In fact, vendors are starting to think the same way as us and actually wanting to cover greater swathes of that kind of capability because they know that's what clients will need. And clients can then decide whether they want to build certain aspects of it. I'm very much a remember the EDF, which is the secret source was the algorithm, that was the optimization algorithm. That's what you were very determined, you retained all of the IP around and all of the modelling around, but actually controlling an asset. Did you want to go into engineering know? Could that be solved by putting a box that somebody else put on and having a digital twin and using leveraging IoT technology? Absolutely. You said, "Yeah, you guys, that's what you do. That's what you're USP for. We'll partner with you but actually, we're going to USP your asset," as you called it, Karim, is the trading team and all of the knowledge that they've built up after doing this for many years. It's now just applying it in a new way through a new different kind of asset class.

James:

I think one of the other challenges, you guys, now this is what you do, but one of the other challenges is that all the systems environments are different. So everyone needs to address this challenge, but it's not like everyone has the same operational setup, right? So that's I think part of the reason why there isn't an off the shelf solution to this stuff because actually, it needs to be problem solved, it needs to be delivered in light of the wider risk book, et cetera. The trading book. So we talked about front of metre storage, we've talked about how that's really driven the digitalization of flexibility, but I think what's interesting as well is what's next? Is it just going to be more front of metre deployment or if I was a trader, maybe I'm thinking about entering this now or I've already got an existing short-term flexibility capability, what should I be thinking about? What's exciting over the next couple of years to me?

Nichola:

I think there's a couple of things that come to mind, which is if you've been capturing all the data, it's actually how are you leveraging that in another way to give you insights? How are you building that view of competitors and how competitors are responding in the market? How are you getting much more granular? We know in the UK, there's potential that we'll consider a bit more of a zonal model. So it's no longer going to be just a single price that's going to dictate. So it will be having understanding where your locations of your assets are, what you can deploy, how you can do that, that will help make decisions that will place you to deliver value.

So again, data insight, it's not more of it, but it's using it in different ways and clever ways and developing and expanding the models and the algorithms that you've got. I suspect there will be new markets that come about as a result of that. So there will be new digital exchanges that will come about. So the ability to understand behaviours and patterns from that be positioned in an ideal way so that your price discovery and your pricing is done and working well.

And I think the other thing, we're throwing it around internally, but I do think behind the metre is starting to possibly play a role. So we've talked about front of metre, but as Karim introduced, societally we are adopting electric cars. We're very sensitive to high prices, we're turning down, we're very much on the go. Electrification is obviously going to be a core part of our lives. So we are going to be the sources of flexibility and actually we might want some of the access to that value. So I think organisations that are able to trade and have insight into customers. At the moment, our price,

the way prices are governed is the most expensive unit and the most expensive half hour of the day, that sets the system price.

Actually, if the system price was 1,000 and a customer large enough to influence or a collection of customers large enough to influence, they might turn down at 100. But actually as a trader, if you don't have access to customer, access to that insight, how are you going to know that? You're going to be trading in the wrong way, in the wrong market. So actually having insight to customer, customer behaviour and how they're going to respond to price signals, how virtual power plants, so the culmination and aggregation of different customers' assets and different sites I think is the next wave because ultimately, that's also then going to be the next source of value.

And I think James, you'll know it from your work as well, that larger customers, INC want resilience. Their decarbonization is top of the shareholder agenda. They're also driving a need for wanting to understand how they respond.

James:

Yeah, there is. There's definitely a drive from a corporate perspective to try and optimise not just their cost position, but it's actually, we could do a whole podcast on this and we probably should, but on their carbon position. So there's a new concept, relatively new concept being tossed around, carbon-free energy score. So your CFE score, how close can I get to a 100% carbon-free consumption? And flexibility is... Really, you cannot achieve that without a level of flexible generation demand. So how does a trader start to monetize and influence that?

Nichola:

Exactly.

James:

And we did some really interesting work with some suppliers, both some very asset light, some asset heavy, looking at this problem around how can I really improve my value proposition into large corporates, utilising the short-term flexible capability. So we're looking more at the demand curve than we are at the generation curve with storage, but we should cover that another time because it's quite interesting.

Nichola:

But the reason to bring it up is that a trader is probably not going to want to care about an individual customer, but actually, if you've got a carbon-free index and you've committed to 100% carbon-free energy, actually that is going to influence what they do and how they will do their portfolio optimization and balancing. Yes, they're not going to care about the individual customer metre, but they're going to want to know what the aggregate of the position they need to manage is going to be and how that's influenced. The retailer is then going to... So if they turn on a wind farm or they direct a wind farm, the metre for the wind farm is probably going to have to be matched off against the metre of the customer.

James:

So that's the key difference, is it? If I'm a trader, if I've got that short-term position and I'm moving from a single large or maybe a group of single large assets, a front of metre storage assets and we're saying potentially opportunity is now growing to be behind the metre, what does that mean for me? So how does that impact my operations?

