Steel Talks

AI's next chapter: from digital tools to industrial transformation

Featuring Nik Puri, ArcelorMittal's Group CIO, and Pinakin Chaubal, responsible for our Group Technology Office and Research and Development

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Narrator: Artificial intelligence is generating unprecedented interest across every industry, but for ArcelorMittal, AI is far from a new story. We've been applying AI and advanced analytics across our operations for more than two decades. In this episode of Steel Talks, applied futurist Tom Cheeswright speaks with Nik Puri, ArcelorMittal's Group CIO, and Pinakin Chaubal, responsible for our Group Technology Office and Research and Development, about how AI is already improving safety, quality, and productivity across our business, why people remain at the centre of our digital strategy, and how AI could help shape the future of steelmaking.

[00:53.3]

Tom Cheesewright: Welcome to the podcast, Nik. Welcome back, Pinakin. If we could start things off just with a quick introduction, tell us a bit about yourselves and your role at ArcelorMittal. Starting with you, Nik.

Nik Puri: My name is Nik Puri. I'm Group CIO of ArcelorMittal.

[01:08.5]

Nik Puri: I'm responsible for all things IT at the group level, including the AI digital journey that I work with Pinakin on.

Tom Cheesewright: Pinakin.

Pinakin Chaubal: So I'm Pinakin Chaubal. I'm a group head with several different organisations reporting to me: the technology office, R&D, capital projects, and capital goods, and global ports.

[01:33.5]

Tom Cheesewright: So I mean, imagine like me, AI is a phrase that consumes an increasing part of your working lives at the moment. It's an absolutely dominant topic. And I think it covers a whole spread of different things.

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Tom Cheesewright: As you know, but the predominant meaning in a business context now, the thing that people think about when they talk about AI, is, you know, large language models being used to help people

write emails or create presentations, a sort of an office assistant. But I'm guessing that in an industrial business like ArcelorMittal, that's probably not where the biggest opportunity lies?

[02:14.1]
Tom Cheesewright: And I'll open that up to either of you. Whoever wants to jump in first.
Nik Puri: Tom, you're right. Generative AI is certainly useful. It can help people find information, summarise complex material, help them draft content, definitely helping them reduce administrative task.

[02:33.8]
Nik Puri: And you're also right in an industrial company, that is only one of the opportunity. The biggest prize is connecting AI on how business actually operates, predicting equipment problems, improving quality, safety, optimising production schedules, using energy and raw material more efficiently, and in general, helping our people make better decisions.

[03:03.9]
Nik Puri: We've worked with AI and advanced analytics, including in the R&D that Pinakin manages, for more than two decades. This is not new to us. What is changing now is that the technology is becoming capable, more accessible to frontline employees, not a small group of people, and we are able to deploy it at scale.

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Nik Puri: So our digital strategy is not about chasing the latest tool, latest technology. It remains, as it has always been, about building solutions that meet our business problems. Pinakin, does that ring true for you?

[03:44.1]
Pinakin Chaubal: Yeah, as Nik said, you know, AI is not a new word for us. It's 20 years of ArcelorMittal, and when ArcelorMittal was formed, we had a small team that was already working on specific applications of AI. I think what's different that I see right now in the last four or five years is that AI applications were, let me say, hidden.

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Pinakin Chaubal: It was in the purview of experts, and now it's commonplace. Anyone can get onto their computers and query AI tools and get some answers. So there's a lot more interaction, let's say, on a day-to-day basis of everyone in the organisation, as opposed to those who are far more involved in the manufacturing and the running of our plants.

[04:34.7]

Tom Cheesewright: I want to come back to that accessibility because I think it'd be really interesting to talk about how accessible the whole range of AI applications are. You know, as you've already said, there is the sort of almost consumer-like you know generative tools that most people are familiar with now.

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Tom Cheesewright: But then perhaps the deeper tools that are going into examining manufacturing plants, keeping an eye on equipment, etc. doing predictive analytics. Just talk to me a bit about, you know, what how different those tools look in terms of what it takes to build them and deploy them, and you know how you measure value from them.

