

S2 E2 – AI and the energy transition

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.

VO:

In this episode, James talks to Kelly Hume, partner and expert in data analytics and AI, and Silas O'Dea, partner and expert in energy and resources, about the use of AI in the energy transition.

Kelly:

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James:

When we say enterprise, sorry, what do we mean by that?

Kelly:

So how to go from a proof of concept on your laptop, which you've bought some data locally, you've built out a model, and then you've shown how great that could be, how you move from that to something which is operating across 13,000 employees, your whole organisation in real time with all the data interconnected in a platform in production.

James:

Right.

VO:

We hope you enjoy the conversation.

James:

Welcome to the Energy Innovators podcast. I'm here today with Silas O'Dea and Kelly Hume, and we are going to be talking about artificial intelligence in the energy sector. I know nothing about this, so it should be an interesting conversation and hopefully we can unpack what that really means and really get into the value proposition in that within the energy sector, which I think is hugely, hugely exciting.

So Silas, do you want to give us a bit of an intro into what you do in Baringa, your background and how you got to be working in AI in energy?

Silas:

Yeah, sure. So, my role in Baringa is the Digital Lead for our resources transition business. Basically helping major mining clients and energy clients leverage digital and technology to help them transform their businesses. And it's the space I've been working in for the last 20 or so years, helping all sorts of different asset intensive and especially energy clients get access to digital technologies and transform their businesses.

James:

Great. Great. And Kelly, a little intro on yourself?

Kelly:

Yeah, sure. So Kelly Hume, I lead our data analytics and AI practise. I've spent the past 20 years, I guess, delivering data-led transformation programmes across highly regulated industries, including the energy networks industry. So as part of that, we're often looking at how we help clients to adopt new technologies, move to cloud at the moment, and adopt AI is clearly something high on the agenda.

James:

Cool. So, can we just start by just defining exactly what we mean by AI?

Kelly:

Yeah, sure. I guess in the broadest sense, AI is the computer's mimicking human intelligence. So there are many ways, and I guess many advancements over the past 10 years also in which we've done this. So using logic and machine learning for pattern recognition, building neural networks and being able to deploy applications like speak-to-text and image recognition.

James:

And Silas, could you just give us an overview of what you think applying this to the energy market, where's the opportunity and where is this exciting?

Silas:

For us in the energy sector, the real context is around the energy transition. We're looking to deploy a new low carbon energy infrastructure as we phase out fossil fuels and look to invest in green and renewable power. And that presents a massive opportunity for us to leverage AI, to optimise the delivery of that infrastructure. We deliver it faster, more efficiently, and also to optimise the new energy system that we get to. So leveraging data, digital and AI to actually optimise the operations, physical and commercial of the new energy system.

James:

Okay. And is the energy sector leading the way in this or are there other sectors that are further ahead looking at these problems that we've looked at? Is there any parity across that?

Kelly:

Yeah. I think we can see some parity with similar transformations we've seen say in telco networks and in adjacent industries. So we certainly see AI be used, to Silas's point, in large capital

programmes, infrastructure programmes to understand how you can end-to-end plan and deliver in a really optimised way. We've certainly seen that with the move to fibre networks in Telco, for example, several years ago. And that's help using AI to disseminate lots and lots of disparate bits of information, geospatial information, network overlays of competitors, all of the assets that hang off the network and understanding how you can bring all of that data together to really prioritise and optimise the way that you deploy the next generation of networks.

James:

Right. So, it's about assets, it's about data, it's about systems and processes and speeding up things that we currently do, maybe often by even intuition and putting those into... Like you said at the beginning, I'm not going to try and repeat your definition of AI, but yeah. Okay, cool. And do we have examples in Baringa where we've delivered this from an energy context, that we are allowed to or can talk about?

Kelly:

So I think what I would say is if we're talking about AI specifically, I think we have many very specific use cases across the end-to-end journey, everything from where we're helping to optimise the planning of a capital programme and bring all of that data together so you can organise yourself in the right way, understand where you'll get the best return on investment for where you are going first in terms of deployment. So there's definitely capital programme use cases we could look at. If I think about internal corporate functions and optimising our general operations, we've definitely got very specific use cases there where we're say helping line managers by deploying chatbots so you can help them answer questions for their team really quickly, reading across all of your internal policies, benefits, packages, et cetera.

And then I guess if I talk, one of our client examples we can talk to is the Energy Networks Association. So with them, they have a central body in the UK that's set across several of our energy networks operators. And for them we are building an AI solution, so whereby engineers can go out to current network, take photos of various network components, upload them to a portal, and AI can recognise the technical state of those components, what they are and what manufacturer they are, and recommend how they can be retrofitted with low-carbon technologies.

