BreweryPro Podcast

TRADESHOW: Brewhouse Automation

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TRANSCRIPT

SPEAKERS

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Matt: Welcome to this BreweryPro Tradeshow podcast. Trade Show is a sponsored podcast where we showcase products and services available to the brewing industry. In this edition we meet Neal Cameron from Brewtique, and also Warren Bradford from Fermecraft, and we look at brewhouse automation.

Over the last two decades, the companies supplying the small brewing industry have grown and matured as much as the brewing industry itself. And the specialised brewing equipment available to

brewers has become much more sophisticated. The level of automation available is a great example of this. And Neal and Warren talk me through what is available in terms of brewhouse automation, how it benefits brewers, and also where automation is headed. Enjoy the podcast.

Neal Cameron and Warren Bradford, welcome to this Tradeshow, BreweryPro Tradeshow. Thank you for joining us.

Warren: Thanks for having us.

Neal: Thanks, Matt, good to be here.

Matt: I think this is probably the first time that you've been on a Radio Brews News podcast, which is, I have to be very – it is almost remiss, because I'm trying to think of how long I've known you. How long have you been brewing? Because I remember when I was editing another magazine 17 years ago, you were a contributor to it back then.

Neal: Yeah, I think I actually predated you on that certain publication for sure.

Matt: I came on in the second addition. So you can't have predated me by much.

Neal: Oh, in that case, it was the same time. We started our careers at the same time, so it would be that far. And I was brewing at that point for sure. So it's been a long, long time. And I have to say, looking at the camera, you've weathered it better than I have, Matt.

Matt: It's that stress free life, but you have not making money.

Neal: For sure. You must be very wealthy then.

Matt: Anyway, gentlemen, we are here to talk about Brewtique and Fermecraft, but really, it's not talking about product. It's talking about problems in the brewhouse, and how they can be solved. And ultimately, we're talking about automation. So, Neal, one of the things – maybe we can start by just giving us a very quick overview of what Brewtique is, Neal, and then we'll hear from Warren about what Fermecraft is.

Neal: Yeah, for sure. I mean, we've been putting in breweries, building, designing them is our primary business. And we've done 50-odd in the last five years, we've kind of given up counting. And these are right across; we've done some in Gladstone, down to Hobart, and Margaret River up to Port Macquarie. So it's been a hell of a journey for sure.

And really, what we've tried to do, particularly, and this is why the

automation gig is important, is trying to differentiate ourselves. Why would you go to an Australian company, when you can go direct to China and buy something that's undoubtedly going to be cheaper? It's about adding technology, it's about allowing people to make better beer. And it's also about ensuring that designs are optimised for actually making great beer. And that's kind of where we come in. Because life is way, way, way too short to drink bad beer. And you don't want – and it's hard enough to make, and you don't want your brewery stuffing it up, as well as maybe some gaps in your knowledge. So it's been a really interesting ride for us for sure.

Matt: And how about you, Warren? Tell me about Fermecraft.

Warren: Fermecraft is really I suppose the end product of years of watching the way that brewers and winemakers in my local area and then extended into Australia were manufacturing their product. And my background is not – I don't really know the first thing about brewing. But I'm quite experienced with automation, and I've been doing it since 1997.

So I was lucky enough to live in an area that had a lot of craft beer and a lot of craft, very good, not craft wine, big wineries, and we started to deliver our automation knowledge to them. And then we started to understand there was a major need for the Australian craft brewing industry for proper automation. And that really is where Fermecraft has come from. It's come from the automation control, the ferment control for craft beer.

Matt: Now, who wants to take this question, because it's a bit of a hairy one. What does automation in the brewhouse actually involve? Because one of the things that we hear most in media releases about craft brewing, is that it's all handmade and hand crafting. And that sort of sounds like the opposite of automation. So I wanted to really start the chat by working out what we mean by automation.

Neal: Yeah, and I was thinking is it a hairy question, but the way you phrased it, yeah, you've made it super hairy. Thank you for that. I think one of the drivers for me is, I don't necessarily see the value of a well-trained experienced brewer, and now, thankfully, well paid brewers. I don't see the point in them opening and closing valves, I don't see the point of them speeding up and slowing down pumps. And I don't see the point of them capturing a lot of data on spreadsheets, because I don't see how that makes better beer using a well-trained person.