[05:10.1]
Tom Cheesewright: And then I think, you know, a question are some of the deeper tools also becoming more accessible and actually easier to build now?
Nik Puri: Today, it has become a lot easier to do a certain task, but when you go back into manufacturing and you look at developing a model, it requires a deep understanding of the entire process.

[05:34.4]
Nik Puri: It requires a deep understanding of the tools under AI that you will use, and it requires a lot of testing. Today, you can come into the morning. Log into your computers, and it's very easy to define the problem that you want to solve and get answers.

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Nik Puri: All our entire ArcelorMittal community has access to basic AI tools. We are very proud of that because we want every one of our team members to leverage the tool in their day-to-day task.

[06:11.8]
Nik Puri: We also have advanced tools, close to 8,000 licenses available for folks who want to automate their task further. We also have provisions where team members can download tools from some of our strategic partners, download actually algorithms, models from our strategic partners, and apply them in industrial automation.

[06:36.3]
Nik Puri: And we have more sophisticated. Frontier models, as they're called in the industry, for our R&D team, so that they can evaluate new ways or new properties and new ways of making steel. The point is, everybody, every persona in the company can start using it.

[06:56.0]
Nik Puri: Over a period of time, every technology will become a commodity. We are just at the start of the journey of AI, but that day will come. It hasn't come yet.

Tom Cheesewright: From a digital strategy perspective, how much has that had to change in the recent past?

[07:13.1]
Tom Cheesewright: And particularly given those sort of tiers of access and tiers of application, there's a level of complexity there, perhaps that might be quite challenging to manage.
Nik Puri: So our digital strategy actually has three pillars. The first one is on industrial automation. This is our bread and butter.

[07:30.1]
Nik Puri: This is what we do for a living, and it is a lot more complex. As Pinakin said, we need to understand the process and make it better. Both Pinakin and I, the way we talk about this, it's about solving a business problem, not adopting technology.

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Nik Puri: The second pillar we focus on is on support functions. There, the tools are very different. In the first area, we are using sensors to collect data. The type of algorithms, models used there are different, more mathematical.

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Nik Puri: The second one, we are using models which are workflow optimisation, different set of models. And the third pillar of our strategy is around upskilling our team members, which is, I believe, the one that will differentiate us from other companies.

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Pinakin Chaubal: Just to play off that, Tom, I think the biggest gain or the advantage an organisation can have with, and I use the word AI technologies, is if we decide or if we find a way to change how we work.

[08:36.0]
Pinakin Chaubal: We are very good and we will continue to be very good at developing models, as I call them, applications. And those, let me say, work in the background. Those require our very detailed knowledge, not only of our process, but also the mathematical specialists and the AI specialists to develop those tools.

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Pinakin Chaubal: But at the end of the day, how do we change the way of working? Utilising these tools - that's really what's going to drive us. And so, when Nik was talking about the different personas and ensuring that we have access across the whole organisation, that's what we're trying to do. Change the way people think, change the way people will look at doing their jobs.

[09:17.4]
Tom Cheesewright: One of the things that people talk about a lot when it comes to extracting value from AI is actually having, you know, good data to work from, to learn from, to build from. Steelmaking is an industry that generates an enormous amount of data.

[09:32.8]
Tom Cheesewright: You mentioned the, the sort of the range of sensors on the production line there, as on top of the sort of inflows, outflows, the costs, the values of raw materials. I'm guessing that makes AI an incredibly and particularly useful tool for this industry?

[09:53.4]
Pinakin Chaubal: This has been one of the most important reasons why we had decided two decades ago to start looking at using AI techniques, AI technology for improving our manufacturing processes.

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Pinakin Chaubal: The process can occur very fast, and when we have issues, in order to understand what happened, we needed Sensors, we needed databases which stored data with millisecond granularity.