James:

Okay. Got it.

Kelly:

So that's an image recognition use case. So, we have a whole suite of use cases, I guess from the end-to-end across the transition.

James:

Okay, that's super. But what are the risks and limitations for this thing? Because obviously it's not applicable for everything, so where does it fall down? Where does it not work?

Silas:

I would say often it's a very data-hungry beast and often we find our clients want to get ahead and gain advantage with AI, but they might not quite have the foundations, they might not have the data foundation. So, you find out through trial and experimentation that what you really need to do is

establish some really core basic data that allows you to optimise using maybe traditional methods to start with, but then gives you a platform to leverage AI.

I think that's the case for AI. I would say with GenAI nowadays, you could be more flexible in the starting point. And actually GenAI, our clients are finding it's a tool to help them get good data in the first place. It's a tool that actually can take in your messy data and help you make order of it so that traditional AI can work. So it's a really nice use case that our clients are finding for GenAI.

James:

Okay, fine. So actually, by going through the problem statement of where can I deploy this, you highlight the areas of weakness in your broader stack that actually needs to be improved?

Silas:

Exactly. And I think that's where either we start there with some clients. So I've been working with clients who are mobilising new energy infrastructure, one of the largest electrolyzers in Europe for example. And the starting point was we need to build infrastructure that's well-connected, that provides tens, hundreds of thousands of data points in real time. We then need to bring that into a digital twin for example, so that we can monitor and control. And then let's look to AI to really let us optimise the asset and operation. So for a lot of the new energy infrastructure, we're actually proceeding that knowing we're going to take advantage of AI in the future, but building out infrastructure that's connected and data-rich to allow us to do that.

James:

What about workforce and the client's position? So when we're working with clients on this, is there a big journey that they need to go on to really be able to understand this? Because this sounds so new and different. How do we deal with that? Have we tackled that a lot?

Kelly:

Yeah, so I do think it's a journey that clients are certainly grappling with at the moment. Historically over the past few years, we've seen a massive surge in the build of data science teams. So lots of our clients have hired quite hard on data scientists and that's enabled them to build lots of proof of concepts and proof of value so they can understand where they can deploy AI to get great value across their organisation. What they've not looked about is how to do that holistically at an enterprise scale.

James:

When we say enterprise, sorry, what do we mean by that?

Kelly:

So how to go from a proof of concept on your laptop, which you've bought some data locally, you've built out a model, and then you've shown how great that could be, how you move from that to something which is operating across 13,000 employees, your whole organisation in real time with all the data interconnected in a platform in production. And so that movement from the great innovation with a group of data scientists to be able to build something and deploy it and manage it at scale is where I think the gap has become quite clear in a lot of our client organisations.

So, we've been working really closely and I guess when we do go into organisations to help them on this journey, that is a core capability that we are focused on helping them hire the right skills, identify the right skills from software engineers, cloud engineers, DevOps engineers, to build all of this safely and securely and then to manage it in life. So make sure they've got enduring capability for the future.

James:

That's my question. So, is it something you do one-off or is it an enduring thing that you need to maintain and keep the wheel spinning on it? It sounds like it's the latter, right?

Kelly:

Absolutely, yeah. Especially if you want to have the capability to keep building this going forwards too because I think we're just going to see more of this work and a shift to more of those skills in our clients' organisations.

Silas:

I would say the most valuable use cases really come together well when you have people who deeply understand the energy system or the physical infrastructure, and also have in combination, deep data science capabilities, now super hard to get in one person. But we find that you need to develop those skills of people who understand both sides of it to really maximise the commercial or the physical or the infrastructure opportunities. So, it's something that our clients are grappling with, "How do I attract and retain people who will create these really crossover skills between the data science world and the energy industry world?"

James:

It's been an evolution for us as well because come from that deep energy expertise, market fundamentals, et cetera. And I guess really interesting actually just to hear what's that been like and almost like deploying a new AI capability into Baringa, right? Because we are actually deploying that from a client perspective, but we grappling with this as well.

Kelly:

I think to Silas' point, the key to doing all of this successfully is actually being really focused and passionate about the problem rather than the solution. So internally within Baringa, it's thinking about how we can solve some of our problems that we work with every day using some of these technologies. And as we go to our client's organisations, it's exactly the same. It's like focus on the problem, focus about how you apply the technology to the problem and then you get great outcomes rather than what the great outcome might be.