So the whole philosophy here is to take that away. And brewers running around using all that energy, just moving levers and starting stuffing pumps doesn't make any sense to me. What a brewer should do is understand when things are going awry, understand the key control points, pH, wort, gravities, and then let the computer do the rest. And that's everything Warren and I have worked

together, is to just take away that mundanity, that stuff that you're not adding value to, and doing the stuff that you do add value. Which is sensory evaluation, which is recipe generation, which is realising when things are going wrong, and knowing, most importantly, how to put them right. So all that energy goes into making better beer, not to moving shit around, which doesn't make better beer.

Matt: It's interesting, Warren, Neal makes it sound like being a pilot. The pilot is really only there for when something goes wrong.

Neal: I don't know that's actually what I said, for sure.

Matt: Well, no, no, but you're not there to sort of turn the – the autopilot handles things when everything's going well, and keeps it going. But there's a huge amount of skill in knowing when to put your hands on the wheel, and when to drive.

Warren: I think to lead on from what Neal is saying, automation enables a brewer to focus on what they're best at, which is making good beer. The automation takes those elements of that, that are mundane and repeatable and logical, and puts them in a sequence. Which enables the brewer to do that operation the same way every time, and then allows them to concentrate on the elements that are, I suppose, the human touch. That's what automation does. It does not take the craft out of the craft beer. It in fact enables the brewer to focus what is most about craft beer, and make sure that the next time they do it, they do it in the same way. So automation is a way to lock down the process, in order for them to concentrate on what's best.

Matt: And the reason I, again, I wasn't trying to make it too curly for you, Neal, when I talked about craft beer. But there was always that underlying premise of what craft brewing is, is you've got some guy with a mash paddle, standing over and stirring it, using his thumb to determine the temperature and things like that. Which, fortunately, seems to have been jettisoned in a lot of minds. But it's still something that I think holds on when brewing as the industry has matured. It's been about making better beer more consistently, which seems to be where we're coming from with this conversation.

Warren: I think you've nailed that there, Matt, that is probably the best one. I'm going to write that down. It's making the exact – exactly what you said. It basically just improves the consistency, the same quality every time, rather than quite a scattergun approach.

Neal: And I think as well, let's get back to the origins of why we've sort of seen this explosion of craft breweries. There's an explosion of craft breweries, because perhaps the commercial offerings that were available there weren't as tasty and varied as people wanted. So that's why the craft brewery has gone, has come up. And that's why you've got all these ingredients, suppliers putting some amazing

stuff, new varieties of hops, that's what's driven that. It just so happens that the time, doing the whole brewing manually came from maybe the home brewing side, where people were getting their little mash tons and all that stuff.

So I think the manual nature of craft brewing is synonymous with the output. And really, I think it's time to move away from that. Because the cost of automation and the ability to control these processes relatively simply and relatively cost effectively is now paramount. So we've just got to get away. And that's part of the philosophy. We talk to brewers every single week and they want to do that manual stuff, because let's face it, we don't move enough in our lives a lot of the time. So that manual aspect to brewing, plus the creativity, plus the fact that you have alcohol on tap at the end of a hard working day is amazing.

But I think particularly now with brewers now getting paid $80, $90, $100, $120,000 a year, when you're paying them $35,000 a year, sure, you can afford them to do that. But nowadays you can't. And again, the skills of our brewers are developing massively. So these are just not bodies on the floor. These are highly trained smart guys and girls, of course, in most cases. So yeah, I think it's changed.

Matt: That's very much where I was wanting to land. Because I think over the last 20 years that we've seen the modern craft brewing, 23 years we've seen the modern craft brewing industry, the early days, it was craft brewers growing out of home brewing often in their sheds, using repurposed milk equipment, because that was the only option they had. And in some ways, it was glorifying what they were doing, as opposed to doing things the best way that they could. And as we've seen the industry mature, you've noted, brewers are increasingly skilled, they're expensive. Do we want that investment to go into turning valves, as opposed to other things that can easily be automated?

Neal: Yeah, for sure. And also we find – a perfect example of this, a little tale – we put a Fermecraft system up at King Tide Brewing in Coffs Harbour. And I was looking at the screen. So you have remote access as well. So I went into remote to have a look at something on Josh's system. And I noticed that his hot liquor was going in super hot.

Anyway, I rang him about four times to say, "Mate, you've got a problem, you're putting super hot water into your lauter." And he'd been distracted. And eventually he answered the phone, going "What?" And I said, "Look, this is the problem you've got." And he was doing the brewing that day. But some customers had come in, they wanted some growler fills, I wanted to chat to him about beer as they do. And he didn't have his automation parameters on. He was doing it manually. And the system would have taken control of it, and looked after it while he was busy doing something else, and

avoided that issue.