Karim:

Well, I think as we touched on earlier in the discussion, I think batteries took a baby step in readying trading floors for this digitalization that unlocks value from INC and residential customers. We talked about the way that you needed to see information and manage it quicker, but it only went part of the way. So if I were to summarise, up until very recently, a large amount of value for these front of metre large batteries was about day ahead market selection. Should I choose this frequency service or that frequency service to bid in, or do I think wholesale prices are going to be really high? The day ahead decision framework.

Don't get me wrong, you have to adapt the next day during delivery, but it was largely the game. That's changing. So those frequency services markets are suppressed in value now because of the amount of participation in the... We've got more batteries on the system. So increasingly, as a trader of this flexibility, it's no longer good enough to rely on generating most of your value for your customers in frequency markets. You need to do more, you need to find value in the wholesale markets, which means you need to be able to identify that value and it will not be good enough to do that based on human manual tasks and processes alone anymore.

And the reason for that is simple. Unless you look at a certain amount of scenarios, you don't spot patterns in the way that demand is forecasted or that wind is forecasted by the system operator, which drives the system price. You need to look at a huge amount of scenarios to spot patterns which requires digitalization and which requires an element of self-learning from a system [inaudible 00:33:53].

James:

Machine learning requirements.

Karim:

Absolutely, that's a necessity. If you are a trader and you're just looking after a battery asset base, that's the baseline going forward. You need to move to more intelligent processes. And I think it's nice because what that does is it sets it up for the next wave of flexibility, which we've just started to talk about. If you want to manage hundreds of thousands of distributed assets that we've been talking about in businesses and in homes, you can't rely on traders forecasting what they think the system price is going to be based on what the control room did. You need thousands of scenarios that then display patterns and enable them to interrogate the outliers to make decisions when you're managing an asset base of that amount.

So I think we're on a transition and just like batteries set trading floors up to become slightly more digital in a way that they operated, they will also ready trading floors to manage this different level of scalability, of flexibility going forward.

Nichola:

We have a market change, so we have a change going through at the moment expected in around like 2025, '26. It's called mandatory [inaudible 00:35:03] settlement. So to not bore our listeners, but ultimately, we're all in a transition to smart metres that enables us to have a lot more information to be sucked in to basically drive some of these decisions. It will be mandatory that all customers have that. What does that actually mean and why is that relevant? Well, it's relevant because ultimately, back to that electrification question and the fact that societally we're changing the way in which we behave, forecasting algorithms are going to have to adapt. There's going to be new ways in which the

likes of utilities and retailers can build propositions off what the trends that they're seeing. So that will then drive new sources of value.

And again, it all comes back to that point, which is it's around we started up... If we think about the clients we've recently been working with around batteries, it all starts with data. How are you going to differentiate your price and be picked up by National Grid for their service? It's all about price and it's all about reliability. Reliability is about the ability to deliver the service quickly and price is about the ability to have the insight.

Karim:

You're right because MHHS, as boring as it sounds, and it reads, for our sins, is actually, you could argue that there is a correlation there from what you're saying between, for example, SME power customers, if I'm EDF. You don't necessarily have that half-hourly level of information on their forecast demand curve. So I look at them in a block quite differently to the way I do a half-hourly monitored large energy user on my screen, a water company or something like that. So from a trading perspective, I'm looking at that water company and I'm going, "Okay, cool." So I can on a half value basis, see how they're using power and as you said, in the prompt market, then make some calls around what I can offer them.

But maybe with MHHS, that's actually going to unlock actually a significant part of the market to maybe aggregate some of that much more visible potentially flexible demand up for traders. So that'd be interesting how that plays out.

Nichola:

Exactly, and I think that's potentially one of the next waves. PPAs is also going to have an impact on that as well. So PPAs typically have been quite structured in nature, have sat outside systems, are quite bespoke. You've drafted a number of heads of terms yourself. Now actually, they're becoming a bit more benign and regular. So actually, we now have to manage all of these in a systematic way and we need to understand the risk associated with it. We need to understand if there's a PPA, so we associate it with a customer, associate it with a battery storage asset because that's also the way in which we'll utilise it. So actually, a lot of the contracting that we've done needs to be digitalized because the way in which we need to manage the risk curve or prompt is going to fundamentally change and that's also going to have an impact on trading desks short or long-term.

And then I think realistically as I said, it's going to be, what is it? If we look ahead to 2030, where we are today is the numbers talk for it themselves. There's 13 gigawatts on the system batteries today. So 3.7 gigawatts of storage today, going to 13 gigawatts in 2030. That's quite a phenomenal growth. That's based on the Baringa projections. You've got growth in other sources, be that resets, be that hydro and demand-side response, which is what we talk about typically as the behind the metre. That's going to grow 176% between now and 2030, and actually, that's only six short years away.

James:

Yeah, so building the capability, you're going to get tested.