[10:30.0]
Pinakin Chaubal: But now with AI, what we can do is to make sure that all these sensors, all this very granular data is analysed 24/7, as opposed to only when an issue occurs. A real advantage is the combination of this data with our operational expertise, because the algorithm can identify a signal, but it's the experienced people that we have that determine what that signal means.

[10:59.5]
Pinakin Chaubal: It is about people also that I want to emphasise, not just data, but process and people.
Tom Cheesewright: So let's put that into in practical terms. What are some of the real world applications that you have deployed now that might surprise people, might catch people's attention in terms of leveraging that that huge sea of data and AI to make a real difference?

[11:24.9]
Pinakin Chaubal: It's a it's a good question, Tom. And if I think about it, I think maybe the first thing people may be surprised by is how extensively we use AI. Okay, we use AI whether it's for logistics, whether it's for assessing business opportunities, or whether it's for controlling our processes, or whether it's for optimising our scheduling, matching up how our processes must run based on when the customer wants what delivered.

[12:00.5]

Pinakin Chaubal: But in terms of a wow factor, just think about this. We are in our processes producing a coil of steel. This coil of steel is running at something like anywhere from 500 to a thousand meters a minute in some parts of our process.

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Pinakin Chaubal: And at that speed, we have to ensure that every square inch has the same properties in terms of its surface quality, in terms of its mechanical properties, in terms of its look and feel. And that and to and to bring this to our customers, I think that is probably something that people would be would have the wow factor.

[12:50.5]
Tom Cheesewright: Yeah, I mean, you're going to have to run to keep up with a piece of steel moving at 60 kilometres an hour coming out of a process! So, what does that look like? Give me a specific example, if you can.
Pinakin Chaubal: Quality for us is very, very critical. If the quality of our product is not correct, a lot of tons can be produced, which are not prime tons, which don't go to the customer, and will have to be scrapped.

[13:13.1]
Pinakin Chaubal: And that's an enormous impact on us financially, of course. But it also impacts our ability to provide our customers on time. The quality and on quality the product that they need. So we have several tools. We use cameras, we use data from the equipment which is measuring many things.

[13:33.1]
Pinakin Chaubal: We combine all of that with both physical or physics-based, math-based models and AI-based tools to ensure that we are able to judge in real time the quality of what we are making and in real time make adjustments to our process.

[13:50.1]
Pinakin Chaubal: And at the same time, we can also use the AI tools to ensure that if this order or this coil is not able to meet the particular customer's specifications, which is the other customer specification it can be made, and can meet, and then at the same time also determine if subsequent processing can.

[14:11.8]
Pinakin Chaubal: eliminate the defects that have been created. So this allows us to, in real time, to ensure that we are meeting our quality targets. In the area of safety, we have defined two applications. We call one of them is called iRed Zone, and the other one is called iMove Safe.

[14:30.2]

Pinakin Chaubal: Now, in the case of iRed Zone, in our operating departments, operate on the shop floor, we have defined areas. Where a human cannot enter when the machinery is in operation, and there are cameras which are tracking this area in real time, 24/7, and as soon as a person enters that area, it automatically alerts that this person is entering the area, or if that's an area where the person can enter only with appropriate protective equipment, it also is able to check if that appropriate protective equipment is on the person or not.

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Pinakin Chaubal: iMove Safe is another application where we are looking at ensuring that people do not come within a certain vicinity of moving equipment, like tractors, like front-end loaders.

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Pinakin Chaubal: And the way this is done is by having a set of lights that tracks and ensures that certain region is protected, and cameras on the equipment also can track if someone is entering and makes an alert.

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Pinakin Chaubal: We are now going to the next step, where, as appropriate, when a danger alert is there, we can even stop the equipment so that the person is ensure the person is safe.
Tom Cheesewright: I know one of the areas that's been of particular interest to people is predictive maintenance.

[15:55.0]
Tom Cheesewright: You mentioned being able to process all of that data all of the time rather than just when there's an exception to examine. Are you seeing benefits in terms of predictive maintenance?
Pinakin Chaubal: So we have in some of our sites now what we call control towers, and here we have almost gone to a point where 24/7 certain kinds of equipment across the entire site.