So there's a thing for a busy business owner, as most brewers are now, letting the system take control. And if he gets distracted, it can also keep running it for him.

Matt: One of the things, and it strikes me again, coming back to your point, Neal, about wages is, is it possible to quantify how much time in the brewhouse automation can save the human brewer in the process?

Neal: We've put in, I'm not sure, Warren, 10, 12 Fermecraft breweries with Brewtique?

Warren: Yeah, it would be at least that.

Neal: Yeah. We believe it's about 50%. So if you took a manual brewhouse and you were running it, if you put a Fermecraft automation system in, probably half of your time on the brewhouse, at least half of your time has been removed. So that's half a person. That means you don't necessarily have to have maybe an assistant brewer. And it means you can genuinely leave the brewhouse for an hour at a time, hour and a half in cases of the runoff, and you can go and clean the tank, you can go and wash some kegs, fill some kegs, talk to customers, or just do your admin.

And what you can also do, if you're on your computer, you can have your screen open, and you can just keep on checking it. Rather than having to walk up to the brewhouse and have a look in the tanks or on your panel, you can actually just do it remotely. So easily 50% of the brewer's time. And that's if someone's brewing full time, that means the system will pay for itself in a year, probably, something like that.

Warren: I think, Matt, we've seen, there's a particular brewery in Melbourne that we did with Neal recently, where it was a really unique opportunity to see the advantage of automation on that. And in the same site with a new brew kit, but with the advantages of automation on there, they were actually able to get two turns out of that brewery, rather than one. And I think they're working towards three now.

So they've started to build sequences around the early processes of their brewing for the first turn. They're able to run those off time starts, off remote access and starting those systems early in the morning before they arrive at the brewery. In the same way, the automation allows them to finish off the tail ends of the brewery or prepare for the next one tomorrow after they've left the brewery. So particularly, these are big claims, but really we felt that in that case, we're really doubling the output of that brewery from the same brew kit.

Matt: That was where I was going back to some of the basic ideas around what craft brewing that we're still rooted in, that equipment is much more for purpose for the modern brewery these days. We've had the chance with that 20, 30 years of design, that we're not using repurposed dairy equipment or anything like that. Modern brewhouses are built for purpose for the modern brewery.

Warren: Yeah, I think it's absolutely, yeah, it's very accurate. Because with the level of automation we're now to offer these brew kits out to the grain delivery, to the trade waste, to the seller, to the brew kit itself, because they are specific built for purpose, the automation just gets better with them. So we're in fact, it's almost a bit of a perfect storm or great timing for us. Because if we had tried to bring the level of automation that we bring now to a brew kit 10 years ago, it simply couldn't handle it. The fact that we have got great access with Neal into the manufacturing space, means the brew kit comes out ready for the connection of the automation. So it really does amplify the advantage of automation. So yeah, absolutely. We've really seen an increase in the technology, the material and the hardware, which then connected to the automation produces a much better outcome.

Matt: One of the things that we're seeing with breweries that are starting up, or even expanding, is that there's a real cost sensitivity. These are small breweries. Do you have an idea of what the added cost of full automation would be for a standard brewery install these days?

Neal: Yeah, it's a good question. It's why they become much more sensible for larger breweries. And anything over 20 hec that we're doing nowadays, it's obvious that you would put a Fermecraft system in. They're roundabout, if you go for a fully manual brewhouse, and then you add a semi-auto system, which is another one, which is basically a simple touchscreen with actuated valves, which just means the brewer doesn't have to run up down steps, but he still needs to do all the pumps and open all the valves himself. That adds normally about $30,000 to the brewhouse. And then if you go to full automation, it's probably another $30,000 on top of that.

So most brew pubs now, 10 hec, three vessel systems, plus tanks, you're talking about $250,000. You're talking about adding about 20, 25% to the cost of your brewery, which is not insignificant. But as we talked about, there is a direct return on investment for that, which you can measure in a year or 18 months. Plus all the extra capability that you can then slot in. And we just concentrate generally on the brewhouse, and the tank farm. But you can easily put your chillers on, you can put your wastewater system, as Warren said, there's all sorts of other stuff you can hook into it. But that's just every time you do that, that's extra dollars.

Matt: But again, one of the issues I see most commonly with breweries is, they're focused on the startup costs of the install, but are often blind to the ongoing running costs, that are actually the most significant costs that their business will face.