Internally, we are absolutely on the same journey as all of our clients. The technology is changing week by week and it's almost the decision to invest, what you invest in, whether you go for it now, whether you wait another six months and take advantage of the next wave of innovation, the skills that you hire for now, because some of those are quite different than what I've bought here.

James:

That was going to be a question actually I have in general on this topic because you look at what's going on at the moment with Google, with the data science community there and mass layoffs, et cetera, and a lot of that is, mine's low level understanding of that, it's being driven by some of these

efficiencies. So how have we found that engaging, maybe not just to the energy sector, but even more broadly across Baringa's... The other pillars of our offering? How do we deal with that with clients? Because obviously this isn't something that necessarily is always reacted to hugely positively. I think some people are maybe sceptical or worried about this, aren't they?

Silas:

I think a lot of the clients I'm working with are in mega growth mode. We're dealing with clients who are maybe trying to deploy five times the level of infrastructure they previously had to, to cope with the energy transition. So, we're talking about how can I avoid having to hire so many people to manage and optimise our business? That's the sort of conversations we're having. We're dealing with industries in growth mode that really will take advantage of AI to build a much more efficient business and as they operate.

James:

Yeah, brilliant. And I guess the wider societal benefit of that is that everything happens faster, it costs us less in general. Right? That's super. So going back to the energy sector for a second, let's talk about some of the specific use cases and things that we're quite excited about within the energy sector that are going to really benefit from this technology and capability. So, are there any specific areas?

Silas:

Yeah, I think I'd mentioned in the start around the scale of distributed assets that we're seeing on the network at the moment. And I think combined with the fact that everything's speeding up, we're having to, we will be in future and we're starting to now, start to understand where our green energy is coming from at an hourly basis. It's not enough now to say that this generation capacity is giving us green power on a yearly basis. Clients need to know that they actually really are consuming green power and their customers are starting to demand that they really are using green power. So, we're coming to a situation where everything's moving faster. We have a lot more assets that we're trying to orchestrate to provide power to the grid. So we're dealing with tens to hundreds of thousands of solar assets or battery assets or controlling demand response for hundreds of thousands of households at once. And the amount of data involved and the speed with decisions we need to make means we're just dealing with environment that's more complex and it's harder to operate with more simple tools.

So that's where we need to gather all that data. We need to process it fast, and then AI is starting to help us actually make sense of that. So, to optimise 100,000 behind-the-metre assets, there's no way to do that without using AI.

James:

Yeah, that really resonates with me. I was with a client the other day. So, there's a B-to-B energy supply, and we were talking about the impact of market-wide half-hourly settlement, and the data team got very excited about the level of... If they listen to this, they'll be laughing. The level of complexity, the level of data, if you're starting to half-hourly metre your P3, P4 metres, significant volume of data coming in. We were also talking in the same conversation about a behind-the-metre optimization offering. So, thinking about deploying storage, thinking about how we can analyse that data from the MHHS in order to identify these options. And then the conversation got to, "Well, this

is all great, but actually, what we really need is we really need to just be able to see what's behind the metre and what's happening."

But the problem statement they gave to us there in the room was, "But we don't have anywhere near the capability digitally to be able to access that, to get that." So, it's almost like the digital backbone required before we can even start thinking about AI. So, is that a common theme we're seeing in clients that actually, they need to start at grassroots first before we can even consider this?

Kelly:

Yeah, I'd say absolutely. We still see clients that we've not fully adopted cloud, they've still got critical processes running on legacy infrastructure, things that are sat under the desk. Everybody, I'm sure all of our clients have got something that's running on a hard drive under their desk somewhere. So that move to cloud, being really ruthless about that is a key enabler. Then getting all of the foundations right in terms of data architecture, understanding your data, your lineage, where it all sits, and then how you can absolutely leverage it for these use cases, making sure the governance and the quality of that is right.

James:

That can be quite a lot of work, aren't it, for a client to actually...

Kelly:

Yeah, it is lots of work and I guess we try and tackle this in a really agile way, and I think that's the only way of going about it is by being really ruthless about the use cases, you are choosing, the data therefore that feeds those use cases and doing it layer by layer at a time to deliver business value as quickly as possible.

James:

So, there's an optimum pathway.

Kelly:

Absolutely.

James:

Okay. Right. So, you can't just jump there straight away.

Kelly:

I think the challenge from some of our clients is that they think that AI is potentially going to be a bit of a silver bullet and help them shortcut the hard yards and the foundational work they need to do. And unfortunately, it's not one of the key things from an ethics and governance perspective when you think about generative AI for example, is that the data that you are training those models on and any bias or inaccuracies within that data can't be forgotten by the model. So, it will always be there in its memory. And so all of your investment in training and fine-tuning those models needs to be done on data that you're absolutely certain of.