[16:20.1]
Pinakin Chaubal: are being monitored in real time with AI-based tools to ensure that they are running in the proper way, to detect if there's an anomaly, and to alert the operator and then the maintenance organisation that we have certain equipment which is, which we are predicting may fail within a certain amount of time. Therefore it allows us to ensure that we plan our maintenance outages and ensure also that we don't, that it doesn't lead to a unplanned failure, because unplanned failures both are a cost.

[16:55.9]
Pinakin Chaubal: It can also be dangerous to our team members and it also can lead to catastrophic failure of equipment. Then for scheduling, to ensure that, you know, when we are making steel, we are making all different grades, and we want to make sure that as we transition from one grade to the other, we have minimal amount of downgraded material produced.

[17:19.2]
Pinakin Chaubal: So when we talk about manufacturing, predictive manufacturing, we include all these aspects, and really that's the exciting part for us right now. So these are some of the applications that we have where we have installed AI-based tools, and we're continuing to grow them in their maturity, and then also rolling them out across the rest of the company.

[17:42.3]
Tom Cheesewright: Nik, like there's clearly a number of places it sounds like AI is deployed in just about every aspect of the steelmaking process. Are there applications that you can see coming in in the near future that, you know, in a few years' time we might do this conversation again and are now standard?

[18:00.8]
Nik Puri: I do think so. The first chapter of AI use cases is written, but not the last one. So there is more to come. Every day, there is a new model with new capabilities being deployed.

[18:17.4]
Nik Puri: So I do believe that the frontiers where AI is deployed are expanding. On the IT side, we are now well advanced in the industry on using AI on cybersecurity side, and it cuts both ways.

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Nik Puri: The bad guys can use AI, so can and the companies that are leveraging AI to increase their defences. So the way I would answer your question, Tom, is the areas where AI is deployed in, is being very broadened, and in almost every aspect of our business we can find application.

[18:56.7]
Nik Puri: A few years from now, when you look back, that difference and ambiguity will be gone.
Tom Cheesewright: Pinakin, any specific areas that you can see coming on the on the edge of possibility now?
Pinakin Chaubal: One of the areas that I think will become very important in the steel industry is when we start to bring in new technology.

[19:16.2]
Pinakin Chaubal: Okay, so ArcelorMittal, we are a technology company. Our bread and butter is to continue to improve the products and the solutions that we bring to our customers. And in order to do that, we will continue to invest in new technology, technology that we have developed and technology maybe others have developed, which we have to adapt.

[19:40.8]

Pinakin Chaubal: I see that the use of AI-based technologies to help us. be to help us make the right choices, to help us make sure that we ramp up anytime we install a new technology, and even I would say maybe going a little bit early into the phase of development of technology to guide us in ensuring that when we develop a technology from pilot scale to lab scale to industrial scale, there is a far more intelligent way of assessing what are the risks are, and what risks should we should we try to eliminate in the next phase of the development.

[20:21.7]
Nik Puri: And Tom, if I can just broaden this conversation, in the technology world, it's never one technology that defines the future. It's a compounding effect of many technologies. So AI. With physical AI robotics, with quantum, that's where the revolution, revolutionary progress will be made.

[20:46.3]
Nik Puri: So the future will be very, very different when these technologies start converging, because the ability of any enterprise to deliver value increases exponentially.

[21:02.8]
Tom Cheesewright: You mentioned their Pinakin partnerships, and I think, you know, Nik, I wanted to come to you to talk a bit about that, you know, working with other companies and their technology. You've recently announced partnerships with Microsoft and with AWS. Why are partnerships like that important, and what do they enable you to do that perhaps would be difficult to do as ArcelorMittal alone?

[21:27.6]
Nik Puri: Both the partnership help us accelerate our digital journey. We've been on this journey for a while. We want to accelerate it now, but they address complementary part of the journey. Our expanded collaboration with Microsoft strengthens our backbone.