Neal: Absolutely.

Matt: So I would have thought, particularly when you're looking at the wages you're talking about, if you're seeing a significant percentage of saving on the human side, which is a significant cost in a brewhouse, that upfront investment would actually be a long-term efficiency.

Neal: It is. And normally people would finance that over a period of time. So it gets easy. Also, I mean, I'll add to that. I mean there's a lot of technology coming up with heat pumps, changing the subject slightly, but this is another project that we're doing with Fermecraft, looking at, and they've done that with Three Ravens Brewery, in looking in that balancing of energy. All breweries use a lot of cooling. And all breweries use a lot of heating. At the moment, never the twain shall meet, which is slightly insane.

Whereas heat pumps are able to take that heat from one part of the brewing process, and then heat water or whatever you want, to feed into the next. And that's the kind of smarts that Fermecraft, again, has enabled Three Ravens, particularly, to do this project, because it's complicated, and it needs some processing power. And that's another one where energy costs, for Christ's sake, at the moment, energy costs are just absolutely punitive. So there's another cost you can put into your capital investment. But your ongoing running costs can be massively reduced.

Warren: Where it gets really powerful is, I like to throw a term around; accelerating return. And what happens is, once that initial cost goes in, automation systems enable those businesses to be able to add more and more to them. And particularly what Neal's talking about with Three Ravens, there's no way you could do what we're doing there at Three Ravens without an automation system like we've got. The complexity of the way the system works together to understand where heat requirements are, and cold water requirements are, is substantial. And a high level automation system is required to get that done. Anything else would basically be unworkable.

Now, that system was already part of the initial growth plan for Three Ravens. And when they came speaking about adding extra technology in order to make the system much more efficient, they were very pleased to really understand that what they had would do it. Fermecraft had the ability to run those extra controls, what they wanted.

So yes, the initial cost is much higher. But we think that most

breweries can tend to be victims of their own success. And by the time that they can afford a good automation system, they're well overdue for the installation of it. So it's something that I think Neal does very well. He's able to demonstrate to new breweries, startups or growing breweries, that this investment is really critical.

Neal: We're doing a brewery up in here in the Southern Highlands, New South Wales, called the [Guild 00:21:13] in Robertson, and trying to make it a highly sustainable install. And what we're able to do is we were going to put a steam system in, because we're putting a distillery and we're putting a brewery in. But we've managed, using heat pump technology, and two stage heat pump technology, to actually make really hot water, so to 95 degrees.

So we've been able to take the cost, we're able to use that hot water to do a lot of our heating requirements. Therefore, we've managed to take the steam boiler out of the equation. Now, as anybody that's tried to put a steam boiler in, that's $100, $120,000 to get one of those in, including all the pipe work. So if you cannot put a steam boiler in, and you can still get highly efficient energy usage, then you can invest that money that will save you energy. We reckon it will probably take 70, 80% of our energy costs out of that brewery, using heat pump technology. And it will almost pay for itself, plus there's government grants, all that stuff. And over the course of the next five, 10 years, we'll have energy bills that will be a fraction of what they would be.

So I think that enabling technology, accelerating technology is a great term, because all of a sudden, all this technology out there and this drive to be sustainable, drive to be energy efficient, takes a lot of smarts. And it's kind of sitting there in the Siemens PLC just waiting to gobble up this kind of capability.

Matt: We've seen such a huge focus on innovation in brewing equipment, where is automation going?

Warren: Look, it's a very exciting part of the industry to be in. And again, that accelerating returns we're seeing with the technology in automation. One of the great things about our system, Fermecraft, is that by using very much the latest technology in field devices, so let's talk sensors and cabling outside around the brewery, we've actually made the system inherently easy to install. So a number of years ago, we were introduced to a technology called IO-Link. Well, IO-Link has basically put very smart brains in the head of every sensor that we use. It's able to tell us its name and its serial number, and able to do multiple things. And that has just created an automation package that is inherently adaptable.

Without going too much in the technical side of it, in the old days, we had what I called centralised control, Matt. So you would find an automation system in a big box bolted to a wall. All of the sensors

and motors would be wired back to that big box. And if you wanted to add more sensors or more motors, they too had to be bolted back to that big box.

What you find now is the world has adapted to a decentralised type of automation. It was first, I first saw it in probably early 2000s for a company called SEW-EURODRIVE that were very good at decentralised technology, which meant that the likes of BMW and Mercedes Benz could run entire factories without having big control boxes. They were basically smarts embedded in the devices dotted around the factory.