Nichola:

Yeah, exactly. Trading desks, thinking six seasons ahead, probably about three years ahead. So we're going to be in that window pretty quickly and the influence of those decisions will then have an influence on the short-term. We're also going to see lots more uptake of electric vehicles on the go charging, the need for charging points to be able to offer dynamic prices because you're going to be

price sensitive as a customer. I know certainly in my current petrol car I drive around, where's my pennies? I'll want that for the same for when I'm going to charge my EV.

So we're going to be sensitive and hence for traders to be able to efficiently and effectively trade, deliver the returns shareholders need, deliver value and lower prices that we as consumers want. The more information and insight you can have from various different sources delivered up in an automated way, distilled down into insights and scenarios that traders, we are going to create these models, they're not going away, traders aren't disappearing. We just need them to put their insight into models so that it can be executed at speed.

James:

Yeah, it sounds like a really interesting opportunity, but also quite a significant challenge for the trading environment to navigate that from a systems perspective, market, value extraction, there's a lot going on there.

Nichola:

Yes, and I think one of the trends we are seeing is really starting to see customer, the retail arm of utilities and the midstream arm had tendency to be at arm's length. I think on the commercial front, we're starting to see a little bit more alignment so that the risk that traders and the midstream business are managing is better understood. The metres, the customer price will still sit in retail systems. Traders will never want to know about that, but they'll want to have a dynamic aggregated view of it served up quickly, accurately, on demand as necessary to drive the necessary decisions, be they manual or systematic. That will be the differentiation.

James:

So Karim, given your background that we've covered off with EDF, super interesting. Thanks for that and your transition recently into Baringa. Really interested I suppose to just hear your reflections on that and what that journey's been like even at a high level, but also what you see as the key market... Look, almost like the most impactful things that you've seen since you've landed in Baringa and what we can do about that?

Karim:

Firstly, it's great to see EDF continuing to go from strength to strength. So that goes without saying, they had a great time there. One of the things that I've enjoyed most in the last six months being in Baringa is the exposure that you get right across the value chain, from charge point operators to asset owners, to investors, to utilities. It's one of the reasons I came and I love it. It's been fantastic. What role does digital play in this is? That's one of the most interesting things that I've seen.

So in the world that we've spoken about largely today, we've been talking about big batteries that are managed by traders and we talked a little bit about the visibility that's required of the position that you have to do do that. We talked about the insight that's needed and the speed and that's been the case for a year or two now. And we went on to talk about the fact that it's no longer good enough. You need to find value and in order to find value, you need to be able to manage huge amounts of data and scenarios to identify value that humans can't on their own. Definitely the case for fundamental batteries.

What's interesting is that across the value chain and the exposure that I have now, what I'm starting to see people realise and clients explore is the fact that yes, you need to create visibility and insight and operate with a speed and a scale for front of metre batteries, but incorporating INC customers

and residential customers, charge points and all of the things that go around that. They're starting to explore the different levels of value that can be achieved from different versions of vertical integration. And going back to that bubble that I described at the very beginning, the bubble page of assets on one side and markets on the other, generating value from assets in markets.

It's going back to that utopian view, the VPP, the virtual power plan that was often talked about, which was by combining all of these different types of assets, I can generate more value in markets. And it's been refreshing and exciting to see the fact that clients recognise and are exploring investing in the fact that their digital experience they create for clients, the insight that they provide, the visibility that they provide and the value that they can gain via digitalization applies to their INC, their residential base, as well as the generation assets that they manage. That's why working here is great.

James:

Love it. Thanks again for your time today guys. We get to give you your fuel, your energy transition, chocolate bar present for doing the podcast.

Nichola:

Thank you.

James:

Thanks very much. But yeah, I thought it'd be cool just to hear from both of you, what really does fuel your energy transition? So what gets you out of bed in the morning? Why are we doing this?

Nichola:

I think for me, I've been in the industry 20 years, largely majority of my career as a consultant, and no day is ever the same. It may be power and gas is the background theme, but every client problem is different. Getting to work with people, understanding how they want to imagine a solution, seeing Baringa grow from the 30 people to the 2,000 today means that we get to go, and Karim and I are off to the US to support our US colleagues fuel their transition and understand how they're going to take flexibility to the US market. So it's seeing how we can take what we do with clients to the next evolution, see those clients succeed in their journey and then see the growth of Baringa kind of grow globally. For me, that's what gets me out of bed.

James:

Love it. Karim?

Karim:

From my perspective, getting to work with clients every day is perfect because sometimes when you're working in an organisation, there'll be certain days that you have to do change based stuff and some days where you have to keep the wheels on the bus. Every day you're working with clients that need to change things and are extremely motivated to change things. So every day is a pleasure because that's what I like to do and it's all contributing to an energy transition that I think we all buy into, which is extremely exciting and interesting. And you get to work with clients that you learn from, they learn from you, and it's just got a great momentum to it. So that's what fuels it for me.

James:

Great. Nichola Plower, Karim Alnakkash, thanks very much for your time and I'm sure we'll do another podcast soon.

Nichola:

Thanks James.

Karim:

Thanks for having us.