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Nik Puri: This is the IT backbone. It supports modernisation of our core system, more trusted data foundation; accelerating our analytics and deployment of AI across our various business processes. On the AWS side, it extends cloud AI and edge technologies closer to steelmaking.

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Nik Puri: That is something that we are very progressive about. This includes industrial IoT, real-time sensor data management, machine learning, predictive maintenance, everything that Pinakin has talked about. While we bring steelmaking.

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Nik Puri: knowledge, industrial knowledge. Third parties bring the compute and the models that allow us to leverage our knowledge, our data, and make it into a business outcome.

Tom Cheesewright: I want to sort of connect two questions.

[22:42.1]
Tom Cheesewright: You said when sort of you're looking at what applications might be there in the future, that actually a lot of this is about scale. It's about you know scaling the deployment across the organisation. But at the same time, I guess there are places where there's the greatest value to be had, and there are places where perhaps it's more marginal.

[23:02.0]
Tom Cheesewright: So how do you balance that desire to, you know, scale these technologies across the organisation with perhaps the need to focus in those areas where you've got the greatest opportunity or the greatest strategic priority?
Pinakin Chaubal: ArcelorMittal is an organisation that has grown acquisition, right?

[23:22.6]
Pinakin Chaubal: And therefore, we have a very wide range of capabilities within our manufacturing sites. Now, step by step, we are starting to bring them to, let me say, the equivalent levels. And why do I mention this?

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Pinakin Chaubal: Because that impacts actually the scalability. Because the capability, when I say capability, I don't only mean the capability among the people, but the capability among many of the things that Nik was talking about in terms of databases, data access, all of those are necessary to ensure that we can scale.

[24:01.7]
Pinakin Chaubal: Today, what we are doing is to ensure that we look at What are the business cases which really are going to give us the greatest value across our manufacturing sites? We start to run pilots in a given site, ensuring, of course, that the other sites who can take advantage of those pilots are getting ready to roll out those pilots when the pilots have been proven.

[24:29.0]
Pinakin Chaubal: For me, the most important part is what I call the base architecture. You know, if all of that is scaled across the company, and if all of that is uniform, then building the business-driven AI applications, I think, will be much faster for us in terms of scaling out.

[24:52.4]
Nik Puri: So, building on Pinakin's point, the key word here is architecture. We design for the business case where it's justified. However, the next deployment, the unit cost goes down.

[25:08.4]
Nik Puri: Yes, customisation are required, but the architecture allows the next deployment to be cheaper. So our focus starts with, to answer your question, on working to address the immediate need where it makes business sense.

[25:25.0]
Nik Puri: After some deployment, the unit cost is so low that others can then opt in. Because there is value to be created, yes, it may not be their highest priority, but they can opt in when they are ready. So it's not a limitation of technology; it's a limitation of our manpower to adopt something new and a need.

[25:49.5]
Nik Puri: If there's a need, they have the opportunity to lean into group solutions that are now available.
Tom Cheesewright: It's a good segue because you mentioned very early in the conversation, people are very important to you in this, and it's about you giving people the skills, the capability.

[26:07.4]
Tom Cheesewright: Nonetheless, I encounter people all the time who are who see the deployment of AI in a very binary fashion. It's either, you know, is this going to replace me? And some people are much more optimistic about this being an augmentation rather than automation of their job.

[26:26.6]
Tom Cheesewright: How do you think about that issue, and more importantly, how do you communicate around the issue of the deployment of AI to people in the organisation?
Nik Puri: Tom, I've been in industry for more than 30 years now. These claims are made every time there is a new technology.

[26:42.6]
Nik Puri: Each generation of technology has helped us automate more. Technology has been doing it since 1970s, during the time of mainframe, and ever since then. It has also, however, created new opportunities, new jobs, new ways of working.

[27:01.3]
Nik Puri: So I do not think that the most useful framing is people versus machines. I view it as how do we learn new ways of doing things. We have all learned how to use the internet, mobile devices.