Now fast forward to 2023, it's exactly what Fermecraft runs, is a decentralised system. So what we see reducing the requirement for engineers to be at the head end of automation systems. So Neal knows very well, and so do brewers using Fermecraft, that new sensors can be added to that system and commissioned, completely either remotely or automatically from the system itself.

Now, going back 10 years, that was never possible. Systems had to be set up by engineers, and lots of code was written to run them. Well, that's not the case now. Fermecraft uses very modular technology, which enables all this stuff to be connected quickly. We've commissioned breweries internationally in a matter of days, that would have taken us weeks, as close as four or five years ago.

So that's where automation is going. It's going to the point where – it's almost like with computers, we probably will remember the day when we were playing with function keys and remembering what they did to navigate around DOS applications, right. So an automation was a function of that as well, automation that we see now puts power in the brewer's hands they're not scared of, and they can operate it. And it's just getting better and better and better. So I think the future for automation for us will be almost no engineers, self-commissioned Fermecraft systems by brewers, so much so they feel part of the automation system, rather than just a user of it.

Matt: I hate to think how you've just shown your age, there, Warren. There are a lot of our listeners that would have never needed function keys. But I'm sure they'll get your point.

Warren: They can Google it.

Neal: No, they'll use chat GPT to do an essay on it for them, that's what they'll do now.

Warren: That's it, yeah.

Matt: Exactly. But being technology, is it upgradeable and scalable?

Warren: Yes. It's inherently upgradeable, and scalable. And that's part of this decentralised technology. So there's certain things like the way automation talks on a language that we don't see that being changed for a very long time. And all of the new devices are really falling in lock step with that same language. So let's just say there's an industrial language that we use as part of Fermecraft, or part of a big automation system. And pretty much all of the new sensors and drives and motors that we purchased to add on to that talk on that same language.

So really, rather than having to change out the entire system, you've just absorbed another – if you call it a community of sensors and smart things, you've just added another member to the community. And aside from an initial handshake, they're all talking the same language, and off they go. So yeah, I don't see anyone in our, particularly in our even distant future, having to upgrade major parts of their automation system to add different systems in, or different devices into it.

Matt: Does it integrate with a lot of brewery management software as well?

Warren: Well, that's where it's brilliant. That's where it really is brilliant. So there's an industry term that's thrown around now that's called Industry 4.0. I'm not sure if you've heard that. I was lucky enough to be in Germany when they released that, and said, "This is what we're going to call it." And I think it's probably been a bit stolen by the people like the World Economic Forum, and the WHO lately talking about Industry 4. But really, Industry 4 means the Fourth Industrial Revolution. And it is, rather than an automated factory, the connection of multiple automated factories, in order to make them run more efficiently.

And as part of that, Fermecraft is a true Industry 4, or a Fourth Industrial Revolution solution. Because we have, as we speak, there'll be breweries, multiple breweries around Australia, and even some throughout the world that are talking to third party software systems, and transferring data that up until a few years ago, had to be transferred manually. And what we found is that Fermecraft, or a brewery automation system, if we keep it that generic, really has a lot of the data that a lot of these software systems want to have. And the software system is sophisticated. So is the automation, but you've got this human bridge in the middle, Matt, that basically means data can be corrupted. If you talk to a software person, and you talk about human entered data, it's a big problem.

So Fermecraft and modern automation packages are able to share data to third party software vendors, so that the brewer doesn't have to do it, but also the data is accurate.

Neal: Beer 30 comes to mind straight away. I know, Warren, that

integrates so you can download data straight from Fermecraft into Beer 30. I know it links to kind of CODI canning lines. As long as the company is pretty willing to share their API, which has not always been the case, it can all slot in quite happily. For sure.

Matt: Great. Before we end, there's just something else I want to ask you about Neal. But before we move on from automation, is there anything else that anyone wants to cover off about the must knows about brewery automation?

Neal: Yeah, just one thing I wanted – because it's all very well talking about the philosophy and the interesting side of it. But I think the one thing I'd like to do is just paint a little picture of what Fermecraft automation does for a brewer working on one of our systems.

So the picture of really how a brewer would use it, you can, if you've got a bulk malt system, you can put a certain number of kilos of malt, which you will then automatically mill to that required quantity. Every beer that you make has its own recipe. You build a recipe with times, temperatures, amount of water, and all that stuff. So you literally go into your brewhouse, you press 'mash in,' it will open your grist case slide gate, it will get water at a certain temperature and a certain amount, it will mash in for you. And it will then check that your temperatures are correct, and it will adjust the temperature either up or down using cold liquor or heat.