James:

And is there no way back there or do you have to start again?

Kelly:

Yeah. So, you almost have to start again in terms of go back to a foundational bundle and start to fine-tune it and train it again on new data or different data.

James:

So what do you put in place then to make sure that doesn't happen? So if I was a client, I'd be like, "That's the main thing I'm worrying about." If I'm spending money with a consultancy like Baringa to try and figure this out, how do we stop that from happening?

Kelly:

So, I guess data ethics and governance in AI is really key. Realistically, the coding practises that you should have in place should be trying to prevent any sort of bias in the data and the way that you are modelling it. So that's just best practice coding in data science space. But absolutely, you can't get away from having good quality data and having data that is fully understood. You know where it's come from, you know why it is how it is, and making sure that you've got the right controls and governance around that. There's no shortcutting that, unfortunately.

James:

That's fascinating. So it's great when it works, but for it to work, we need to have the foundations in place. There are, from the sounds of it, some very practical deliverable problems that can be solved from this within the energy market from an energy context. But actually, getting there is going to require... It's not like the energy industry is renowned for having the best data architecture and systems in place, right?

Silas:

No, I think as Kelly said, there are lots of examples where there's underinvestment in the technology. It's not like in some industries like banking or telco where digital is core and central to the business model. So I think it's an area that will require investment. And as Kelly described, I think tying the AI value along with the effort to realise the foundations is a great way to do it. You need to see the value that could be attained if you did fix some of the foundations, because otherwise it's hard yards just to do it on its own without the upside that you'll get from realising that business value.

James:

Yeah, super, super interesting. But maybe stepping back then, what is it that got you guys interested in this space, be that before Baringa or within Baringa?

Silas:

So, I'm an engineer by training. In my early days of working as a Production Engineer, I discovered Microsoft SQL Server analysis services, and so brought together the disciplines of engineering and analytics together and it's been quite a theme in my career ever since. And the technology has moved on many times since then, but I guess the core of it it's still the same. I'm looking to solve engineering challenges with analytics as I used to, and now AI and GenAI as we look forward.

Kelly:

So, for me, I guess I started out in science more so than in data specifically. I was looking at climate change as a problem and the evolution of the earth's atmosphere by studying planetary atmospheres that have an atmosphere similar to earth years and years ago. And as part of that research work, I was modelling the evolution of the earth's atmosphere and trying to understand catalysts that have led to the rate of global warming that we've experienced. So a lot of that work was computer modelling and simulations, which then I did three years working for NASA, doing some of that, and I wanted to move away from research and apply the skills that I had in more of a practical domain, I guess, hence moving to consultancy.

James:

So, space exploration to-

Kelly:

Absolutely.

James:

Energy problem-solving.

Kelly:

Into transferable skills is the way I badged it on my CV.

James:

That's great.

Silas:

I'm glad I gave my history first. I don't think I could follow that.

James:

Yeah, that's pretty impressive. We'll definitely not be following you on the time fish. Great. Any parting words? What is it that really is going to be super exciting about this in the next couple of years?

Kelly:

I can go first on... I guess for parting words, AI, GenAI, the rate of innovation is hugely, hugely exciting. Genuinely, I read something every day at the moment that just absolutely excites me. However, I tend to be the boring one in the room when it comes to talking about this sort of stuff. AI is not a magic bullet. It doesn't remove the need for brilliant basics. So the same messages to all of our clients are emphasising the need for foundations, making sure you've got your cloud infrastructure set up right, you've migrated, you understand your lineage, your data quality, et cetera. We can't escape that. Once we've gotten that in place, I think this will set the world on fire.

Silas:

And for me, as I said in the intro, is the energy transition, which is framing the real value of this for me. As a society, we're spending trillions on new infrastructure and moving to a new energy system, and that's throwing up massive challenges, but also massive opportunities. So, I think AI and digital in

general can help in both cases. I think there's a massive value that we'll get from using AI to optimise all that infrastructure delivery and optimise the new energy system we get. But also, there's massive commercial innovation opportunities that are coming in as companies are seeing the way the system is evolving and looking for really innovative niches on how they can deploy digital solutions to actually capture an edge and a new market. And I think I find that really exciting.

James:

Yeah, that is super exciting. Great. I'm sure this isn't the last conversation we're going to have on this, because I've learned loads and this has been really, really cool. So, thanks both for the time.

Silas:

Thank you.

Kelly:

Awesome. Thank you.

James:

Thanks everyone.