[27:17.8]
Nik Puri: Nobody will even debate those are optional today. We will all have to learn new ways of using AI in our daily job. This is why I believe the dialogue here is: how do we upskill our team? How do we upskill ourselves?

[27:34.7]
Nik Puri: How do we learn new ways of doing things? And that's why we have between Pinakin and my team and HR team something called Digital Academy, where we allow team members to learn this and apply that in their daily job.
Pinakin Chaubal: Building on what Nik said, right?

[27:51.4]
Pinakin Chaubal: I think, I mean, like he, I have also been for a while in the industry, and I've seen automation and let me say different levels of using mathematical algorithms to make ourselves work better, right?

[28:07.2]
Pinakin Chaubal: But I think what I've seen, and which is which is very important, is that the what I call the man-machine link has become stronger and stronger. And as technology grows, as we adopt new technologies, whether it is AI or it is, you know, there are different technologies in terms of automation, in terms of the equipment that we have.

[28:32.8]
Pinakin Chaubal: It has just made us look at our workforce requirements in different ways, and certainly some roles are not required in this production of production sequence, but there are other roles that are being required.

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Pinakin Chaubal: And today, I can see that we are looking more and more at you know, the infrastructure architects, we're looking more and more at people with knowledge of AI technologies, we're looking at more and more people who have deep scientific understanding of processes.

[29:09.6]
Pinakin Chaubal: So the job requirements are changing. So I don't look at it really as some as replacing people, but augmenting the roles and the requirements of the workforce.
Tom Cheesewright: Two questions, I think, to really wrap things up.

[29:26.7]
Tom Cheesewright: The first one is: I'm interested in what the biggest barriers, but also the biggest opportunities, are over the next five years. What barriers are there to really fulfilling the potential of AI in the steel industry? And what does that look like if you can?

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Tom Cheesewright: And then I'll wrap things up by looking sort of a bit. A bit more in the in the big picture, but let's start with that one. You know, if you know, what are the biggest barriers to really maximising the potential of AI in in the steel industry?

[30:00.7]
Pinakin Chaubal: Maybe just a couple of words. It's change management, and change management includes people, and that to me has, I would say, has been the I don't want to say the biggest barrier, but let me say the biggest challenge to overcome.

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Nik Puri: The barriers are less about whether the algorithm exists, whether the technology can do something or not, because every day new frontiers are being crossed here. It's more about people, the mindset.

[30:35.0]
Nik Puri: We need to ensure that our leaders, whether they are on shop floor or in offices, understand. The potential of the technology. The one difference this time that it's not about automating, it's about reimagining, and that difference is very meaningful, and will set us separate the companies from are you an adopter, or are you a leader in using the technology to differentiate in the market.

[31:05.8]
Tom Cheesewright: If steel was the defining material of the industrial revolution. Do you see AI as one of the defining technologies of the next industrial era, or even this industrial era? And what role do you want ArcelorMittal to play in that story?

[31:24.4]
Pinakin Chaubal: Tom, I look at AI as a progression. I started my career with a with a small application using neural nets. That was 40 years ago. That was AI, but That is simple compared to where we are, where we are today, right?

[31:42.0]
Pinakin Chaubal: So, I don't necessarily say that AI is a defining technology, but AI in its growth, right, and what it what it brings to us is a defining technology.

[32:01.7]
Nik Puri: I don't want to make a claim that AI will transform steelmaking overnight. The more credible ambition, Tom, is to apply it in a systematic manner, where we are improving all aspects of our business: safety, quality, reliability, productivity, energy efficiency, and operating at scale, embedded in the fabric of our business process.

[32:30.4]
Nik Puri: Just like steel is the fabric of life, AI will become fabric in our processes. If we do that well, we can help shape the next era of steelmaking, rather than respond to it.

[32:47.5]
Nik Puri: So our ambition is to leverage it to define that era and not be defined by it.
Tom Cheesewright: Thanks, gentlemen. A fascinating conversation. Thank you both for your time.