It'll then mash for the right time, it'll do a step mash, it'll then alert you when that process is finished. You would normally then do a manual transfer into your lauter. But it will already have preheated your lauter and put a certain amount of foundation water in the bottom, so you're straight in. It will then do a recirc for a certain amount of time, it's got pressure transducers above and below the beds, so it will check if you're getting stuck mash. It'll run a certain amount of wort off, it'll lauter a certain amount of water at a certain temperature on top. So basically, once you start the run off, you can walk away for an hour and a half, and you get back and you've got 1,000 or 2,000 litres of wort in your kettle, which is already being heated.

And then it'll heat it for a certain amount of time on the boil. And then when you press your next button, it will then start the run off, and it will control temperature, it will control flow rate, you can have it opening your oxygen if you wish. And then when it's in the fermenter, you can then do up to 15 different steps. So you can have 20 degrees for 24 hours, 18 degrees for a period of time. And then you can just do any number of temperature changes.

And even if you want to do slow cooling, you can get it to cool at the end of your ferment by one degree per day, if you wanted, or one degree per six hours, whatever. And it will do all of that for you. And it will keep all the data for you as well. So all of those processes are

kind of one button, and then you walk away, which is pretty, pretty cool.

Matt: Well, look, it certainly sounds like, again, we've come ahead in leaps and bounds in terms of servicing the brewer, which ultimately services the beer drinker, I'd imagine. Now, I'll be linking to an article that provides a little bit more information. But if anyone wants to pick up the phone and dig a little bit deeper into any of these topics that we've really only just skimmed the surface of, should they call you, Neal, or should they call Warren?

Neal: Yeah, no, primarily myself. If it's brewing, definitely me. If it's something allied to that, then it would probably, it would be Warren. We just do the brewing side of it.

Matt: Great. Well, we'll put a link through to the Fermecraft site anyway. But Neal, while I do have you, there is something else that I wanted to just ask you about, going from automation to the circular economy. Do you want to just give us a quick overview; the new bulk handling of grain system that Brewcraft has also recently pioneered with Bintani, is that the right way to put it?

Neal: Yeah, well, we've been looking for ways to innovate really, and I don't know about most brewers, but having made millions of litres of beer myself, I've also chucked away thousands of 25 kilo plastic bags, which I've always found pretty disturbing. So we put all of our engineering and manufacturing smarts to that. And also, we chatted to Bintani and Voyager particularly about whether they'd want to get involved, and they both went "Look, absolutely."

So we've designed a really cost effective bulk grain handling system. And these are reusable, one ton bulker bags that you can get delivered, hook up to a frame. And then you've got a little control system where you can just put a certain amount of grain, and it will automatically dispense that amount of grain into your mill system. And you just keep those bags until you've got a few, and then you send them back to Bintani or Voyager, and then they clean them, and then they reuse them. And our objective is to take over quarter of a million bags over the next five years out of landfill.

The guys at Bintani did a calculation; probably up to a million grain bags a year is going into landfill from Australian craft breweries, which is, that is literally rubbish. So we'll be launching this whole process probably in the next few weeks, so people will start to see it through you guys. We've done some videos, we've done a lot of promo stuff. And I just urge everybody to really look at those systems, because it's a great solution to, I think, a really significant problem. We've been looking for solutions for some time.

Matt: Well, look, I'm looking forward to being able to release that news, because it is very exciting. Again, another one of the deserved

buzzwords in industry is sustainability and circular economy. So looking forward to being able to report a little bit more on that, and thank you for teasing it for us.

Neal: Yeah, easy.

Matt: But Warren and Neal, thank you very much for talking about automation this afternoon. There will be a link in the show notes for anyone who wants to find out more. But it's certainly something that I think anyone that has a brewery and is looking at installing, or is looking at opening their first brewery, really probably needs to get in touch to even ask some of the basic questions about what they should be looking at for their own brewery.

Neal: Yep, and thanks for the opportunity to talk about, it's been great.

Warren: Thanks Matt.

Matt: And that was Neal Cameron from Brewtique, and Warren Bradford from Fermecraft. You can find their contacts in the show notes. Otherwise, you can reach out to Neal who is the technical director of Brewtique, on 0407 884 019, or reach him at neal.cameron@brewtique.com.au. And again, you'll find those links in the show notes.

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